The Current State of Global Surgery Training in Plastic Surgery Residency

Harry S. Nayar, M.D., M.B.E.
A. Neil Salyapongse, M.D.
Delora L. Mount, M.D.
Michael L. Bentz, M.D.

Madison, Wis.

Background: The current state of global surgery training in U.S. plastic surgery residency programs remains largely undefined.
Methods: An electronic survey was distributed to Accreditation Council for Graduate Medical Education–certified plastic surgery residency programs. Programs with global health curricula were queried regarding classification, collaboration details, regions visited, conditions/procedures encountered, costs, accreditation, and personal sentiment. Residencies without global health curricula were asked to select barriers.
Results: Sixty-four of 81 residency programs returned questionnaires (response rate, 79 percent). Twenty-six programs (41 percent) reported including a formal global health curriculum; 38 did not (59 percent). When asked to classify this curriculum, most selected clinical care experience [n = 24 (92 percent)], followed by educational experience [n = 19 (73 percent)]. Personal reference was the most common means of establishing the international collaboration [n = 19 (73 percent)]. The most commonly encountered conditions were cleft lip–cleft palate [n = 26 (100 percent)], thermal injury [n = 17 (65 percent)], and posttraumatic reconstruction [n = 15 (57 percent)]. Dominant funding sources were primarily nonprofit organizations [n = 14 (53 percent)]. Although the majority of programs had not applied for residency review committee accreditation [n = 23 (88 percent)], many considered applying [n = 16 (62 percent)]. Overall, 96 percent of programs (n = 25) supported global health training in residency, choosing exposure to different health systems [n = 22 (88 percent)] and surgical education [n = 17 (68 percent)] as reasons. Programs not offering a global health experience most commonly reported lack of residency review committee/plastic surgery operative log recognition of cases performed abroad [n = 27 (71 percent)], funding for trip expenses [n = 25 (66 percent)], and salary support [n = 24 (63 percent)] as barriers.
Conclusions: Residencies incorporating global health training describe the experience positively. Funding and case accreditation are the major obstacles to implementing these curricula. (*Plast. Reconstr. Surg.* 136: 830e, 2015.)

In 2008, Paul Farmer and Jim Kim exposed the neglected role of surgery in global health discourse.[1] The academic surgery community has since responded with a proliferation of work related to delineating the global burden of surgical disease, quantifying worldwide surgical volume, developing resource allocation strategies,

From the Division of Plastic and Reconstructive Surgery, University of Wisconsin Hospital and Clinics.
Received for publication April 9, 2015; accepted July 28, 2015.
Presented at the 93rd Annual Meeting of the American Association of Plastic Surgeons, in Miami, Florida, April 5 through 8, 2014; the American Council of Academic Plastic Surgeons Spring Retreat, in Miami, Florida, April 5 through 8, 2014; and the Midwestern Association of Plastic Surgeons 53rd Annual Scientific Conference, in Chicago, Illinois, May 10, 2014.

DOI: 10.1097/PRS.0000000000001817

Disclosure: *The authors have no financial interest to declare in relation to the content of this article.*

Supplemental digital content is available for this article. Direct URL citations appear in the text; simply type the URL address into any Web browser to access this content. Clickable links to the material are provided in the HTML text of this article on the *Journal*'s Web site (www.PRSJournal.com).

examining quality and cost-effectiveness, and building surgical capacity.[2–8] In this light, it is now clear that practitioners of global surgery in the twenty-first century will require, in addition to clinical training, specialized education on matters pertaining to international health systems (e.g., fundraising and philanthropy, operational analytics, knowledge of population-based preventative and interventional approaches, and the ethical considerations of health inequity).[9] The Lancet Commission on Global Surgery, convened to address how best to meet the surgical needs of the world's indigent, is the nexus of these efforts, and maintains that fostering a sense of collective responsibility among the world's academic surgical centers is crucial to accomplishing this goal.[10] Despite the momentum of global surgery as a field of study, however, research into global surgery education has been comparatively lagging.

With these issues in mind, integration of global health training into residency was the focus of the 2014 spring retreat of the American Council of Academic Plastic Surgeons in Miami, Florida.[11] Presentations and panel discussions detailed specific aspects of surgical education, including onsite and Web-based curriculum development, relevance of the experience to the surgical competencies, and formal accreditation for the curriculum. Matters of funding, namely, identifying successful philanthropic sources for salary support, travel, and other various logistics (e.g., malpractice insurance and the financial impact on the traveling program), were of particular interest. Given the paucity of published data regarding the effect of global health curricula on surgical education, research into the outcomes of international surgical experiences was made a priority moving forward. Perhaps most important was the symbolism of the meeting, as it represented the first organized forum where individual plastic surgery residency programs gathered to exchange their attitudes and experiences with global health training.

The goals of this study were thus twofold: first, we sought to describe the current state of global surgery exposure in plastic surgery residency programs nationally. Second, against this national backdrop and drawing from the experience at our institution, we report the benefits and barriers of an integrated global surgery curriculum.

MATERIALS AND METHODS

This study was conducted under institutional review board exemption from the University of Wisconsin School of Medicine and Public Health. A 17-item questionnaire was distributed electronically twice on consecutive weeks in September of 2013 to Accreditation Council for Graduate Medical Education–certified plastic surgery residency programs in the United States. (**See Appendix, Supplemental Digital Content 1,** which displays the questionnaire in its entirety, ***http://links.lww.com/PRS/B501***.) Before distribution, the questionnaire was pilot tested among faculty at our institution for clarity and subsequently revised multiple times based on this feedback to ensure appropriate capture of data. Demographic data pertaining to the residency programs were collected and included the following: classification, number of residents taken per year, and location by region.

Following these demographic data, the first item of the questionnaire asked whether a global health experience was currently recognized as an official component of their residency program; answer choices were "yes" and "no." All subsequent items were based on the answer given to this question, and many items would allow for more than one selection. For those answering "yes," subsequent items addressed the following aspects of their global health experience: classification (e.g., educational, clinical care, research), mechanism of implementation, current duration of the program, conditions/procedures encountered abroad, regions traveled, logistical support for both faculty and residents, dominant funding sources, accreditation, and personal assessments. For those programs responding "no" (i.e., those currently without an official global health experience as a part of their residency), barriers to establishing a curriculum were explored.

RESULTS

Sixty-four questionnaires were returned completed from 81 programs (response rate, 79 percent). Respondents were evenly represented by the three major categories of Accreditation Council for Graduate Medical Education–accredited plastic surgery residencies: independent, integrated, and both. Program size (i.e., number of residents accepted each year into the program) was widely distributed. Questionnaires were completed by program directors (or chair/program director, if jointly appointed). Table 1 displays demographic results for all respondents.

Of the 64 respondents, 26 (41 percent) currently include a global health component as a formal part of their residency curriculum;

Table 1. Residency Program Demographic Data

Characteristic	No. (%)
No. of respondents	64
Program classification	
Independent	16 (25)
Integrated	25 (39)
Both	23 (36)
Residents taken per year	
1	8 (13)
2	32 (50)
3	13 (20)
4	5 (8)
5	4 (6)
6	2 (3)
Geographic region	
Southern	21 (33)
Northeastern	15 (23)
Central	14 (22)
Western	14 (22)

38 (59 percent) do not. When asked to best classify this curriculum, a majority selected a clinical care experience [*n* = 24 (92 percent)] followed, in order, by an educational experience [*n* = 19 (73 percent)], charity [*n* = 13 (50 percent)], and finally as research [*n* = 2 (8 percent)]. The most common mechanism used to establish the international partnership was personal reference [*n* = 19 (73 percent)], followed by regular follow-up [*n* = 12 (46 percent)] and memorandum of understanding [*n* = 8 (31 percent)]. A majority of respondents report global health experiences that have been in existence longer than 5 years (Fig. 1). With respect to procedures and conditions encountered on the last trip abroad, cleft lip and palate procedures were uniformly reported, and both thermal injury reconstruction and posttraumatic reconstruction were common. Unsurprisingly, cosmetic surgery was not typically described in these populations. Overall, the operative experience is broad and commensurate with domestic training (Fig. 2).

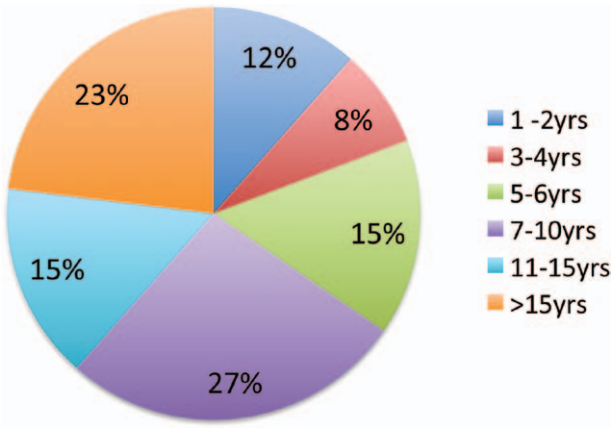

Fig. 1. Average duration of relationships reported by respondents.

Regarding dominant funding sources, the majority reported nonprofit organizations, followed by faculty personal expenditures and section/division/department contributions. A minority selected the university as a dominant funding source (Fig. 3). Of special interest were the supports offered to both residents and faculty members traveling abroad. Although this was asked as two separate questions, the results were identical (Fig. 4). Nearly one-quarter of programs with global health curricula currently do not provide health care coverage, salary, malpractice, medical evacuation, or disability insurance to either residents or faculty traveling abroad.

With respect to accreditation status, although the majority of programs have yet to apply for plastic surgery operative log credit, many are considering applying in the future (Table 2). Finally, regions where respondents have traveled are illustrated in Figure 5. Response percentages (multiple selections were allowed) are superimposed onto a world map that depicts territory size as a proportion of per capita health care expenditure.

Overall, 25 of the 26 programs (96 percent) currently incorporating global health training into residency indicate their support of this educational approach, selecting exposure to different health systems [*n* = 22 (88 percent)], importance to surgical education [*n* = 17 (68 percent)], and preparation for a global health career [*n* = 15 (60 percent)] as majority reasons (Fig. 6). Those programs not offering global health training to their residents [*n* = 38 (59 percent)] were queried regarding possible impediments. The most commonly reported barriers were a lack of residency review committee/plastic surgery operative log recognition of cases performed abroad [*n* = 27 (71 percent)], lack of funding for trip expenses [*n* = 25 (66 percent)], lack of salary support [*n* = 24 (63 percent)], and domestic clinical duties [*n* = 15 (39 percent)] (Fig. 7).

DISCUSSION

The pursuit of global surgery education has traditionally been a postgraduate endeavor, one that tends to be self-motivated and self-directed. Charitable international health organizations, such as Operation Smile, Smile Train, and ReSurge International (formerly Interplast), rely on dedicated volunteers to provide free surgical care across the globe. The primary goal of these organizations is the provision of free health care; however, the training of volunteers has been increasingly incorporated by means of electronic learning sources,

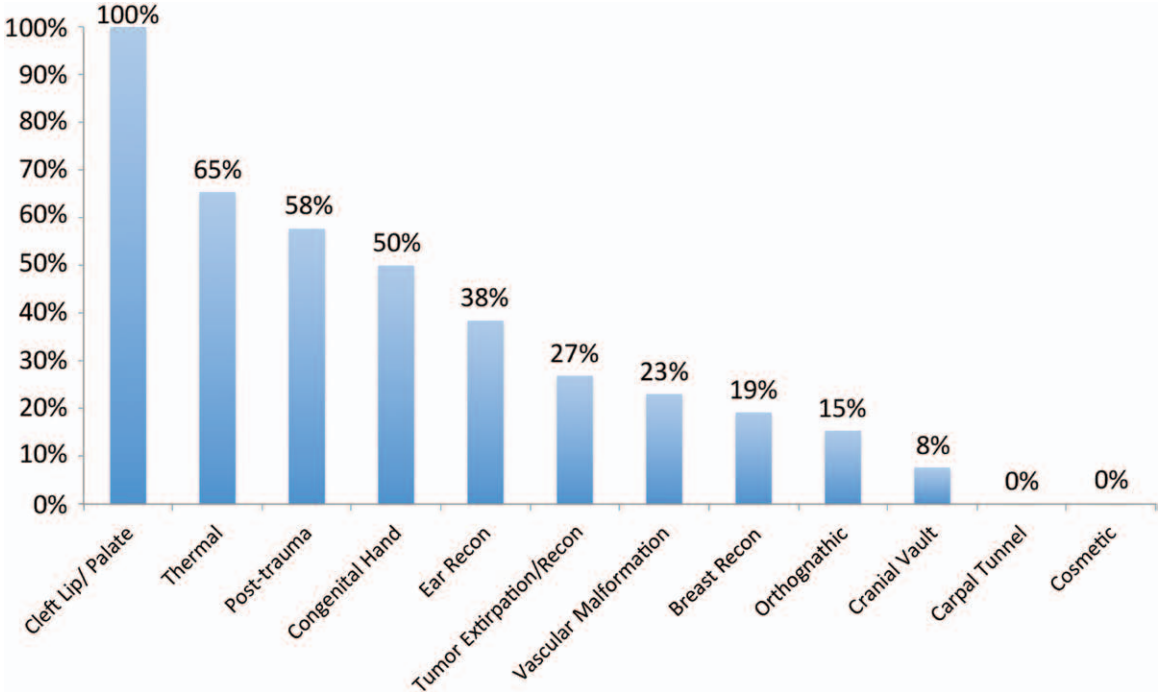

Fig. 2. Surgical conditions encountered abroad on the last trip.

university partnerships, and various sponsored fellowship programs, some of which are available to residents in plastic and reconstructive surgery.[12] Health Volunteers Overseas provides a model of global surgical education, focused on placing volunteers in locations where the traveling surgeon will work alongside staff and trainees, acting as a visiting faculty member.[13] Similarly, the American Association for Hand Surgery recently endorsed a reverse fellowship in Kumasi, Ghana, that aims to train local surgeons and their residents in an effort to build capacity and strengthen local infrastructure.[14] For the most part, however, these avenues to global health training are informal and aimed at providing experiential, on-site training to surgeons who have successfully completed residency. More recently, formal training programs have been developed for those seeking structured global surgery education. The Paul Farmer Global Surgery Fellowship, through equal emphasis on education, clinical care, and research, is one such example.[15] Despite this progress, the role, much less the implementation, execution, and educational standards, for global surgery training in U.S. residency programs remains to be elucidated.

These data indicate that barriers to global surgery education are mostly logistic in nature, namely, issues of funding (both for trip expenses and salary support), domestic time constraints, and accreditation. According to our results, the most common mechanisms for funding these curricula are nonprofit organizations. In our

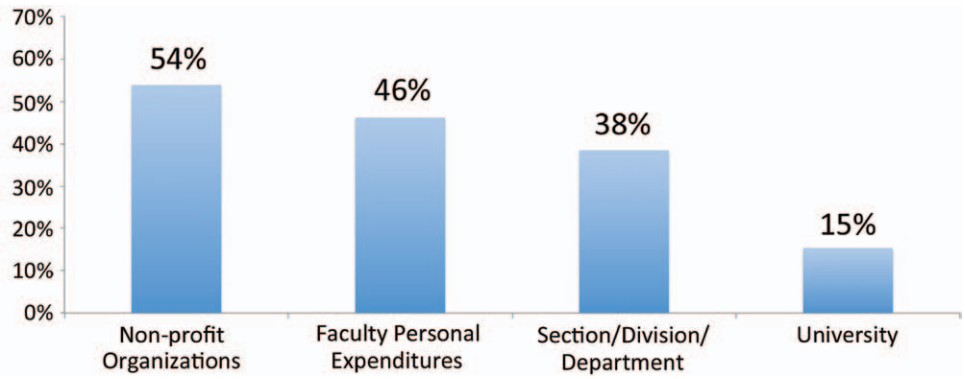

Fig. 3. Dominant funding sources selected by respondents.

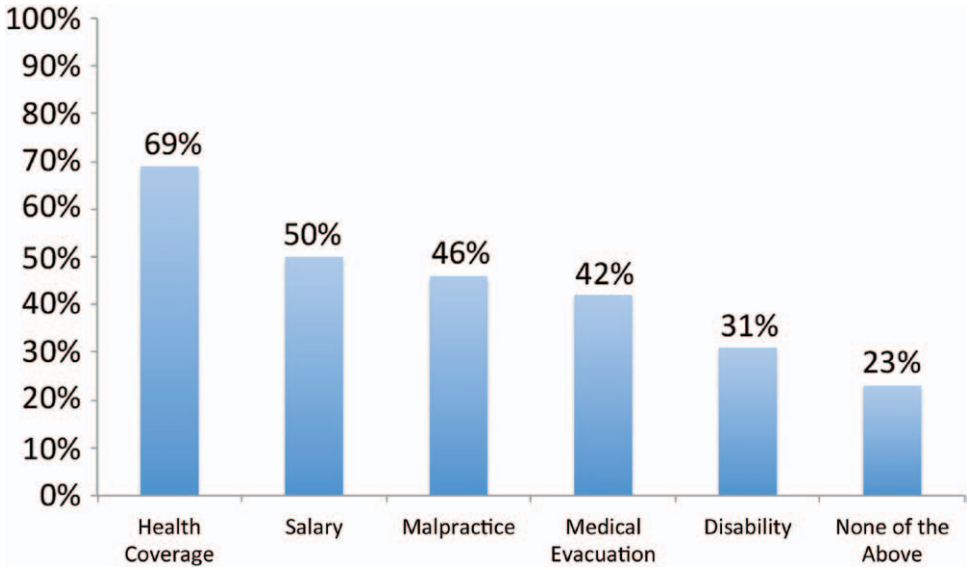

Fig. 4. Logistic support offered to both residents and faculty traveling abroad.

own institution, we have established a 501(c)(3) foundation, Eduplast, which assists in covering the costs of travel, housing, and supplies beyond what is received in donations from our hospital. In addition, Eduplast provides outlays for the expenses of training a plastic surgery resident at the host program. Although direct salary support for the time dedicated by faculty who travel away from their practice is not provided, their educational efforts for this curriculum are recognized through compensation tied to academic incentive programs offered by the department. These financial strategies help offset losses in clinical and personal revenue and enable the majority of our faculty to participate in global health education.

With respect to accreditation, the Accreditation Council for Graduate Medical Education and the Plastic Surgery Residency Review Committee have made significant progress in facilitating the application for international rotations. Complete application details can be reviewed on the Accreditation Council for Graduate Medical Education Web site.[16] Salient considerations for approval include description of the site's operative volume and type, available educational resources, and adequate supportive infrastructure (e.g., anesthesia, radiology). In addition, the curriculum must incorporate the Accreditation Council for Graduate Medical Education competency-based goals and objectives. Although the educational benefits of direct patient care for less common conditions (e.g., late postburn reconstruction and treatment of neglected malignancies) are obvious, the foil of practicing in an alternative health system, with different resources and potentially different social needs, challenges trainees to examine the systems and standards in place at their home institution.[17,18] Participation by the resident in the entire continuum of care (preoperative, perioperative, and postoperative) in these foreign settings promotes heightened cultural competency, which is increasingly emphasized by the Accreditation Council for Graduate Medical Education and difficult to achieve domestically.[19,20] Continued communication after each visit and thus some degree of "continuity of care" is easily overlooked and must be safeguarded. Considered together, these patient care experiences, and assisting in the design and implementation of a system for providing that care, approach some of the highest, "aspirational" goals of the new milestones in plastic surgery.[21] Certification and approval of activities performed abroad for operative case-log credit should go a long way to addressing time constraints felt at home, further facilitating the uptake of global surgery education.

Table 2. Accreditation Status for Residencies with Global Health Components

Accreditation Status	No.	Yes (%)	No (%)
Formal RRC accreditation	26	3 (12)	23 (88)
Considering applying	23	16 (70)	7 (30)

RRC, residency review committee.

Although accreditation protects trainee interests and affirms academic merits of international rotations for faculty members, a mechanism that provides oversight and guidance for the unique challenges of international health

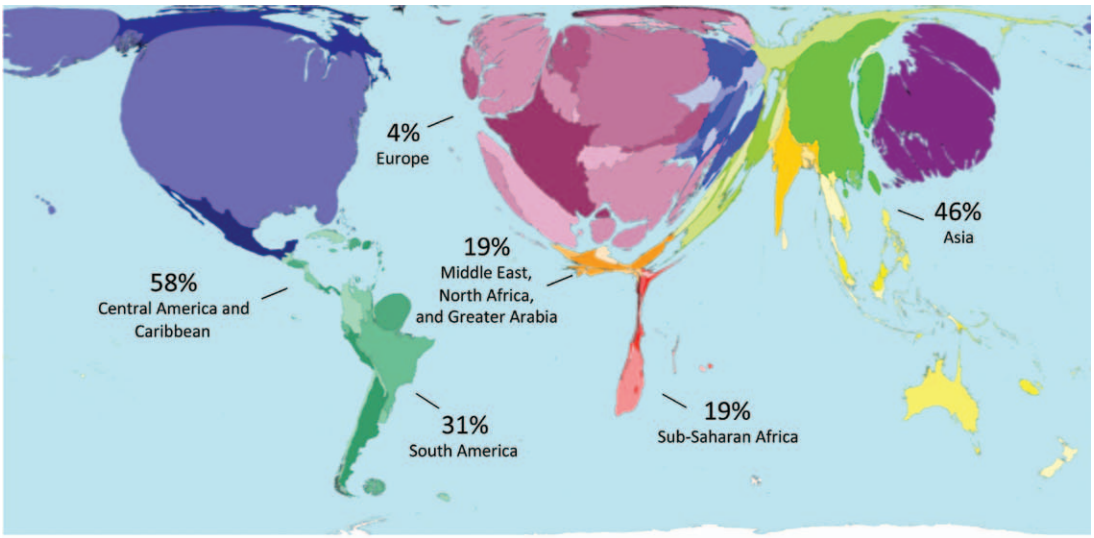

Fig. 5. International partnership locations selected by respondents superimposed onto a world map where territory size reflects the relative proportion of per capita public health spending. [© Copyright Sasi Group (University of Sheffield) and Mark Newman (University of Michigan).]

partnerships is currently lacking in plastic surgery. In response, the American Council of Academic Plastic Surgeons is currently organizing plastic surgery global health information for residency programs and volunteer surgeons. Our survey data, in addition to highlighting positive attributes, reveal this relatively fragmented, opaque nature of academic global health pursuits, evidenced by the variability reported in mechanisms of implementation and dominant funding sources. Indeed, to our knowledge, this is the first publication that reports on this subject from the academic plastic surgery nationwide standpoint. Transparency to this effect could be promoted through the formation of a multidisciplinary group composed of academic leaders from both low- and middle-income countries and high-income countries that coalesces and freely

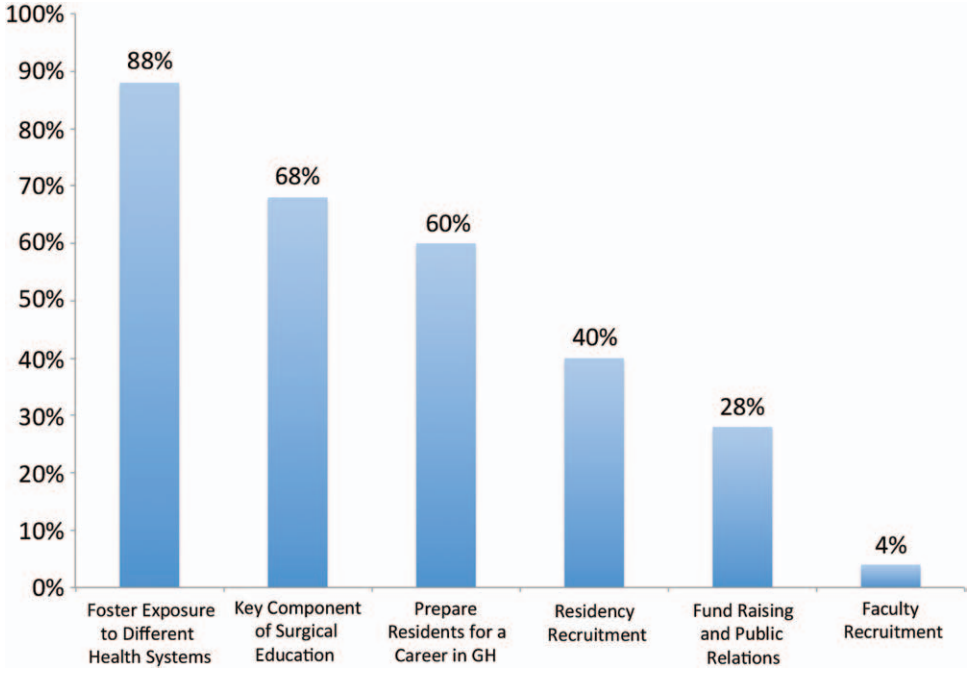

Fig. 6. Motivations selected by respondents who currently do offer a global health (*GH*) experience to residents.

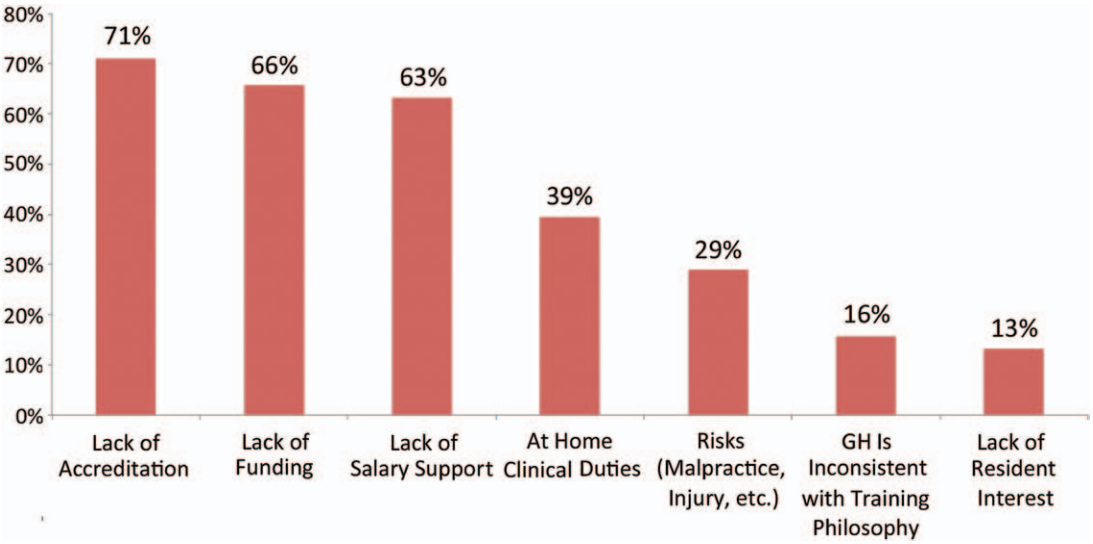

Fig. 7. Barriers selected by respondents who currently do not offer a global health (*GH*) experience to residents.

disseminates the activities and strategies used by individual institutions. Established in 2008 through donations from both the Bill & Melinda Gates Foundation and the Rockefeller Foundation, the Consortium of Universities for Global Health represents one of the most ambitious efforts to interconnect academic, industry, and philanthropic agencies with interests in global health, thereby facilitating collaboration and the exchange of ideas.[22] In addition, the Consortium of Universities for Global Health arranges educational meetings and publishes a Web site that offers an open access forum for members across the globe to share their experiences with the broader community. Subspecialty groups, such as the Global Pediatric Surgery Network, address disease-specific issues and focus efforts to where they are needed most.[23] Similar to the Consortium of Universities for Global Health and the Global Pediatric Surgery Network, an academic global plastic surgery collaborative would function as more than a passive repository of information by encouraging open dialogue, performing needs assessments, promulgating guidelines for international partnerships, and, of course, responding to inevitable challenges and controversies as they arise.

This study was not without limitations. We elected to keep the definition of an official global surgery experience broad and general. Although this strategy could certainly invite ambiguity as to what truly constitutes offering global surgery training, we maintain that, as a baseline study, it is more important to completely capture programs in all stages that include exposure to global health, rather than only those with rigorous, established training pathways. Future studies will explore details of these programs, including fiscal structuring, curricular requirements, duty hours, operative case logs, and educational standards and competencies, including the adoption of plastic surgery milestones.

CONCLUSIONS

The sustainability of global surgery will ultimately depend on practitioners who are sensitive to the multitude of aspects that encompass the provision of care in resource-limited settings. The academic plastic surgery community has indicated that training to this effect can start during residency. Establishing educational standards, best-practice guidelines, and cultivating ethical and cultural sensitivity on both personal and institutional levels are essential and could be aided by the formation of a leadership society. Accreditation of these curricula is a necessary step toward legitimizing the field of global surgery as a cornerstone of graduate medical education.

Michael L. Bentz, M.D.
Division of Plastic and Reconstructive Surgery
University of Wisconsin School of Medicine and Public Health
G5/361 CSC
600 Highland Avenue
Madison, Wis. 53792
bentz@surgery.wisc.edu

REFERENCES

1. Farmer PE, Kim JY. Surgery and global health: A view from beyond the OR. *World J Surg.* 2008;32:533–536.

2. Calland JF, Petroze RT, Abelson J, Kraus E. Engaging academic surgery in global health: Challenges and opportunities in the development of an academic track in global surgery. *Surgery* 2013;153:316–320.
3. Weiser TG, Makary MA, Haynes AB, et al. Standardised metrics for global surgical surveillance. *Lancet* 2009;374:1113–1117.
4. Funk LM, Weiser TG, Berry WR, et al. Global operating theatre distribution and pulse oximetry supply: An estimation from reported data. *Lancet* 2010;376:1055–1061.
5. Haynes AB, Weiser TG, Berry WR, et al. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med.* 2009;360:491–499.
6. Weiser TG, Regenbogen SE, Thompson KD, et al. An estimation of the global volume of surgery: A modelling strategy based on available data. *Lancet* 2008;372:139–144.
7. Haynes AB, Regenbogen SE, Weiser TG, et al. Surgical outcome measurement for a global patient population: Validation of the Surgical Apgar Score in 8 countries. *Surgery* 2011;149:519–524.
8. Chao TE, Sharma K, Mandigo M, et al. Cost-effectiveness of surgery and its policy implications for global health: A systematic review and analysis. *Lancet Glob Health* 2014;2:e334–e345.
9. Ruxin J. Doctors without orders. Available at: http://www.democracyjournal.org/9/6618.php?page=all. Accessed April 9, 2015.
10. The Lancet Commission on Global Surgery. (Web site). Available at: http://www.globalsurgery.info. Accessed April 9, 2015.
11. Nayar HS, Mount DL, Bentz ML. The state of global health training in plastic surgery residency: Pragmatic considerations and future directions. Paper presented at: 93rd Annual Meeting of the American Association of Plastic Surgeons; April 5–8, 2014; Miami, Florida.
12. Operation Smile. Short and long-term fellowship opportunities. Available at: http://www.operationsmile.org/our_work/education-training/fellowships.html. Accessed April 9, 2015.
13. Health Volunteers Overseas (Web site). Available at: https://hvousa.org. Accessed April 9, 2015.
14. American Association for Hand Surgery. Kumasi, Ghana reverse fellowship. Available at: http://handsurgery.org/endowment/kumasi.cgi. Accessed April 9, 2015.
15. Boston Children's Hospital. Department of Plastic and Oral Surgery Paul Farmer global surgery fellowship. (Web site). Available at: http://www.childrenshospital.org/centers-and-services/department-of-plastic-and-oral-surgery/paul-farmer-global-surgery-fellowship. Accessed 9 April 2015.
16. Accreditation Council for Graduate Medical Education. Plastic surgery. Available at: http://www.acgme.org/acgmeweb/tabid/145/ProgramandInstitutionalAccreditation/SurgicalSpecialties/PlasticSurgery.aspx. Accessed April 9, 2015.
17. Ozgediz D, Roayaie K, Debas H, Schecter W, Farmer D. Surgery in developing countries: Essential training in residency. *Arch Surg.* 2005;140:795–800.
18. Riviello R, Ozgediz D, Hsia RY, Azzie G, Newton M, Tarpley J. Role of collaborative academic partnerships in surgical training, education, and provision. *World J Surg.* 2010;34:459–465.
19. Campbell A, Sullivan M, Sherman R, Magee WP. The medical mission and modern cultural competency training. *J Am Coll Surg.* 2011;212:124–129.
20. Henry JA, Groen RS, Price RR, et al. The benefits of international rotations to resource-limited settings for U.S. surgery residents. *Surgery* 2013;153:445–454.
21. The Accreditation Council for Graduate Medical Education and The American Board of Plastic Surgery. The Plastic Surgery Milestone Project. Available at: http://www.acgme.org/acgmeweb/Portals/0/PDFs/Milestones/PlasticSurgeryMilestones.pdf. Accessed 9 April 2015.
22. Consortium of Universities for Global Health (Web site). Available at: http://www.cugh.org. Accessed April 9, 2015.
23. Global Pediatric Surgery Network (Web site). Available at: http://globalpaediatricsurgery.org. Accessed April 9, 2015.