

Using Simulation for Global Health Preparation

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Participation in global health electives (GHE) by pediatric residents continues to grow. In 2013, more than half of residency programs in the United States offered international electives, and 1 in 15 residents participated in such an experience during that year.¹ Pretravel preparation for these experiences has been established as a best practice and should include learning about diseases likely to be encountered, health and safety abroad, site-specific information, and strategies to address cultural differences.² Unfortunately, of the 127 programs offering GHE in 2013, only two-thirds (66.1%) provided pretravel preparation.¹

Increasingly, preparatory curricula are available ranging from online self-directed modules to standardized lectures with facilitator guides for faculty.³ Much of the focus is on medical knowledge including topics such as the management of tropical diseases. Although this knowledge is an integral part of pretravel preparation, in our experience, trainees note that the more common challenges they experience working in resource-limited settings involve emotional and ethical issues that emerge while abroad. As such, preparation that focuses solely on the acquisition of knowledge, but ignores the skills and attitudes needed to practice global child health, may be short-sighted.⁴

We wish to highlight the need for comprehensive preparation for GHE that goes beyond merely transfer of medical knowledge and includes objectives aimed at attitudes and skills, areas which often present significant challenges for learners working in resource-limited settings. By sharing a collaboratively designed curriculum that fills many of these gaps, we provide educators with a tool that has been used successfully and can be implemented in their programs with minimal training. Finally, we describe a model of dissemination that highlights the potential benefits of making a curriculum open-source including rapid expansion, new opportunities for research, and innovation.

SIMULATION FOR GLOBAL HEALTH PRETRAVEL PREPARATION

Along with the increasing participation in GHE, the use of simulation in medical education has grown rapidly.⁵ Simulation has evolved from an initial focus on technical and procedural skills (eg, cardiorespiratory resuscitation) to include acquisition of knowledge (eg, medications to administer in a code or where to find this information quickly) and

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Dr Pitt conceptualized and designed the Simulation Use for Global Away Rotations (SUGAR) curriculum (with Dr Butteris), oversaw the data collection and analysis in the initial multiinstitutional studies referenced, and drafted the initial manuscript; Dr Butteris conceptualized and designed the SUGAR curriculum (with Dr Pitt), oversaw the data collection and analysis in the initial multiinstitutional studies referenced, and reviewed and revised this manuscript; Dr Gladding was involved in the qualitative analysis of the initial SUGAR studies and reviewed and revised this manuscript; and all authors approved the final manuscript as submitted.

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more recently communication skills and attitudes about health care (eg, importance of teamwork, value of empathy). As well-designed simulations can bring participants to the intersection of the knowledge, attitudes, and skill domains of learning, it may be an ideal strategy to deliver pretravel preparation for GHE.

In 2012, members of the Midwest Consortium of Global Child Health Educators, a 7-institution consortium of pediatric GH educators, developed a standardized simulation curriculum for use in preparing residents for the emotional challenges they are likely to encounter when working in resource-limited settings. We designed cases to expose residents to clinical scenarios encountered in these settings, such as not having access to the diagnostic or therapeutic tools they are accustomed to using for a given situation. For example, in 1 case the patient presents with classic signs of diabetic ketoacidosis. In the simulated scenario, they are faced with obstacles that may mimic those they would encounter on their GHE such as not having access to an insulin pump or being handed a glucometer with 3 remaining test strips and instructions in Arabic. Each case is paired with a standardized debriefing script for the facilitator to use to encourage meaningful discussion after residents participate in the simulated case. See Fig 1 for a breakdown of the initial pilot cases and themes for this curriculum, which we called Simulation Use for Global Away Rotations (SUGAR).⁶

During the pilot year (2013), 51 residents at the 7 institutions participated in 1 or more cases and completed an evaluation after each case (160 evaluations completed). Immediately after completing the cases, nearly all (98% of evaluations) indicated that the simulation elicited strong emotions that mimicked those

historically reported by residents on return from GHE. Before travel, residents reported feeling that the experience was useful in preparing them for their electives (4.49 on a 5-point scale; 1 = completely useless, 5 = very useful) and 96% of the comments indicated that they planned to make changes to their pretrip preparation as the result of participating in the simulation.⁶

The most helpful aspects of participating in the SUGAR curriculum described by residents upon completion of their GHE suggest that this form of pretrip preparation goes beyond the transfer of medical knowledge and begins to address the acquisition of new attitudes and skills. In a follow-up survey of the residents who participated in the SUGAR curriculum and completed their GHE in 2014, the most frequent themes for the helpful aspects of SUGAR described by residents ($n = 34$) were as follows: practicing with limited resources (36% of comments), learning to problem-solve (29%), expanding medical knowledge (26%), and cultural preparation (26%). The first 3 themes occurred in similar frequencies as the most common themes identified in comments from residents immediately after completing the simulation (before travel). There was, however, a 13-fold increase in the percentage of comments citing the benefits of cultural preparation gained through participation in SUGAR on return from their GHE (26% of comments) as compared with immediately after the simulation (2%).⁷ Participating in SUGAR cases can provide opportunities for residents to encounter cultural differences at the patient and system levels, and this appears to be an important benefit of the curriculum not as fully realized until the residents' actually experience cultural differences abroad.

OPEN-SOURCE CURRICULUM

Based on the successful pilot of this curriculum, we wished to make it accessible for other institutions. After leading several workshops at national meetings, we developed an open-source training Web site in 2015, sugarprep.org, which provides free access to training videos, cases that can be downloaded, and the ability to participate in the design of new cases or the creation and leadership of spin-off projects. In the 2 years since the pilot, 140 facilitators from 85 institutions in 6 countries have been trained to facilitate and debrief SUGAR sessions.

There are several collaborative SUGAR projects being led by over 1 dozen people trained in the curriculum. These spin-offs include the following: SUGAR Procedural Education for Adaption to Resource Limited Settings (PEARLS), which will provide video instruction for performing common medical procedures with limited resources; SUGAR Cases About Nonmedical Events (CANE), which focuses on challenges encountered in travel in low and middle income countries (eg, lost passport); SUGAR: Practical Information from Core Educators (SPICE), which is gathering teaching insights for facilitators to improve the learners' experiences; and SUGAR-4-All, which is studying the impact of participation in the SUGAR curriculum on cultural humility for residents not previously interested in GH. In addition, individuals are expanding the curriculum with cases from surgery, emergency medicine, obstetrics and gynecology, clinic environments, immigrant health, and cases for medical students.

CONCLUSIONS

As resident interest and participation in GHE grow, residency programs have an obligation to adequately prepare residents for the challenges

Target Emotion to be Elicited During Simulation	Ideal Adaptive Characteristic to Arrive at Post-Debriefing	Case Example
<p>Frustration</p> <p>"I know what I would do at home but I can't do it here."</p>	<p>Adaptability</p> <p>"I was able to overcome obstacles encountered in a resource-limited environment and ultimately helped this patient."</p>	<p>Diabetic Ketoacidosis</p> <p>Resident knows how to treat the patient effectively in the US but encounters obstacles (no insulin drip, no urine dipsticks) that require dynamic problem solving</p>
<p>Floundering</p> <p>"I don't know what to do with this disease or where to find information that could help me."</p>	<p>Awareness of Resources</p> <p>"I was able to utilize available resources to learn how to manage a disease I had little experience with and ultimately helped this patient."</p>	<p>Lymphocytic Interstitial Pneumonitis</p> <p>Resident is unfamiliar with the disease but able to utilize local guidelines or other resources (i.e. WHO textbooks) to assist them in managing the case</p>
<p>Failure</p> <p>"I thought I knew how to make this patient better, but I am making them worse. What is different about this patient in this environment?"</p>	<p>Adjustment/ Humility</p> <p>"I learned that having false assumptions that patients will always be physiologically the same as those I am used to, can at times be harmful."</p>	<p>Shock in Patient with Severe Malnutrition</p> <p>Resident begins management of a patient in shock, but as patients with SAM may require different fluid management, this patient deteriorates if aggressive rehydration is begun</p>
<p>Futility</p> <p>"Why does everyone seem so complacent with death here? Am I the only one who cares? What will happen to this patient if we 'save' her?"</p>	<p>Acknowledgement</p> <p>"Sometimes death is unavoidable. A patient dying is difficult for everyone; how this is expressed may be different than what I am used to but this doesn't mean my hosts are not affected by it."</p>	<p>Neonatal Death</p> <p>Resident must ultimately stop resuscitation of a neonate as no ventilator is available, resulting in the neonate's demise and the need to deal with complexities of culture and death</p>

FIGURE 1

Adapted with permission from Butteris SM, Gladding SP, Eppich W, Hagen S, Pitt MB. Simulation Use for Global Away Rotations (SUGAR): preparing residents for emotional challenges abroad (a multicenter study). *Acad Pediatr*. 2014;14(5):533–541.

encountered when working in resource-limited settings. Although providing the medical knowledge needed for these experiences is an important start, curricula that focus on the attitudes and skills necessary to thrive while abroad are needed. The use of simulation in pretravel preparation may provide an ideal approach to address these domains of learning. The widespread use and rapid expansion of the SUGAR curriculum

reflects the need and desire for residency programs to have access to open-source GH preparatory resources.

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ABBREVIATIONS

GH: global health
GHE: global health education
SUGAR: Simulation Use for Global Away Rotations

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