


Leveraging Peer Teaching for Global Health Elective Preparation: Implementation of a Resident-Led Global Health Simulation Curriculum

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Abstract

Introduction. As more trainees engage in global health electives, the call for best practices in predeparture preparation grows. However, many residency programs may not have the infrastructure or staffing in place to consistently meet these expectations. **Objective.** To assess the feasibility, benefits, and limitations of having residents trained to facilitate and implement a global health preparatory simulation curriculum. **Approach.** In 2016, we had 5 residents undergo online Simulation Use for Global Away Rotations (SUGAR) facilitator training. Since then, we have conducted 3 simulation sessions from 2016 to 2018. Feedback was obtained from 75% of our participants, which was found to be similar to feedback obtained from attending-led models. **Lessons Learned.** A resident-led global health preparatory curriculum provides a sustainable model for residency programs without placing additional burden on attending faculty.

Keywords

general pediatrics, medical education, global health, emergency medicine, simulation

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Introduction

Participation in global health electives by trainees continues to grow.^{1–5} Predeparture preparation for these experiences has been established as a best practice, yet is not uniformly provided.^{1,6} In addition to the need for practical preparation (eg, logistics, visa planning, health and safety abroad, etc) and reviewing relevant medical knowledge for work in a resource-limited setting (eg, management of malaria, malnutrition, etc) trainees should be prepared for the cultural and emotional challenges, which predictably occur in these settings. In 2014, a group of educators published an open-access curriculum called Simulation Use for Global Away Rotations (SUGAR), which uses simulated cases mirroring those encountered in resource-limited settings to provide learners with deliberate practice in global health medical knowledge with a special focus on the emotional difficulties residents face while abroad.⁷ These authors have demonstrated in multi-institutional studies that both residents traveling abroad and those staying within their institution find the curriculum useful for how to problem solve and reconcile the emotional challenges of working with limited-resources.^{8,9} Since its

introduction, the SUGAR curriculum has expanded to include SUGAR PEARLS (Procedural Education for Adaptation to Resource-Limited Settings)—a video training series on procedural adaptations—and has been implemented at over one hundred institutions across the world.¹⁰ The SUGAR facilitator training is open-source and available online at sugarprep.org; however, its primary focus has been to train global health faculty on how to administer the curriculum. Many institutions, however, lack the infrastructure and staffing to support global health preparation for residents.¹¹ A lack of experienced global health faculty, institutional support, or dedication to predeparture

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training may all be limitations to programs, and these challenges may be magnified at smaller institutions.

The traditional faculty-led SUGAR curriculum requires that a facilitator (a trained global health faculty member) introduce a clinical simulation scenario to participants followed by a debriefing session. The curriculum provides set variables that the participants must work through to reach a particular desired outcome, with predictable obstacles implemented to mirror the challenges of working in a resource-limited setting. These outcomes have included themes such as frustration, floundering, futility, and failure. For example, trainees might correctly identify that a patient has diabetic ketoacidosis in one case and readily know how to manage this at their home institution. In the SUGAR simulation they would be faced with the challenges of not having access to a pump for an insulin drip, having to do the glucose check themselves (with the instruction manual in another language), and while only having 3 test strips for the whole hospital.¹² They must problem solve how to manage this case without the resources they are used to. The role of the facilitator and the debriefing process is crucial to the success of the curriculum. One of the primary goals of the SUGAR curriculum is to elicit complex emotions that providers may encounter while working in resource-limited settings. The simulations allow participants to experience and process these emotions in a safe and supported environment, rather than experiencing them for the first time thousands of miles away.

At the University of Massachusetts Medical School–Baystate Medical Center, we are the first, to our knowledge, to develop an entirely resident-led version of the SUGAR curriculum. Our global health preparation model is unique in that it is self-sustaining and allows for minimal faculty involvement. This is important as faculty member time constraints, often without additional compensation, have been shown to limit the expansion of simulation programs.¹³ Studies have also shown that using learners to help with increasing teaching demands can be beneficial without compromising educational benefits.¹⁴ It is well known that peer and near-peer teaching offers benefits to both learners and the organization as a whole.¹⁵ The use of resident facilitators, as demonstrated in our model, may allow for the expansion of global health simulation curriculums in residency programs without placing additional burdens on faculty members.

Approach

We offered resident-led simulations using the SUGAR curriculum to pediatric and medicine-pediatric residents

of all class years on a voluntary basis. One global health faculty member provided in-person supervision of the simulations but was otherwise not responsible for the simulation content or debriefing. The estimated time commitment by the faculty member was 60 minutes per case, which included direct supervision of the simulation and debriefing portions of the curriculum. Each simulation case was chosen, reviewed, modified, and taught by resident facilitators. There were 1 to 2 resident facilitators per session. The facilitators were all resident volunteers with an interest in global health. Global health experience ranged from 1 to 2 prior rotations abroad to prior volunteer work with the Peace Corps. The first resident to become a facilitator was given access to the SUGAR facilitator training online prior to the first simulation session. Subsequently, the only requirement to becoming a facilitator was participation in a SUGAR simulation session followed by online SUGAR facilitator training.

The characteristics of each simulation session are described in Table 1. Facilitators are described by their postgraduate year at the time of the simulation. After each session, 30 minutes were reserved for in-person feedback and debriefing. The debriefing session was led by a resident facilitator using the SUGAR facilitator online tools, which included a debriefing script. The role of faculty was to supervise and record participant responses. A follow-up email was sent to each participant for additional feedback immediately following each simulation. All feedback was sent directly to the resident facilitators for that session. The feedback from each session was then used to modify subsequent simulation sessions. After participation in a simulation, each resident participant was also given the opportunity to become a facilitator and fully lead a session themselves. Of the 16 total participants over 3 years, 4 residents expressed interest in leading future sessions. Three residents became facilitators.

Outcomes

Seventy-five percent of participants provided written feedback. The postsimulation survey specifically asked participants in an open-ended format what, if anything, they gained from the session and what could be done to improve the curriculum. Written feedback is summarized in Table 2. The responses have been coded into themes with representative quotes. In order to compare our feedback with previous studies of feedback on the SUGAR curriculum, we identified 5 common themes. We also identified a sixth theme, in which 42% of residents felt that the SUGAR curriculum provided them

Table 1. Characteristics of SUGAR Simulation Sessions.

Simulation	Participants PGY, (n)	Cases	Time and Location	Facilitator PGY, (n)
Session 1 (pilot)	PGY-3: (2) PGY-2: (1) PGY-1: (1)	Frustration: DKA Floundering: rheumatic fever Futility: neonatal resuscitation Failure: shock and malnutrition	Participants cleared from clinical duties to attend during daytime. Conducted in the simulation laboratory	PGY-2: (1)
Session 2	PGY-2: (4)	Futility: neonatal resuscitation Failure: shock and malnutrition	Conducted in the evening after resident didactics in a conference room	PGY-2: (1) PGY-3: (1)
Session 3	PGY-2: (3)	Frustration: DKA	Conducted in the evening after resident didactics in the simulation laboratory	PGY-2: (1) PGY-3: (1)
Session 4	PGY-3: (1) PGY-2: (2) PGY-1: (1)	Futility: neonatal resuscitation Frustration: pneumonia SUGAR PEARLS: bubble CPAP	Participants cleared from clinical duties to attend during daytime. Conducted in a conference room	PGY-3: (1)

Abbreviations: SUGAR, Simulation Use for Global Away Rotations; PGY, postgraduate year; DKA, diabetic ketoacidosis; PEARLS, Procedural Education for Adaptation to Resource-Limited Settings; CPAP, continuous positive airway pressure.

Table 2. Summary of Written Resident Feedback of Resident-Led SUGAR Simulations.

Theme	Comments With Theme n (%)	Representative Quote
Emotional response of residents	3 (25)	"I love how the cases made you run through your own emotions and question the knowledge you knew cold."
Awareness of lack of medical knowledge	5 (42)	"It would be nice to have a review of the medical content at the end rather than spending so much time on debriefing."
Need for innovation and adaptive problem solving	2 (16)	"It was helpful to go through scenarios that we might encounter while abroad, and to be able to think together with a group about how to overcome or face obstacles that might arise."
Recognition of cultural differences	1 (8)	"Completing the SUGAR curriculum in anticipation of starting a global health elective was a helpful exercise. It stimulated a case in a resource poor setting in a culture I was unfamiliar with. It helped transition my thinking to be mindful of the culture I was going to enter and also consider how I would need to change my approach to medical care during my time away."
Use of available resources/ references	3 (25)	"It helped me build confidence and practice improvising skills to help deliver quality patient care where there may be less resources than I am used to."
Ability to practice novel skills	5 (42)	"I loved being able to participate in something so different from what I am used to learning day-to-day."

with a unique opportunity to practice skills not otherwise obtained in residency.

Ethics Approval and Informed Consent

Our study did not meet the federal definition of human subjects research and was thus deemed exempt from institutional review board approval.

Lessons Learned

Thus far, our curriculum has provided critical predeparture training to 16 residents with very minimal faculty involvement. As interested residents participate in the curriculum throughout each class year, we have had a consistent supply of trained resident facilitators. This has allowed us to continue our curriculum from year to year without involving any additional faculty to lead sessions. Feedback from our resident-led curriculum

was also found to be similar to feedback obtained by attending-led models.¹⁶ This supports prior research regarding the effectiveness of peer teaching.¹⁷⁻¹⁹

We also know that the process of peer teaching offers special advantages both to the teacher and learner. Several studies demonstrate that this model provides an opportunity for residents to develop teaching and feedback skills.²⁰ These skills have been emphasized as important by the Liaison Committee on Medical Education (LCME) and the Accreditation Council for Graduate Medical Education (ACGME).^{21,22} Feedback from our simulation discussed that participation as a resident facilitator allowed for the development of a greater depth of knowledge and practice in teaching. Not only are these skills thought to be important by the ACGME and LCME but are particularly useful in resource-limited settings. Many residents with an interest in global health will ultimately seek global health experiences during and after residency. In each case, residents may not have access to direct faculty involvement. The ability to develop self-directed learning and the ability to teach others are crucial not only in resource-limited settings but also in all medical settings.²³

After each session, we used feedback to modify and improve subsequent sessions. Interestingly, verbal feedback included comments that residents wanted to use their time to focus more on hands-on technical skills (such as creating a bubble CPAP [continuous positive airway pressure]) rather than emotional debriefing, which was the initial intent of the SUGAR curriculum. Most recent sessions at our program have evolved to incorporate SUGAR PEARLS into cases to help residents with the technical skills with which they expressed interest in learning. Sessions have been implemented during daytime hours and residents on outpatient rotations are cleared from clinical duties to attend. Additionally, we have added an end-of-session summary sheet highlighting the important learning points from each simulation. Future directions for our curriculum will also include the addition of a second opportunity for residents to perform the simulation after the debriefing session.

Conclusions/Next Steps

Our resident-led model provides a sustainable global health preparation curriculum for residency programs, which requires minimal faculty involvement. We have also found that feedback from our curriculum was similar to that of attending-led models. We believe that our resident-led model can be used by other programs to develop and expand global health preparation offerings to residents. Several limitations were identified in our study, including our small sample size. While we did find similar themes in feedback when compared with

attending-led models, our curriculum included a much smaller number of resident participants. Further study over time will be needed to provide robust evidence for effective resident-led SUGAR curricula, and to determine the impact of our curriculum on participants following global away rotations.

Author Contributions

Fiona Pirrocco, DO: Contributed to curriculum implementation, data analysis, and drafted manuscript

Ian Goodman, MD: Contributed to curriculum design, implementation, supervision and final approval

Michael Pitt, MD: Provided consultation regarding curriculum design and drafting of the manuscript

Declaration of Conflicting Interests

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