Building a Global Surgery Initiative Through Evaluation, Collaboration, and Training: The Massachusetts General Hospital Experience

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OBJECTIVE: The Massachusetts General Hospital (MGH) Department of Surgery established the Global Surgery Initiative (GSI) in 2013 to transform volunteer and mission-based global surgery efforts into an educational experience in surgical systems strengthening. The objective of this newly conceived mission is not only to perform advanced surgery but also to train surgeons beyond MGH through international partnerships across disciplines. At its inception, a clear pathway to achieve this was not established, and we sought to identify steps that were critical to realizing our mission statement.

SETTING: Massachusetts General Hospital, Boston, MA, USA and Mbarara Regional Referral Hospital, Mbarara, Uganda

PARTICIPANTS: Members of the MGH and MRRH Departments of Surgery including faculty, fellows, and residents

RESULTS: The MGH GSI steering committee identified 4 steps for sustaining a robust global surgery program: (1) administer a survey to the MGH departmental faculty, fellows, and residents to gauge levels of experience and interest, (2) catalog all ongoing global surgical efforts and projects involving MGH surgical faculty, fellows, and residents to identify areas of overlap and opportunities for collaboration, (3) establish a longitudinal partnership with an academic surgical department in a limited-resource setting (Mbarara University of Science and Technology (MUST) at Mbarara Regional Referral Hospital (MRRH)), and (4) design a formal curriculum in global surgery to provide interested surgical residents with structured opportunities for research, education, and clinical work.

CONCLUSIONS: By organizing the collective experiences of colleagues, synchronizing efforts of new and former efforts, and leveraging the funding resources available at the local institution, the MGH GSI hopes to provide academic benefit to our foreign partners as well as our trainees through longitudinal collaboration. Providing additional financial and organizational support might encourage more surgeons to become involved in global surgery efforts. Creating a partnership with a hospital in a limited-resource setting and establishing a formal global surgery curriculum for our residents allows for education and longitudinal collaboration. We believe this is a replicable model for building other academic global surgery endeavors that aim to strengthen health and surgical systems beyond their own institutions. (J Surg 72:e21-e28. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: global surgery, academic global surgery, surgical education, mapping, cross-country collaboration, LMIC partnership

COMPETENCIES: Patient Care, Medical Knowledge, Professionalism, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

Academic surgery is experiencing a new focus in the global health arena.[1,2] In view of the high burden of surgical disease and the demonstrated cost-effectiveness of surgical procedures,[3,4] there is growing momentum for the inclusion of surgical care in primary health and other global health movements, such as the United Nations' Sustainable Development Goals.[5,6] Concurrently, increasing numbers

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of surgical trainees are demonstrating interest in an international surgery rotation as an accredited operative experience in postgraduate surgical training.[7-12] In response, many surgeons have highlighted the role that academic support could play in transforming the field of global surgery from short-term, independent mission trips to long-term, capacity-building partnerships.[13-18] These partnerships would subsequently strengthen surgical systems, reinforce evidence-based care, and provide research opportunities in both settings.[12,14,19] Sustainable collaborations with recurring, bidirectional partnering of clinical, research, and educational initiatives have been described as a means of providing human and physical resources and clinical and academic capacities.[12,14,19-25] Both the Residency Review Committee for Surgery and the American Board of Surgery have affirmed these objectives by establishing accreditation venues for such long-term international collaborations.[26]

Building on work in humanitarian disaster relief initiatives and volunteer surgical missions since 1811, the Massachusetts General Hospital (MGH) Department of Surgery established the Global Surgery Initiative (GSI) in 2013 to redefine its mission in low- and middle-income countries not only to perform advanced surgery but also to train surgeons beyond MGH through international partnerships across disciplines. The objective of this newly conceived mission is to enhance surgical expertise and contribute to the number and quality of competent surgeons around the world. From its founding, the GSI has strived to create training opportunities that serve the partner institutions and the MGH participants in equal measure.

At its inception, the GSI was charged with the development of a plan to advance global surgery training in the MGH Department of Surgery. A steering committee comprising faculty and residents actively engaged in global surgery projects was brought together to formulate a strategy for creating training opportunities that would serve the needs of both partners in resource-limited settings and also our MGH faculty and fellows. To accomplish these objectives, the steering committee identified 4 steps for sustaining a robust global surgery program: (1) administer a survey to the departmental faculty, fellows, and residents to gauge levels of experience and interest, (2) catalog all ongoing global surgical efforts and projects involving MGH surgical faculty, fellows, and residents to identify areas of overlap and opportunities for collaboration, (3) establish a longitudinal partnership with an academic surgical department in a limited-resource setting, and (4) design a formal curriculum in global surgery to provide interested surgical residents with structured opportunities for research, education, and clinical work. These 4 steps are discussed in further detail in the following sections.

Taking Stock: A Departmental Survey

The MGH Department of Surgery has a long history of international work and global perspective among its members.[27-33] However, much of this work was conducted independently and is not well documented, leaving the larger surgical community unaware of prior work, fundraising efforts, and actual effect. To develop a cohesive and effective academic GSI, the first step was to inventory the collective experiences and gauge the interest level of the department's faculty, fellows, and residents.

In 2013, 33% of departmental members responded to an online survey regarding global surgery interest and experience (Fig. 1). Of the total number of respondents, 53% of attending physicians and 46% of residents reported recent global health work in a total of 34 different countries. Additionally, 86% of attending physicians and 81% of residents reported an interest in participating in global health programs (Table 1). Notably, 18% of attending physicians and 22% of residents stated that global surgery would be the focus of their career (Fig. 2). Our survey results regarding global health activity are consistent with an unpublished national survey of Fellows of the American College of Surgeons that found 53% of respondents had previous international volunteer experience.[27] However, faculty interest in global surgery is 2-fold higher than that previously reported in the literature, confirming the growing interest in global surgery at the faculty level.[10] The MGH resident level of interest is similar to that seen in other published surveys,[10,11,34,35] representing a steady interest in such opportunities among surgical trainees. For the purposes of our survey, we assume that nonrespondents were not engaged in global surgery activities. However, these results are a conservative assessment of actual global surgery activities and interest level at MGH as we are aware of other global surgery projects that were not captured in the survey.

The MGH global surgery survey indicates that the primary barrier to engaging in global surgery efforts is financing, with 89% of respondents stating they would spend more time on global surgery efforts if more funding was available. Other significant barriers are the low number of organized opportunities, noted by 25% of respondents, and the lack of time, noted by 20% of respondents. The identification of these 3 barriers is consistent with previously published survey data.[9-11,34-36] Conceivably, providing additional financial and organizational support to eliminate these barriers would encourage more surgeons to become involved in global surgery efforts. In response to these survey results that indicated that one-third of the faculty and one-fourth of the residents are interested in global surgery, additional administrative and financial support has been allocated to the GSI for global surgery activities.

Putting MGH Global Surgery Efforts on the Map

Surgeons and anesthesiologists engaged in global surgery projects are often unaware of others' work at a partner

1. Name (option to remain blank)
2. Role
    a. Attending
    b. Fellow
    c. Resident
3. Division/Training
    a. General
    b. Vascular
    c. Thoracic
    d. Transplant
    e. Trauma
    f. Pediatric
    g. Burns
    h. Plastics
    i. Surgical Oncology
4. Which statement below best describes your interest in Global Health?
    a. I would like to participate, but don't know how to get started
    b. I would like to participate, but cannot get the time off
    c. I am currently participating in global health projects
    d. Global Health is/will be a major component of my career
5. Are you interested in participating in Dept. of Surgery sponsored programs in global health?
6. Have you participated in global health initiatives over the past 5 years?
    a. If yes, describe how you became involved
    b. If yes, describe why you work in global health, and what this brings to you personally, the Department, and/or the MGH
7. Please describe these efforts, starting with the most recent.
8. How much time do you currently spend on global health efforts (days/yr)?
    a. In the US (planning days/year)
    b. In country of global health work (days/year)
    c. Is this work done as part of your MGH responsibilities or on your own time?
9. How much time would you ideally spend on global health efforts (days/year)?
    a. Would this # increase if you had funding for travel/room/board?
    b. Would this # increase if you had funding for travel/room/board and salary support?

FIGURE 1. Survey administered to MGH Department of Surgery members.

TABLE 1. Interest and Experience Rates in Global Surgery

Role	Number of Respondents	Have Previous Experience	Interested in GSI Experience
Attending physicians (111)	43 (39%)	23 53% Respondents 21% Overall	37 86% Respondents 33% Overall
Fellows (26)	4 (15%)	1 25% Respondents 4% Overall	4 100% Respondents 15% Overall
Residents (87)	26 (30%)	12 46% Respondents 14% Overall	21 81% Respondents 24% Overall
Total (224)	73 (33%)	36 49% Respondents 16% Overall	62 85% Respondents 28% Overall

Results from survey administered to MGH Department of Surgery regarding interest and experience rates in global surgery, divided by training levels (attending physician, fellow, and resident).

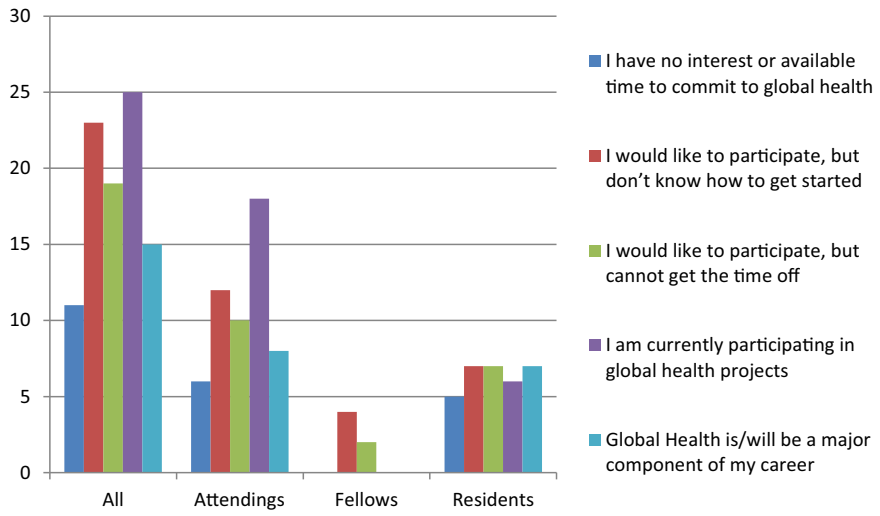


FIGURE 2. Results from the survey administered to MGH Department of Surgery members divided by training levels (attending physician, fellow, and resident).

institution or other institutions.[37-39] In our case, there were 3 individuals from the same department working at a partner institution who were unaware of each other's projects, creating a lost opportunity for collaboration in longitudinal training and resource conservation. In another example, a neurosurgeon working at a partner institution did not know of the trauma surgeon working at the same partner institution; consequently, the opportunity to work together to address head trauma from motor vehicle accidents did not materialize. Advancing a culture of collaboration, transparency, and coordination with improved communication about past experiences and current opportunities would benefit fundraising efforts, travel logistics, and overall program effectiveness, as well as the care of patients and training of surgeons.[24]

Previous global health projects have typically been documented on individual institutions' websites without updates on status of projects or contact information.[40,41] Similarly, at MGH, a few global surgery projects were widely visible, yet up-to-date information about project status and contact information were unavailable. To catalog and share the collective global work of MGH residents and faculty, a biannual newsletter and an open-access online map were created. The GSI Newsletter serves to report international activities of department members, raise the profile of these activities, and publicize opportunities for international activities. A crowd-sourced map of global surgery activity was developed in partnership with Kartis, Inc., to increase awareness, facilitate the consolidation of efforts, and promote communication between project participants and funding organizations (Fig. 3). The Kartis interface presents a novel intrainstitutional view of global work, with plans to link posts to social media such as Facebook and Twitter, which can thereby magnify the potential scope of engagement and ultimate collaboration.[42] The GSI plans to maintain both the newsletter and an up-to-date, open-access, interactive map to document the work in progress, facilitate the exchange of expertise, minimize the duplication of work, allocate resources efficiently, and maximize the effect of effort.

Developing a Long-Term Academic Partnership in a Resource-Limited Setting

Although the newsletter and map are helpful in consolidating information about various efforts in different countries, it was clear that one way to maximize efficiency and effect would be to focus institutional efforts on a single partner institution. Therefore, the MGH GSI sought to establish a long-term collaboration in a resource-limited setting with an academic institution that was equally motivated to be a partner. Ideally, the partner institution would have an established foundation of educational, technical, and research capacities. It should also have a demonstrated potential for and an interest in growth in these areas through collaboration. A mutually acceptable goal between partners would be the creation of a training center with clinical, research, and educational programs.

In 2013, members of the MGH GSI visited the Department of Surgery at Uganda's Mbarara University of Science and Technology (MUST), an institution with existing ties to the MGH departments of medicine, obstetrics and gynecology, emergency medicine, pathology, gastroenterology, pediatrics, radiology, and anesthesia (Fig. 4). The pre-existing relationship with the anesthesia department is particularly relevant to the prospect of improving the delivery of surgical care. MUST is a compelling partner academic institution for the following reasons: it is a university with both a medical school and a nursing school, it has a historically strong commitment to teaching and

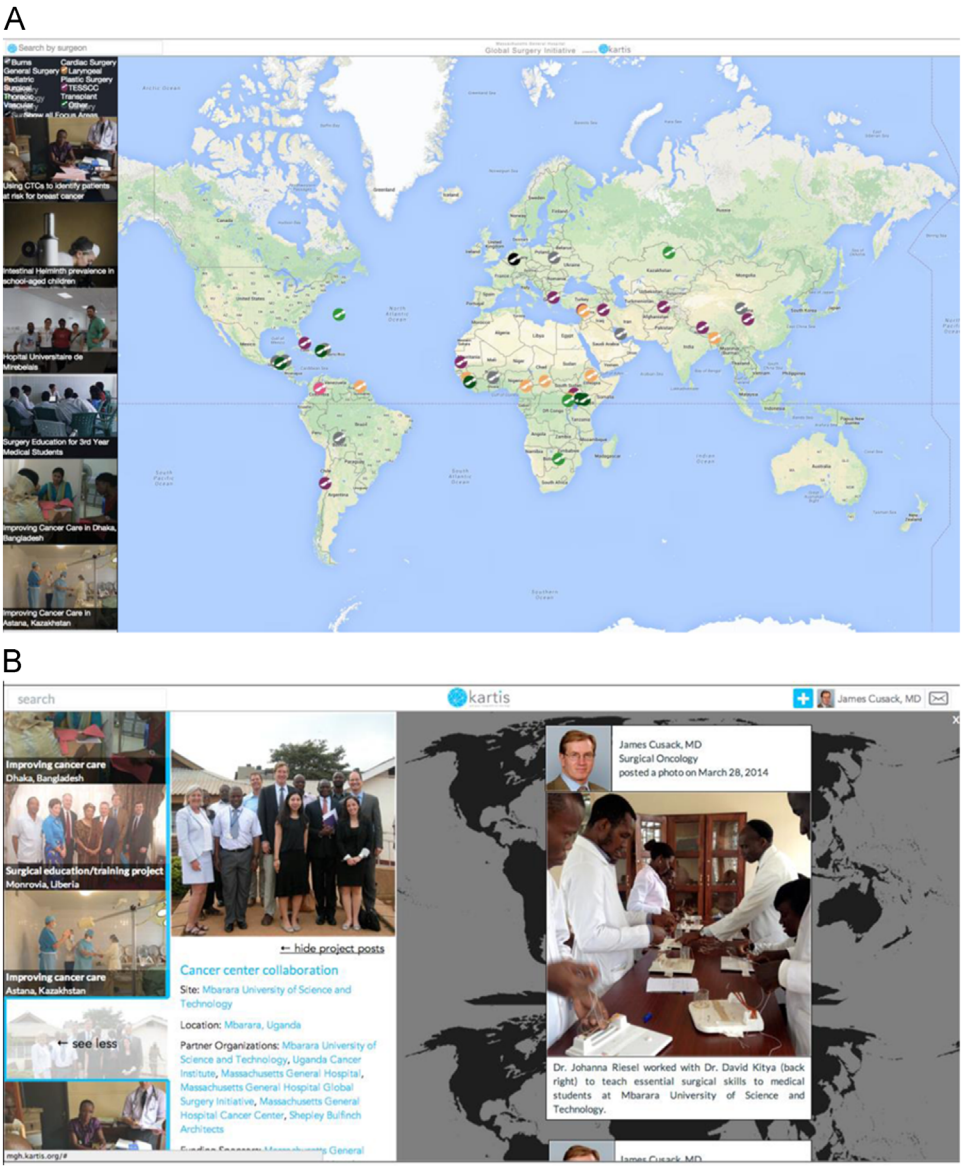


FIGURE 3. (A) Kartis map. Cartogram found at gsi.kartis.org demonstrates current global surgery projects in the MGH Department of Surgery. Projects are searchable by location or subspecialty. (B) Kartis website. Collaboration details are marked on the Kartis map, including collaboration partners, project details, funding sources, academic references generated, and contact persons.

training, it is interested in expanding its surgical services, and it is dedicated to outcomes tracking and research (Fig. 5). Furthermore, MUST's affiliated hospital, Mbarara Regional Referral Hospital, was renovated in 2011 and includes space for 8 (4 currently functional) operating theaters and an intensive care unit with 8 beds. Although the current patient-doctor ratio is inadequate to provider and facility capacity, MUST has the potential to become a National Referral Hospital for complex surgical problems if given the appropriate support.

The GSI works closely with its partner institutions to define program objectives and employ metrics for assessing effect. The goal of the MGH GSI is to focus the professional interest of surgical residents and faculty in a manner that addresses the priorities and needs of its international partners. The goals of the MUST Department of Surgery are to enhance its trauma and critical care skills, expand subspecialty training, and foster international collaboration. Both institutions share an interest in surgical care in different settings around the world and are committed to an ongoing, productive relationship. To this end, an official memorandum of understanding is being developed to establish consensus goals, agreed on by the heads of respective surgery departments, with prospective annual reviews. Some examples of proposed activities include provision of human resources for health, professional development, infrastructure support, and research capacity building and management. The iterative evaluation of these

1989 MUST founded to train healthcare professionals
2004 MUST-MGH Immune Suppression Syndrome clinic opens
2006 Opening of MUST Grants Office
2008 MGH Department of Medicine begins collaboration at MUST
2009 MGH Guest House opened to provide lodging for MGH visitors
2010 Start of Global Primary Care collaboration
2010 MGH's Center for Global Health begin IRB Trainings at MUST
2010 MGH Departments of Surgery and Anesthesia begin collaboration at MUST
2011 Mbarara Regional Referral Hospital (400 bed) built
2012 Global Primary Care Residency Track
2012 Mass Eye and Ear Institute (MEEI) begins ENT collaboration at MUST
2012 MGH Dept of Pathology begins collaboration at MUST
2012 MGH-MUST Department Partnerships Program begins
2013 MGH GSI formed; begins collaboration with MUST Department of Surgery
2013 Co-creation lab created with MUST and MGH-based Consortium for Affordable Medical Technologies (CAMTech)
2014 MGH/MUST Cancer Center collaboration
2014 ACGME approved surgical rotation at MUST
2014 Department of Emergency Medicine begins collaboration at MUST
2014 Creation of Strategic Plan

FIGURE 4. Mbarara University of Science and Technology (MUST)-MGH relationship timeline.

activities will allow both institutions to monitor progress and maintain accountability in responding to the needs of both institutions. It will also allow for a balance of priorities with the resources available at both the partner institution and at MGH.

Over the past year, members of the MGH GSI have taken part in educational, research, and capacity-building initiatives at MUST. The first MGH resident participated in an Accreditation Council for Graduate Medical Education (ACGME)-approved clinical elective at MUST in November 2014. There are ongoing research collaborations and plans for trauma and critical care courses for 2015. The MGH GSI is focusing its human resources on capacity building and maintaining a bidirectional partnership with MUST.

The Global Surgery Pathway

To facilitate the most beneficial partnership for both MUST and MGH, a longitudinal presence is essential. The Global Surgery Pathway (GSP) at MGH was designed to provide interested residents with structured opportunities for research, education, and clinical work in preparation for a global surgery career that might culminate in a long-term working relationship with the partner institution.[43] Critical components of the GSP include early exposure to global health work, education in research and policy work, and practical application of clinical training as a senior resident working in a low-resource setting. There are additional opportunities to attend global health-related lectures and journal clubs. The GSP for residents was introduced to the Surgical Education Council in 2013 and approved shortly thereafter.

Residents accepted into the GSP matriculate with the categorical 9-person general surgery class but have a curriculum specifically designed for the global surgeon. Early in the residents' training (postgraduate year 2 [PGY2] or 3), a protected elective month is provided to facilitate opportunities in research, international clinical experience, or additional relevant education. The residents also have the opportunity to pursue elective rotations within different surgical specialties at MGH, including obstetrics and gynecology, orthopedic trauma, urology, and neurosurgery services at MGH. The inclusion of additional designated and nondesignated preliminary residents in the junior resident schedule provides the flexibility in the surgery resident training program to accommodate residents interested in pursuing the GSP.

During their research time, residents in the GSP have the opportunity to join the Program in Global Surgery and Social Change at Harvard Medical School/Boston Children's Hospital as Paul Farmer Global Surgery Research Fellows.[44] This research fellowship reinforces skills in study design, international collaboration, and policy and advocacy work. Significant portions of this fellowship are spent in a partner country collaborating with local providers on research topics pertinent to the needs of the local surgery community. The strong ties within these 2 Harvard institutions, agreements between the program directors, and the efforts of participating fellows and faculty in both programs facilitated partnership with this competitive fellowship. MGH residents who are undertaking global surgery projects have been able to find full salary support from a combination of grants and existing research funds for residents from the MGH surgery department. International travel has been funded through a variety of sources, including the Program in Global Surgery and Social Change, the MGH Center for Global Health, and a recently-established fund named for a senior surgeon who has dedicated her career to global health efforts.

During the fourth clinical year of residency, the global surgery residents spend 1 month in an ACGME-approved rotation at MUST/Mbarara Regional Referral Hospital. The purpose of this senior elective is to focus the residents' existing clinical skills for work in low-resource settings. In

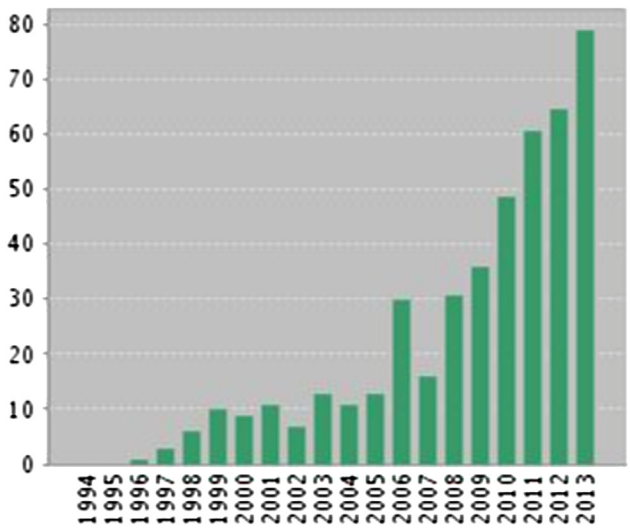


FIGURE 5. Publications from Mbarara University of Science and Technology (MUST) by year, according to ISI Web of Science. ISI, Institute for Scientific Information.

compliance with ACGME guidelines for international surgery rotations, a standard application[26] was submitted to the ACGME, including a program letter of agreement signed by the directors of both institutions, which describes the goals and guidelines of the rotation. The rotation was approved for ACGME credit in October 2014. The resident rotating at the partner institution is supervised on-site by an American Board of Medical Specialty–certified visiting MGH faculty. The GSI and the MGH Center for Global Health also provide logistical support, in-country mentoring, and assistance with travel planning. Plans are currently underway to establish a longitudinal presence at the partner institution, including educational and clinical duties with residents from both institutions to provide continuity between the partnered institutions.

CONCLUSION

As global surgery emerges as a viable academic career path, it is necessary to coordinate strategic priorities with financial support so that its practitioners are seen not as short-term visitors performing surgery on their vacation time, but as surgeons professionally trained for work in low-resource settings.[17] To enable the GSI to carry out its mission, we have found it critical to utilize the professional and funding resources available at our institution, capitalize on existing institutional relationships, and coordinate the collective experiences of our colleagues. Centralizing and disseminating information of existing projects and opportunities in the field direct the MGH GSI and others toward the goal of building sustainable surgical capacity and education in resource-limited countries with maximum efficiency. Creating a partnership with a hospital in a low-resource setting and establishing formal global surgery curriculum for our residents allows for education and longitudinal collaboration. We believe this is a replicable model for building other academic GSIs that aim to strengthen health and surgical systems beyond their own institutions.

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