Perspective Piece

The Minnesota Model: A Residency Global Health Track Framework

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Abstract. Residency programs are increasingly responding to the growing demand for global health (GH) education by forming dedicated GH tracks. These tracks incorporate a targeted curriculum, support best practices surrounding GH electives such as predeparture preparation and post-return debriefing, and encourage meaningful engagement with international and domestic partners. The University of Minnesota's pediatric residency has had a formal GH track since 2005, and although they have shared several curricular components in the literature, they have yet to provide a comprehensive summary of their GH track. In this article, the authors provide a thorough description of their evolving GH track model, highlighting outcomes and sharing free resources, with the goal of providing a concise, replicable GH track framework for educators seeking to provide more formal GH education within residency programs.

INTRODUCTION

Over the last two decades, residency programs have responded to the growing call for formalized global health (GH) education by incorporating targeted curricula and forming dedicated GH tracks.^{1–5} Although there is a growing body of literature proposing curricular content^{1,6–9} and the number of self-defined GH tracks has doubled in pediatrics in the last decade,^{4,10} detailed descriptions of GH track content and outcomes are rare.

Recently, a consensus definition was published, defining a pediatric GH track as “a longitudinal area of concentration dedicated to global child health, offered within a residency program, which includes a formal curriculum and mentorship with required scholarly output for a defined cohort of pediatric residents.”¹¹ The University of Minnesota pediatrics residency has had a GH track that meets this definition, since 2005. Our track is opt-in and open to all interested residents, with the goal of equipping residents with skills necessary to care for children from all over the world, including preparing for meaningful engagement in GH in resource-limited settings. Over the course of administering our track, we have published several curricular components, which we developed with international and stateside partners, to aid educators looking to implement GH tracks at their institutions.^{7–9,12–17} These articles have described specific components of the track but do not take into account the evolving nature of our track and lessons learned along the way. In this article, we will comprehensively describe our GH track model, together with outcomes and resources, and provide a concise, replicable GH track framework for educators seeking to create more formal GH education within residency programs.^{1,2,18,19}

GLOBAL HEALTH TRACK COMPONENTS

Over the last 14 years, 138 residents have completed all requirements to graduate with a track certificate, which includes 1) participation in the curriculum described in the following text, 2) pretravel preparation, 3) successful completion

of a GH elective and associated assignments (i.e., writing activities, academic project, and evaluation), and 4) engagement in post-elective debriefing. We provide a description of each of these components, with a summary linked to resources and outcomes provided in Table 1.

Curriculum. We believe that an understanding of core GH concepts is essential for all pediatricians, not just those with expressed interest.^{3,18,19} Accordingly, we developed a competency-based curriculum that serves as the foundation of our track and defines a core curriculum for all residents and a more in-depth curriculum for track residents.⁷

Presently, we provide half of the curriculum (18 hours) as core content to all residents over 3 years as part of the residency program's biweekly half-day academic curriculum. We aim for these sessions to be broadly applicable to all pediatricians and include topics such as travel medicine, caring for immigrants and refugees, addressing malnutrition at home and abroad, identifying vaccine-preventable diseases, and working with interpreters. Track residents receive additional content through monthly track dinners, lectures, and supplemental learning materials such as suggested readings and online modules. We recently began piloting the GH Track Passport,²⁰ a novel approach for individualizing the competency-based curriculum within a busy residency program by giving track participants the opportunity to complete specific learning objectives through one of several offerings (e.g., online module, in-person discussion, and reflective writing) and logging their completion in real time. For many topics, we have created online lectures with self-study questions, packaging them together as the Global Pediatric Education Series.²¹ Our residents receive free access to the series, and we provide it externally for a nominal fee, using the funds generated to support hosting international residents as part of our bidirectional exchanges.^{22,23}

Global health elective. All track residents are required to participate in at least one GH elective lasting ≥ 4 weeks, during the second half of their second year or later.²⁴ This elective may be local (e.g., international adoption clinic), in the United States (e.g., Indian Health Service), or international with one of our seven partners. Residents must go to one of our partner sites unless they are going to their birth country, considering a job in a non-partner country, or the resident's objectives cannot be met at our partner sites. At all sites, our partners

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TABLE 1
University of Minnesota's pediatric global health track certificate requirements

Track component (what)	Purpose (why)	Description (how)	Published outcomes/examples (where to learn more)
Core content GH curriculum for all pediatric residents	Provide basic overview of essential topics in global child health with which all practicing pediatricians should be comfortable. Much of this core curriculum is targeting the fact that Minnesota is a refugee resettlement state, and nearly 80% of practicing pediatricians in the state train at our institution.	Six sessions delivered over the course of residency during academic half day (3-hour workshops) covering the following: - Global burden of disease and approach to key causes of childhood mortality - Immigrant/refugee health - Undernutrition and food insecurity - Travel medicine - Maternal and newborn health worldwide - Cultural humility and working effectively across cultures The track-specific content is offered via multiple forums from which learners can choose based on availability and interest. These include the following: - Attending monthly evening dinner discussions with pediatric GH faculty - Joining university-wide multidisciplinary monthly conferences - Several self-directed learning options, which include viewing online video lectures, selected readings, or writing activities	Competency-based Curriculum Full description of our competency-based curriculum available in Reference 7 Academic half-day core topics for all residents Example: merging local (food insecurity) with global (malnutrition) using team-based learning available at tinyurl.com/ghlumn and described in Reference 31 GH Track Passport Track residents can view an offering of multiple options to choose from to complete their objectives and log their progress via our GH Track Passport (tinyurl.com/GHPassport) which we began piloting in 2017. Global Pediatric Education Series (G-PEDS) Video series on core GH topics which we make available to our track residents for free and provide for CME credit for a nominal fee externally, using funds raised to support hosting international trainees from our partner institutions. Available at tinyurl.com/UMNG-PEDS. GH-specific simulation and procedural training We have been involved in the multi-institutional creation, evaluation, and dissemination of an open-access GH-specific simulation curriculum and video demonstration of procedural modifications for use in resource-limited settings. Both curricula available at sugarprep.org and described in Reference 8,9
Track-specific curricular content Dedicated content for residents with career interest in GH			

(continued)

TABLE 1
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Track component (what)	Purpose (why)	Description (how)	Published outcomes/examples (where to learn more)
Mentoring/debriefing 	Support track residents while they navigate the GH track, choose and prepare for their GH elective, and debrief upon return.	We offer a pairing of each track participant with a faculty member with knowledge of the GH track. Each resident must meet with a GH faculty before engaging in a GH elective to discuss goals and objectives, and must meet on return to review their elective projects and formally debrief the experience.	Role for GH faculty We identified the presence of dedicated faculty in GH as a core requirement of having a successful GH track. We describe this and other essential factors in Reference 5
Faculty guidance Predeparture training 	Provide comprehensive preparation for the logistics and challenges of working in resource-limited settings.	To determine readiness for participation in a GH elective regarding medical knowledge, we created a peer-reviewed 60 question self-assessment test, which we call the Medical Knowledge for Service Abroad test. Residents must obtain 80% or greater to be able to travel, and may take the test more than once. To address the nonmedical knowledge domains, we hold an annual required full-day predeparture boot camp for all traveling residents, which includes sessions on health and safety abroad, cultural humility and culture shock, ethics cases, simulation, and strategies for maintaining wellness while abroad.	Medical Knowledge for Service Abroad test Interested faculty can email the corresponding author to receive access to the most current version of the test and detailed answer key. We published on the impact of medical gained on GH elective in Reference 32 SUGAR's Pre-Departure Activities Curricular Kit (S-PACK) We recently partnered with the Midwest Consortium of Global Child Health Educators to develop and pilot a comprehensive predeparture curriculum and have compiled free facilitator training materials at sugarprep.org/s-pack . We describe this curriculum development in Reference 14
Comprehensive preparation for GH elective GH elective 	Provide an opportunity for residents to gain hands-on experience in GH by working with one of our several institutional partners. Because of the amount of preparation needed for an effective GH experience, only track residents are able to participate in a nonlocal GH elective. Encourage reflection and engagement during the GH elective.	Each track resident must complete a minimum of 4 weeks on a GH elective with options including the following: Local (e.g., International Adoption Clinic) Stateside (e.g., Indian Health Service) International (with one of seven institutional partners, tailored to resident's goals and objectives) As part of the GH elective, each resident must complete the following: Patient log describing ten impactful clinical scenarios and why	Model of Collaborative Institutional Partnership We are members of the St. Damien's Collaborative, a replicable model for multiple stateside institutions to partner with one international institution to collaboratively address that institution's stated needs in Reference 23 Patient logs Qualitative analysis of themes from patient logs revealed several reasons most residents found these clinical experiences impactful, including dealing with diagnostic ambiguity and needing to overcome challenges of working with limited resources. Residents also indicated that one-third of these experiences had not previously been encountered in their stateside training. We describe these findings in Reference 16
Hands-on GH experience Requirements while on GH elective			

(continued)

TABLE 1
Continued

Track component (what)	Purpose (why)	Description (how)	Published outcomes/examples (where to learn more)
 Strategies for meaningful engagement		Reflective essay on a topic of their choosing related to the elective Academic project, where resident brings a scholarly approach to a mutually agreed upon need of the hosting institution; faculty with experience in GH research and quality improvement provide mentorship for this component Written evaluation from the supervising provider must be obtained	Reflective Essay Thematic analysis of track residents' reflective essays revealed that GH electives provided an opportunity to achieve all of the ACGME competency domains. We describe this project in Reference 12
			Academic projects Analysis of the summaries of the first ten years' academic projects revealed that most fell into quality improvement, education, or clinical research domains, and followed best practice recommendations, i.e., mentorship, needs assessments, and plans for sustainability. We describe this in full in Reference 26

GH = global health.

provide on-site clinical and educational supervision by pediatric-trained physicians or nurses and a written evaluation of the resident's performance. International elective opportunities include university referral hospitals and clinics, village health programs, faith-based health care, and a freestanding children's hospital and training program. We have a University of Minnesota faculty leader for each partnership, who personally knows and regularly engages his or her international or Indian Health Service colleagues. Partnerships have evolved over the years based on institutional needs and occasionally because of safety concerns in the country.

Pretravel requirements. Predeparture training. All traveling residents participate in a full day predeparture orientation. This includes discussions of logistics such as insurance, licensing, health and safety abroad, ethics, culture shock, GH simulation,^{8,17} procedural modifications,²⁵ and academic project planning.²⁶ During debriefing sessions with faculty mentors, our residents have repeatedly expressed appreciation for pretravel orientation to their specific elective site with residents, who had previously worked there; simulation to address emotional response to child death due to limited resources; and preparation for culture shock, particularly in the initial encounter with a much different health care system from one's own. Learners found the simulation particularly helpful in preparing for some of the culture shock challenges encountered during their GH elective.¹⁷ Recently, we collaborated with the Midwest Consortium of Global Child Health Educators^{27,28} to develop an open-access facilitator training package, S-PACK, which incorporates much of this work.^{14,29}

Knowledge assessment. All residents must pass ($\geq 80\%$) an online Medical Knowledge for Service Abroad (MKSA) examination that we created and was peer-reviewed by GH educators at outside institutions and is updated regularly. We provide the MKSA examination via email to GH educators by request.

Elective requirements. Academic project. Consistent with the consensus definition of a pediatric GH track,¹¹ our track residents must engage in a scholarly project as part of their GH elective. In a previous review of the 67 projects completed during the first 10 years of the track, most (90%) were quality/process improvement, education, or clinical research projects, and the majority (71%) were developed in collaboration with the host after arrival.²⁶ Residents are required to present their scholarly work on their return at either an annual grand round or a dedicated poster session.

Patient log. To encourage case-based reflection, we require residents to log their clinical experiences while abroad. In the most recent iteration of this log, residents describe their 10 most impactful clinical experiences. Analysis of these logs revealed that nearly one-third of these experiences had not previously been encountered in the trainees' stateside training, highlighting the type of learning that can happen on international electives.¹⁶

Reflective essay. On return, residents must submit a short written reflection about their experience. In a previous qualitative analysis of these essays, we found residents' descriptions mapped to all Accreditation Council for Graduate Medical Education core competencies, supporting the importance of international electives as valuable educational experiences.¹²

Written evaluation. Each resident is required to obtain a formal written evaluation from their supervising physician during their GH electives. Although we have not formally studied these evaluations compared with their peers who are

not participating in GH electives, the feedback from our partners has been consistently positive.

Mentorship/debriefing. Track residents are paired with a GH faculty member who provides mentoring on elective selection, academic project development, and career planning. The GH faculty member maintains an “open-door” policy to meet with our residents at any time, or email or talk by telephone when at home or abroad. In addition, all residents must debrief with a GH faculty member on their return to discuss their suggestions for improving predeparture preparation; review their project, reflections, and their faculty evaluation; and help process any challenging experiences encountered while working in a resource-limited setting. Only after debriefing are residents eligible to receive their travel reimbursement, up to \$750.

LESSONS LEARNED

Figure 1 summarizes four factors we think have been critical to our success in sustaining a GH track with a high level of resident engagement: 1) departmental support (including funding for track dinners, resident travel, and annual travel for faculty to GH partnership sites), 2) dedicated GH faculty and staff (0.5 full time equivalent (FTE) shared across multiple clinical faculty, 0.5 FTE support for a GH program coordinator), 3) strong international partnerships, and 4) engagement with GH educators outside our institution. The first two factors mirror findings of a national survey of GH educators, which indicated strong departmental and residency program leadership support and dedicated faculty were essential factors for having a GH track.⁵ Faculty responsibilities include planning and implementing up-to-date, evidence-based GH curriculum, accommodating the needs of the residents and program; evaluating the track; maintaining and nurturing domestic and global partnerships; advising and mentoring residents and fellows across divisions in their GH academic pursuits; disseminating our scholarship through workshops, publications, and presentations; and modeling advocacy in GH. Our staff provide all the logistical support from planning meetings and updating memoranda of understanding with domestic and international

partners, to formatting GPEDS, updating the website, and planning for the arrival of international residents.

This support goes beyond financial backing to cover costs of both faculty time, the logistics of training (meals, supplies, etc.), and resident salaries while abroad; it includes the emotional buy-in and belief in the added value of the program. Our track began at the invitation of the departmental chair in 2005. Financial support from the chair’s office has been sustained and increased over the last 14 years. We have maintained this support by demonstrating the value of the GH track through rigorous evaluation and direct communication with our chair. We regularly share evaluation results, including resident outcomes and program impacts on areas such as resident and faculty recruitment, important to departmental and residency leadership.¹⁹

Although departmental financial support has been critical, we have also sought revenue-neutral ways to increase support, such as the creation of a GH chief resident position funded by providing a small number of hospitalist service weeks. The chief resident works closely with faculty to ensure implementation of the curriculum integrates seamlessly into the residency program, mentors first-year track residents, and teaches. The chief also has 6 months of protected time to pursue their GH interests at home or abroad.

The GH track would not be possible without strong partnerships.³⁰ Partners provide essential clinical and research experiences for our residents. In turn, we strive for meaningful reciprocity and mutual benefit through opportunities such as bidirectional exchanges for both trainees and faculty.

Finally, the development of our GH track has benefitted from engagement with GH colleagues outside our institution. These collaborations have fostered the sharing of ideas that have improved our GH track and led to innovations that would not have been possible to undertake as a single institution, such as the creation of the SUGARPREP predeparture curricula.^{8,9,14,15,28} We have also learned the importance of flexibility in finding creative ways to adapt our GH track as residency requirements, schedules, and the overall landscape of residency education have changed, most recently with the development of the GH Track Passport.

FIGURE 1. Essential factors for maintaining a successful global health track.

CONCLUSION

The evolving Minnesota Model for a pediatric GH track continues to provide valuable learning opportunities for our residents in a structured yet flexible program. Through evaluation and careful attention to the larger residency and GH environments, we have continuously revised our goals and methods for administering the track. By sharing our lessons learned and providing a framework and adaptable resources, we hope to support educators seeking to develop or strengthen their own GH programs.

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