

# Academic Partnerships in Global Surgery

## An Overview American Surgical Association Working Group on Academic Global Surgery

Haile Debas, MD,\* Olusegun I. Alatise, MBChB,† Charles M. Balch, MD,‡ Murray Brennan, MD,§ James Cusack, MD,¶ Peter Donkor, MBChB,|| Bernard M. Jaffe, MD,\*\* George V. Mazariegos, MD,†† Charles Mock, MD, PhD,‡‡☒ David Mutiibwa, MBChB,§§ Patricia Numann, MD,¶¶ John Kennedy Muma Nyagatuba, MBChB,|||| James A. O'Neill Jr., MD,\*\*\* John L. Tarpley, MD,††† Samuel Tesfaye, MD,††† Girma Tefera, MD,§§§ and Todd M. Tuttle, MD¶¶¶

Most surgeons from high-income countries who work in global surgery will do so through partnerships between their institutions and institutions in low- and middle-income countries (LMICs). In this article, the American Surgical Association Working Group for Global Surgery lays out recommendations for criteria that contribute to equitable, sustainable, and effective partnerships. These include ethically engaging with the LMIC partner institution by putting its interests first and by proactively seeking to be aware of cultural issues. Formally structuring the partnership with a memorandum of understanding and clearly designating leaders at both institutions are important criteria for assuring long-term sustainability. Needs assessments can be done using existing methods, such as those established for development of national surgical, obstetric, and anesthesia plans. Such assessments help to identify opportunities for partnerships to be most effective in addressing the biggest surgical needs in the LMIC. Examples of successful high-income countries-LMIC partnerships are provided.

**Keywords:** global health, global surgery, low- and middle-income country, partnership

(*Ann Surg* 2020;271:460–469)

The American Surgical Association established a Global Surgery Working Group in 2018 to write consensus papers on Global Surgery. The first consensus paper, “Global Surgery: Effective Involvement of US Academic Surgery. Report of the American

Surgical Association Working Group on Global Surgery,” was published in *Annals of Surgery* in 2018.<sup>1</sup> This article on “Academic Partnerships in Global Surgery” is the third consensus paper of the ASA Working Group.

The last 10 years have seen phenomenal growth in academic global surgery.<sup>2</sup> An important driver for this phenomenon has been the enthusiasm and commitment of students, residents, and young faculty.<sup>3</sup> Global surgery has recently been recognized as an important part of global health without which the health component of the Sustainable Development Goals is unlikely to be achieved.<sup>4</sup> Two recent landmark publications have supported the hypothesis and put global surgery on the visible horizon: The Lancet Commission on Global Surgery,<sup>5</sup> and the Disease Control Priorities, 3rd Edition, publication of the World Bank.<sup>6</sup> Another seminal paper has been the Lancet Oncology Commission report on global cancer surgery.<sup>7</sup>

Many Departments of Surgery nationwide have responded to the enthusiasm of their trainees by developing programs in Global Surgery, sometimes in the form of full-fledged centers or departmental divisions.<sup>8</sup> These global health programs have 2 important goals: to provide education, training, and research opportunities in global surgery for US students and residents; and, to help academic institutions in low- and middle-income countries (LMICs) improve their surgical training and patient-care skills. The manner through which different US universities have tried to achieve these goals has varied from ad hoc faculty-to-faculty engagement to well-structured institutional partnerships.

There is general agreement that these goals are likely to be most successfully achieved through partnerships that effectively respond to the needs of each party, particularly to those of the LMIC partners, who are disadvantaged economically and have poor academic resources. Imbalance between the 2 partners must be recognized, minimized, and otherwise managed. All too frequently, these partnerships have supported the academic careers of the faculty in the developed country and much less of those in LMICs.<sup>9</sup> Any formal partnership must ensure that LMIC partners receive equivalent benefits.

This article aims to provide an overview of partnerships in academic global surgery and to describe essential features in their design, structure, and metrics for their success and impact. The article will also provide examples of effective partnerships and emphasize the importance of making commitment to ethics and cultural sensitivity and to interprofessional collaboration with anesthesia, nursing, and critical care.

We recognize different types of partnerships. We describe institution-to-institution partnerships believing that these are likely to be more sustainable, that is, last beyond the term of any single individual, and have greater success in attracting funding. By

From the \*Department of Surgery, University of California at San Francisco, San Francisco, CA; †Department of Surgery, Obafemi Awolowo University, Ile Ife, Nigeria; ‡Department of Surgical Oncology, University of Texas MD Anderson Cancer Center, Houston, TX; §Memorial Sloan Kettering Cancer Center, New York, NY; ¶Division of Surgical Oncology, Harvard Medical School, Massachusetts General Hospital, Boston, MA; ||Department of Surgery, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; \*\*Department of Surgery, Tulane University, New Orleans, LA; ††Division of Pediatric Transplantation, Hillman Center for Pediatric Transplantation, UPMC Children's Hospital of Pittsburgh, University of Pittsburgh, Pittsburgh, PA; †††Department of Surgery, University of Washington, Seattle, WA; §§Department of Surgery, Mbarara University of Science and Technology, Mbarara, Uganda; ¶¶Department of Surgery, Upstate Medical University, Syracuse, NY; ||||AIC Kijabe Hospital and BethanyKids Children's Centre, Kijabe, Kenya; \*\*\*Department of Pediatric Surgery, Vanderbilt University, Nashville, TN; ††††Department of Surgery, University of Botswana, Gaborone, Botswana; †††††Department of Surgery, Hawassa University, Hawassa, Ethiopia; §§§Operation Giving Back, American College of Surgeons, Chicago, IL; and ¶¶¶Division of Surgical Oncology, University of Minnesota, Minneapolis, MN.

☒cmock@uw.edu.

The authors report no conflicts of interest.

Copyright © 2020 Wolters Kluwer Health, Inc. All rights reserved.

ISSN: 0003-4932/20/27103-0460

DOI: 10.1097/SLA.0000000000003640

focusing on institutional partnerships, we do not mean to undervalue the importance of partnerships that are created without institutional commitment. Many successful collaborations exist among individual faculty efforts, and, in some cases, have initiated a larger institutional partnership. We also believe that many of the principles underlying academic institutional partnerships we describe here equally apply to all types of partnerships. Partnering in this landscape offers participants the opportunity to coordinate efforts with other implementing partners to strengthen the surgical care system within a larger effort driven, monitored, and re-evaluated by the national government and offers major advantages over fragmented, siloed, and condition-specific initiatives with limited sustained impact.<sup>10</sup>

## CHARACTERISTICS OF SUCCESSFUL PARTNERSHIPS

### Ethics and Cultural Sensitivity

All practitioners of global health, including global surgery, must always abide by the 3 core principles of bioethics as articulated by the Council of International Organization of Medical Science and the WHO: (a) respect for persons (respect for autonomy, and respect for persons with impaired or reduced autonomy); (b) beneficence; (c) justice.<sup>9</sup>

Substantial differences exist in the level of vulnerability and social privilege that exist between high-income country (HIC) and LMIC academic institutions. As a result, misunderstandings can easily occur. Informed consent can be misunderstood and ethical conflicts occur when externally sponsored research or training is conducted by developed countries in LMICs.<sup>8</sup> To minimize the occurrence of such conflicts, the partnership should be designed by both parties from the beginning. Research questions and training goals should be formulated jointly and should address the needs of the LMIC partner. The ethics review board of the LMIC institution and the IRB of the US institution must approve any research project including how informed consent is obtained. Obtaining informed consent poses a special problem when the subject has low level of education or there are language barriers. Yet the researcher must ascertain that sufficient information has been provided in a manner that the subject or patient can understand and comprehend. The consent must be obtained in conditions free of coercion and undue influence and must be not only in English but also in the language of the consentee.<sup>11</sup> Inequalities can pose a risk of exploitation in training programs when trainees and faculty from developed countries perform unsupervised operations beyond their level of training and expertise. This is immoral and each HIC institution should establish procedures to prevent this by ensuring that these trainees and faculty are instructed on this problem before they depart; and by ensuring that there is adequate supervision, preferably provided on site by Board-certified faculty (either US-trained or with other recognized training). Similar supervision should be provided for pre- and postoperative care. It should be noted that not working beyond one's level of training and expertise also applies to fully trained surgeons, as well as trainees.

Another important consideration is whether the LMIC partner has the capacity to absorb the requirements imposed by the number of students and trainees from the US partner.<sup>12</sup> These numbers should be negotiated from ab initio. Care must be paid not to destabilize the local infrastructure.

Misunderstandings can also occur when insufficient attention is paid to cultural sensitivity and cross-cultural communication. Cultural sensitivity training should be given, particularly to those individuals who have no previous experience in LMICs, before they embark on their work overseas and debriefings should occur upon their return. It is of paramount importance that patients and colleagues are treated with respect and with the same considerations for

confidentiality and privacy as pertain in HICs. Alleviation of suffering must be based on an ethical framework that emphasizes empathy and moral duties. All attempts to understand local customs and learn some words of greeting and of expression of gratitude in the local language go a long way in forming friendship and developing trust.<sup>13–17</sup> At the end of this article are a selection of case studies of successful partnerships. The case study on the Vanderbilt-Kijabe and Kenya Partnership, and the reference detailing it, include useful information about their methods for training on cultural sensitivity.<sup>18</sup>

Academic global surgery partnerships should not contribute to brain drain of LMIC surgeons.<sup>19</sup> To do so will only defeat the original goal of the partnership, which may have been capacity building.

Some general principles that must be borne in mind in all academic global surgery partnerships are summarized in Table 1, from a previous article published by the ASA Working Group.<sup>1</sup>

### Leadership and Faculty Champions

Institutional partnerships require academic and administrative leadership. The academic leaders are often the faculty champions who are committed to the partnership, are enthusiastic themselves, and create enthusiasm for the project among others. These champions must gain the trust and support of their institutional leaders at the highest level necessary, that is, university presidents, deans, department chairs, or institute directors.

The faculty leaders and champions with their LMIC counterparts will articulate the vision and mission of the partnership. They will also lead in developing and implementing the agreed-upon projects in education, clinical care, and/or research the partnership wishes to engage in.

### Performance of Needs Assessment in Conjunction With Host Institution

Partnerships forged to improve access to safe, affordable surgical and anesthesia care in LMICs cover a spectrum of engagement opportunities that spans from the ministerial level to academic medical centers to district hospital or village health care clinic. Understanding at the outset the strengths and limitations of the surgical care infrastructure, workforce, capacity, service delivery, and information management system is critical to the step-wise success of the partnership in each of these settings. To guide the process of improving surgical care systems at the ministerial and national level, a variety of resources have been developed and made available for download by the Program in Global Surgery and Social Change at Harvard Medical School, which established the *National Surgical, Obstetric and Anesthesia Planning (NSOAP)* program (<https://www.pgssc.org/national-surgical-planning>). Several countries including Ethiopia, Zambia, Tanzania, and Nigeria have worked with the WHO and the Program in Global Surgery and Social Change to examine all aspects of surgical care delivery that impact patients' access to the bellwether procedures identified in the *Global Surgery 2030 Core Indicators* for monitoring access to safe, affordable surgical and anesthesia care ([https://docs.wixstatic.com/ugd/d9a674\\_0d6901da03ae48bf82903876035ac66f.pdf](https://docs.wixstatic.com/ugd/d9a674_0d6901da03ae48bf82903876035ac66f.pdf)).

In countries where the NSOAP has been completed and incorporated into a strategic health plan, the gaps in health care services have been identified, the solutions prioritized, and the implementation framework developed.<sup>10</sup> Partnering in this landscape offers participants the opportunity to coordinate efforts with other implementing partners to strengthen the surgical care system within a larger effort driven, monitored and re-evaluated by the national government. This offers major advantages over fragmented, siloed, and condition-specific initiatives with limited sustained impact.<sup>10</sup> The benefits of formalizing a strategic health

**TABLE 1.** Important Guiding Principles for Ethical Engagement in Global Surgery by US Academic Institutions

Domain of Activity	Ethical Principles
Local priority	Local counterparts should equally set priorities for all work. The interests of the local surgeons and their patients should be the primary objective for any work including clinical care, capacity building, and research. When there are differing opinions, local priorities should take precedence. The final decision should be made by local counterparts, without undue pressure from international partners.
Resources	Any program established should augment and not destabilize existing infrastructure and programs. Any engagement must have a plan for how it will aid the local community and build local resources, as the ultimate goal is to build local resources and strengthen local institutions. When US resources are obtained, as much as possible of these resources should be steered toward the LMIC sites. This includes obtaining funding for bilateral exchanges, not just travel for faculty and trainees from high-income sites to LMICs.
Clinical care	Visiting surgeons should have a plan for the management of complications, for long-term follow-up, and for the coordination of postsurgical care with local providers
Capacity building (including training)	Outmigration of trained personnel is a serious impediment to capacity building. The US partners should be sensitive to this problem and minimize the possibility of “brain drain.” This can be accomplished in part by selecting potential trainees already committed to return to the country of origin. Avoid emphasis on costly technology that might not be feasible or might detract from other more beneficial elements of training. Training should be focused on the needs of the community to which the LMIC trainees are to return. For procedural training, priority should be given to the local surgery residents over visiting surgical residents.
Research	Research should be fully collaborative and involve local counterparts through all stages of the work. Publications should, at a minimum, include at least 1 author from the LMIC in which the data were gathered, and preferably more. Research should be set up so that it is appropriate to have LMIC authors as first or senior authors.
General	The same standards for clinical care, education, and research that are adhered to in United States should be duplicated. Health and safety of visitors should be assured. Avoid paternalism. Understand the culture of the community in which you are working. In some cases, especially when multiple short-term visitors are coming to a site, it is important to offer for cultural sensitivity training.

Reproduced with permission from Global surgery: effective involvement of US Academic Surgery Report of the American Surgical Association Working Group on Global Surgery. *Ann Surg* 2018; 268:557–63.

system plan, such as NSOAP, to guide implementation are supported in the literature.<sup>20</sup> As one of the first countries to complete a NSOAP in 2015, Ethiopia has since been able to recruit and coordinate government resources with international implementing partners to renovate operating rooms, improve the supply line, upskill the surgical workforce, expand residency and biomedical engineer training, and quality improvement programs.<sup>21</sup> Working as an implementing partner within the context of an NSOAP provides the best assurance that the available resources are matched to the specific areas of need.

Global Surgery partnerships in LMICs where NSOAPs have not yet been initiated are strategically vulnerable to the disruptive effects of budgetary cuts, personnel and supply line shortages, and limited educational and training opportunities. These opportunities are frequently under the aegis of a Ministry of Health (MOH) and/or Ministry of Education. Hence, coordination of partnerships within a framework structured by the MOH/Ministry of Education provides a platform for improved bidirectional communication regarding both the needs and available resources. In 2015, The Lancet Commission on Global Surgery recommended that all countries collect surgical indicators to lend insight into improving surgical care and established the Lancet Commission on Global Surgery targets for surgical access, workforce, or surgical volume. In Uganda, this initial assessment of public hospitals serving 64% of the population was sanctioned by the MOH and completed in 2018. The assessment demonstrated that <25% of the population had 2-hour access to a surgically capable facility, surgical, anesthetic, and obstetrician physician workforce density was 0.3 per 100,000, and most hospitals reported having electricity, oxygen, and blood available more than half the time and running water available at least 3 quarters of the time.<sup>22</sup> The findings of the study highlight the dependency of surgical services on variably available resources such as electricity or oxygen and the concurrently variable availability of anesthesia personnel and services. Recognizing the critical interdependent relationship

between these limited resources is an important first step toward developing a strategy to address the surgical needs of the community using a multidisciplinary approach that includes surgeons, obstetricians, anesthesiologists, nurses, biomedical engineers, and business/systems expertise.

A strategy similar to the NSOAP approach may be scaled accordingly when organizing partnerships at the regional, institutional, or clinic level of engagement. *The Tool for Situational Analysis to Assess Emergency and Essential Surgical Care in Ethiopia* ([https://docs.wixstatic.com/ugd/d9a674\\_e9481999bec443-b5a291199ff33890a4.pdf](https://docs.wixstatic.com/ugd/d9a674_e9481999bec443-b5a291199ff33890a4.pdf)) is a tool used to conduct the initial surgical care assessment at hospitals in Ethiopia as part of the *Saving Lives Through Safe Surgery (SaLTS)* program. This tool was used to assess all aspects of surgical care from the perspective of the hospital director, surgeon, OB/GYN, anesthesiologist, and nursing staff. The survey covered items that included infrastructure, operating rooms, use of management guidelines, availability of a clinical laboratory, sterilization facility and radiologic services, workforce, interventions, equipment inventory, and supply-line reliability. These tools serve to define the availability of essential personnel, equipment, and supplies needed to perform surgery. The scope of the survey also illustrates the interdependence of the different stakeholders and, in turn, the need to address the gaps in each area if optimal improvements in capacity building are to be achieved.

### Formal Structuring of the Partnership

It is wise that, when operating in a LMIC, specific permission should be obtained from the country's health authorities.

A formally signed agreement, often referred to as a memorandum of understanding or MOU, should be the basis for the partnership and should include the following:

1. Clearly defined goals, mission, and vision
2. A governance structure

3. Committee structure that may include a steering committee, executive committee, operational subcommittees as necessary, an external scientific advisory board, and others as needed
4. A communications strategy, which may include weekly to monthly meetings by phone or by Zoom and periodic face-to-face meetings, and faculty and trainee exchanges
5. Agreement on how potential conflicts will be resolved
6. Agreement on handling of funds and grants
7. Agreement on authorship, intellectual property, and handling of data, tissue, and blood
8. Agreed upon milestones, monitoring, evaluation, and impact analysis
9. However, if sustainability is in question, programs should be initiated, utilizing the needs and resources of the LMIC, such that a realistic MOU can be developed, based on such needs. This can be an approach used by individuals and small groups to develop viable institutional commitment.

### Sustainability of Partnerships

The long-term sustainability of partnerships depends on several factors, including perceived benefits to both sides and openness from the outset. An important factor is the successful implementation of projects and visible and measurable impact of the partnership. The continuing enthusiasm and support of the partnering institution leadership and their faculty is another determinant of sustainability. Partnerships dependent on single individuals in one organization will not succeed. All programs should be initiated with the plan to become sustainable, preferably from within, but until that is possible, the HIC must be prepared to provide ongoing support, often measured in decades.

The willingness of institutions to provide ongoing support crucially depends on whether the partnership has shown demonstrable success and measurable impact. The trust and collegiality that develops between the partners is another measure of success. The availability of long-term, dependable funding mechanism is a necessary condition. Many worthwhile partnerships had to be disbanded because of lack of dependable funding. Funding should be sought not only from the parent institutions but also from the host government, and from bilateral and multilateral organizations. Occasionally, the partnership is able to generate funding from its own activities, such as educational offerings. Finally, securing the collaboration and support of the Ministry of Health and/or Education is likely to contribute to sustainability of the partnership and recognition of its impact on national welfare. Ideally, what the global surgery movement, in general, and academic partnerships, in particular, should try to accomplish is to have government appropriation as a line item in the annual healthcare budget of host countries.

### TOPICAL AREAS OF PARTNERSHIP

#### Training

Training of students, residents, and junior faculty is a prime goal of most academic partnerships.<sup>23</sup> The partnership must ensure a secure environment with adequate housing. Direct patient care by LMIC trainees is not allowed in the United States, unless they have the United States Medical Licensing Examination (USMLE), and gain access to recognized residencies or fellowships. On the contrary, there is every expectation that trainees from HICs will engage in direct patient care in the LMIC institutions. This disparity creates discontent and even some resentment in LMICs. The global surgery community in the United States should advocate that LMIC trainees should have the same opportunities to engage in direct patient care.

When LMIC trainees do have USMLE certification and clinical rotations are undertaken, little is achieved in a month's stay.

A stay of 3 or more months is needed to impart adequate experience. A year or 2 is ideal. The problem is often lack of adequate funding. The sources of funding include national and international fellowships, the partnering institutions themselves, and external grants obtained by the partnership, the host government, and bilateral and multilateral organizations.

Even when hands-on clinical rotations are not possible, both trainees and established physicians in LMICs may benefit and should not be discouraged from visiting academic centers in HICs for observational rotations. For example, principles of safe surgical practice and quality improvement can be observed, learned, and implemented by visitors from LMICs, even though direct patient care is not yet possible.

It is incumbent on the partners to design an appropriate training program, whether the main goal is patient care, research, training skills, or administrative experience. Because foreign trainees without USMLE cannot participate in hands-on patient care, every effort should be made to address their needs specifically and include them in active discussion on ward rounds, in clinics, and the operating room. They can participate fully in research, whether basic or clinical, but specific goals must be set. Observing and learning how activities in outpatient clinics and the operating room are organized and conducted is most beneficial for LMIC faculty, who desire to acquire additional organizational and leadership skills. These skills are critically needed in LMIC hospitals and clinics.

Observerships are of most value to those with significant clinical training, in their country of origin. Early exposure following medical school compounds the complexity and can often lead to the trainee wanting to relocate and begin training in the United States. Other factors that can be used to maximize the benefit for LMIC trainees in HIC observational rotations include preselecting the visitor based on the needs of the home institution, priming the observer by meetings with prior visitors, assigning an individual sponsor with whom regular meetings are held, tailoring the visit to the specific needs of the trainee, and promoting attendance at departmental meetings especially those that might not be held at the home institution, such as quality improvement meetings. Other useful activities to consider include training using simulation centers and training related to surgeons as educators. If the observership is strictly clinical (ie, not working on research projects or other activities), generally 3 months would be a reasonable limit. After that, frustrations of nonclinical care begin to surface.

There are also benefits for US trainees in LMIC rotations. As more and more surgical procedures are performed by minimal-access surgery, US students are gaining less and less experience with open surgery. Resident rotations in LMIC institutions provide greater experience with open surgery and exposure to surgical practice in resource-constrained settings, and to the challenges of cross-cultural clinical practice.<sup>20</sup> In addition, "residents have exposure to a spectrum of tropical diseases, acute surgical abdomens, and to advanced malignancy not routinely encountered in western practice."<sup>24</sup> They learn as much from the host faculty and residents as they teach themselves.

The host institution benefits from academic contributions of the HIC faculty and residents. Improved surgical training occurs through the establishment of courses, morbidity and mortality conferences, and the cultivation of improved pre- and postoperative care.

US residents going on LMIC surgical rotations must be prepared for the challenges they are going to encounter. These include difficulties in language, in working cross-culturally, and the realities of surgical practice in resource-constrained and culturally different environment with different expectations of medical care. Importantly, the surgical experience of visiting students and residents from HICs should not conflict or impair the training of

students, residents, and established physicians in the host LMICs. For example, visiting HIC residents should not compete with local LMIC residents for operative experience (Table 1).

An acceptance that they will be exposed to environmental risks such as tropical infectious disease, like malaria, has to be acknowledged and appropriate prophylaxis is essential.

Supervision and mentorship are of paramount importance to the success of exchange programs. This is especially true in resident rotations where the supervision by Board-qualified surgeons or approved local equivalent, is key to Board of Surgery approval of rotations overseas.<sup>25</sup> Again, formal approval of the LMIC health authorities should be obtained. Curriculum development for students and residents in LMICs should be guided by the needs and Board requirements of the host country. An important challenge now faced by HIC faculty is that the time spent and the work performed in LMIC institutions is not given enough weight toward promotion and tenure. This problem must be solved.

The above comments address training in both directions. However, too often the emphasis in many partnerships has been on HIC trainees. Partnerships should be structured to be more equitable. This includes getting more out of observational rotations for LMIC trainees visiting HIC institutions, as noted above. It also includes getting more benefit for LMIC trainees out of HIC faculty who visit LMIC institutions. It would be useful to structure partnerships more toward emphasizing the input of HIC faculty for clinical training, research training, and input on curriculum. This will hopefully be facilitated by the increasing recognition in many HICs that global surgery is an acceptable area of work for academic promotion. It should also be noted that training of residents from LMICs by surgeons from HICs is usually best accomplished at the LMIC site. This strategy meets the needs of the local environment, minimizes potential brain drain, allows residents from LMICs to participate directly in patient care, and provides for training of the entire surgical team. Benefit for LMIC trainees is emphasized in several of the case studies at the end of this article.

## Research

Collaboration in clinical research is of great value to both partners. The potential for clinical trials and outcome studies for US surgeons is significant. Of course, the same ethical standards must be followed and approval by recognized boards on human research must be obtained by both parties. As mentioned earlier, issues pertaining to authorship, handling of data, and biological specimens must be agreed upon in the MOU signed at the beginning of the partnership.

In the past, when research grants were awarded to partnerships, the administration of research funds was done at the HIC institutions for both parties. This is no longer the case. In fact, increasingly, joint grants are given to the LMIC institutions to administer with funds to the HIC institutions given as external contracts. This practice is helping LMIC institutions to develop grant administration capacity. This process is slow but provides an opportunity for capacity development and support of the LMIC institutions by partnering HIC institutions. In addition, academic institutions in HICs can provide much needed formal research training for investigators in LMICs. Many academic institutions offer research programs in health services research, clinical research, epidemiology, and biostatistics. Such institutions should encourage applications from students and physicians in LMICs. Research training can be administered in HICs with the goal of returning trained researchers to their LMIC country.

## Patient Care

Surgeons from institutions in HICs frequently provide direct patient care in LMICs. Therefore, clinical management protocols for

common conditions (eg, trauma, cancer) should be jointly discussed and agreed upon by both the host and visiting institutions. Standardized safe surgery procedures (eg, the time out, timing of perioperative antibiotics, fire safety) should be discussed and agreed upon by the host and visiting institutions. Regular communications using tele-video should be considered to maximize the communications between staff at the partnering institutions and to provide timely consultations about patient management. Purchase, maintenance, and staff training should be discussed between the host and visiting institutions before acquiring new instrumentation or technologies. The impracticality of providing advanced technology to environments where repair and/or maintenance does not exist cannot be overemphasized.

## EXAMPLES OF SUCCESSFUL US-LMIC INSTITUTIONAL PARTNERSHIPS

Leaders from 4 successful partnerships were asked to summarize their experiences, including: (1) the history of the partnership; (2) main goals; (3) main accomplishments; (4) challenges faced; and (5) funding source. These are summarized below. Table 2 demonstrates how each partnership addressed the principles covered in this article, including the importance of developing respectful and ethical relationships, having strong leadership and identified faculty champions, formal structuring of the partnerships, and addressing sustainability.

### Vanderbilt-Kijabe and Kenya Partnership

The Vanderbilt University (VU) strategic partnership with AIC Kijabe Hospital (KH) and BethanyKids (BK) at Kijabe in Kenya represents partnership between a US university and faith-based organizations (FBO) in Africa. FBOs provide an estimate of up to 40% of services in developing countries including sub-Saharan Africa (SSA). Although closely aligned with community needs, FBOs often go unrecognized if operating outside government planning processes.<sup>26–28</sup> Numerous faith-based hospitals arose globally throughout the 20th century. More recently many added postgraduate medical/surgical training, and some affiliated with (or became) university teaching hospitals and medical schools. The Pan-African Academy of Christian Surgeons arose in 1997 to address surgeon shortages in rural and underserved areas. About one-third of College of Surgeons of East, Central, and Southern Africa (COSECSA) Fellows by examination are Pan-African Academy of Christian Surgeons graduates and all reside in SSA.<sup>18</sup>

The VU-Kijabe and Kenya partnership began about 10 years ago by VU faculty with long experience in African humanitarian work in collaboration with KH and BK staff already involved in training surgeons and anesthesia providers. The initiative came at a time when American medical students, residents, and faculty began to seek international experiences and predated the *Lancet Commission Report, Surgery 2030*, which highlighted the need to train African surgeons and anesthesiologists for Africa to improve access to safe surgery and anesthesia.

KH, a 104-year-old, faith-based, tertiary-care hospital, affiliated with the University of Nairobi in research and education, is one of the few Kenyan centers certified for training general and specialist surgeons. The vision was to create a global surgical and cultural experience that would provide educational and professional value for KH trainees and the visiting VU residents and faculty. It helped that a VU anesthesia rotation started in 2010. Challenges included documentation of formal teaching services and curricula, providing digital sources for literature, etc, housing, developing research, obtaining Residency Review Committee (RRC) approval, and, most importantly, funding. For KH and VU, the primary goal is training African

**TABLE 2. Summary of How Each Partnership Addressed Issues Raised in the Article**

	Ethics and Cultural Sensitivity	Leadership and Faculty Champions	Performance of Needs Assessments	Formal Structuring of the Partnership	Sustainability	Learning from Failure
Vanderbilt-Kijabe and Kenya	Started with face-to-face-site visit to ascertain: Did Kijabe actually want a partnership? What did Kijabe stand to gain? Would VU residents always defer to Kijabe trainees and never compete for cases?	VU offers a faculty appointment to KH surgeons, providing access to all VU library resources. Multiple Kenyan faculty from several disciplines have visited VU and been actively involved in research, including authorship and international presentations.			Recruitment of VU faculty as self-funded volunteers not a problem. Variety of funding sources for full-time VU faculty and VU and Kenyan residents: Help through healing hands, PAACS, Private foundations.	Debriefing sessions showed areas for improvement, such as Emotional difficulties of seeing patients forgo life-saving procedures for lack of funds. Overlooked areas of cultural sensitivity training, such as how US residents of color may be perceived by LMIC locals; how to respond to requests for financial assistance.
KNUST and UW	Aided by the fact that the UW PI lived and practiced in Ghana for 4 years.	KNUST and UW faculty as joint PIs on NIH grants. Most recent competitive renewal now has KNUST as prime institution and Ghanaian PI as contact PI for NIH.	KNUST-UW collaboration pioneered use of WHO trauma care resource guidelines and have used over time to document changes in hospitals nationwide.	Informal at first (1990s). Structure now based on joint PIs of NIH grants. Training advisory group to monitor grant activities: consists of leaders in injury control in US and Ghana.	A lot accomplished initially even with no minimal funding. Activities scaled up in recent decade with NIH funding.	Difficulties in achieving equitable gender representation: need for flexibility in family issues.
MSKCC	Global Disparities Fellows spend 6 months in Nigeria, bringing cultural awareness issues to United States. Frequent (>3 times per year) visits from dedicated HIC faculty to LMIC sites.	Constant re-evaluation of needs, weekly phone calls among leaders in US and Nigeria. MSKCC faculty visit at least 3 times per year, with post visit evaluations.	On-site evaluation of need pre- and post- observership, and post-fellowship rotation.	Development of an African network: the African Research Group in Oncology (ARGO)	Active research programs, including NIH funding. Committed philanthropic funding for next 10+ years.	Essentiality of identifying appropriate candidates from LMIC who will remain committed to the program for others on return home.
ACSOGB-COSECSA: Hawassa	OGB survey in 2016: 85% of respondents reported no or minimal training before global health engagement. OGB developed course on global health for surgeons for ACS Clinical Congress.	ACS model developed by bringing together like minded departments in United States. Shared goals with Hawassa. Partnership outlines mutual benefits in pillars of: Clinical care Research Resident education Quality		Annual work plan meeting: all stakeholders participate in defining the shared goals for the next year.	Ethiopian Federal Ministry of Health is a stakeholder and provides logistical support.	Given limitations of observational visits to HIC institutions, we are now exploring south to south partnerships that can provide additional opportunity for local faculty development.

ACSOGB-COSECSA indicates American College of Surgeons Operation Giving Back; COSECSA, College of Surgeons of East, Central, and Southern Africa; HIC, High-income country; LMIC, Low- and middle-income country; KH, Kijabe Hospital; KNUST, Kwame Nkrumah University of Science and Technology; MSKCC, Memorial Sloan Kettering Cancer Center (MSKCC) Global Disparities Initiative in Sub-Saharan Africa; PAACS, Pan-African Academy of Christian Surgeons; UW, University of Washington; VU, Vanderbilt University.

personnel in an academic model so that graduates can establish their own programs in Africa. Training efforts are based in Africa to improve retention. The secondary goal is to provide senior VU surgical and anesthesia residents with an opportunity to work alongside their African counterparts, to learn from each other, and to learn values that only humanitarian work can provide. In 2011, the Surgery RRC approved this elective rotation for VU senior surgical residents who first rotated that year. All participants were oriented for cultural sensitivity before departure and debriefed on return.<sup>12</sup> VU offers a faculty appointment to KH staff surgeons, which provides access to all VU library resources and the REDCap research database. This partnership has grown significantly in scope over time from Anesthesia to General Surgery and Pediatric Surgery with interest now expressed by most of the surgical specialties.

Sustainability depends on many factors. Recruitment of VU faculty as volunteers was not a problem. Short-time volunteers funded themselves. VU and African residents were funded by VU and Help Through Healing Hands, and KH, BK and the Pan-African Academy of Christian Surgeons, respectively. Full-time VU faculty was partially funded by VU and sometimes Samaritan's Purse. Generous funding for Pediatric Surgery and Anesthesia trainees who have and will return to their home sites has been provided by a private US foundation. The ACS has provided digital teaching tools. Clinical and basic research and Fellows' support has come from internal sources and the NIH and NCI, and the GE Foundation has provided significant funding for anesthesia education, simulation, and teleconferencing.

A number of senior VU Surgery residents have elected this experience. All our African Pediatric Surgery and Anesthesia trainees are now in 8 African countries where efforts are being made to establish new training programs.

Another important component of the VU-Kijabe partnership is the cultural sensitivity training provided to US trainees before they go to Kenya. Attention to cultural sensitivity was integrated into the Vanderbilt surgery rotation to Kijabe from inception and started with the findings from the initial site visit by the program director and program liaison wherein the hosts described their needs and the parameters within which the VU residents would work. The results involved crafting a formal session on cultural issues such as resident roles in the hospital (eg, never competing for cases with the Kijabe surgery trainees), appropriate interpersonal relationships (eg, no cohabitation between the unmarried), suitable clothing, respectful language, respect for the spiritual and religious activities of the faith-based institution, and an awareness of the multiple cultures and ethnic groups served by the hospital. This cultural sensitivity session always included "veterans" of the rotation who shared their own experiences with cultural issues (both positive and negative). The formal session was supplemented with a procedures manual that sought to document all aspects of the rotation from pre-trip preparation to on-the-ground advice and information including cultural sensitivity advice and personal safety information and tips on leisure opportunities. Every resident was debriefed shortly after return and the findings were integrated into and enhanced subsequent cultural sensitivity gatherings.<sup>18,19</sup>

### Kwame Nkrumah University of Science and Technology/University of Washington Partnership

Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi, Ghana and University of Washington (UW) in Seattle have collaborated on capacity building for research on injury prevention, trauma care, and surgical issues for 25 years. Much was accomplished early on despite minimal funding. In the past 14 years, resources have become more reliable in the form of continuous funding from the NIH's Fogarty Center. The main goal of this grant is to

strengthen capacity for injury control research in academic institutions in Ghana, building a cadre of qualified researchers. The project's foundations are degrees (MPH, PhD) at KNUST, supplemented with short rotations at UW, and with co-mentoring by KNUST and UW faculty. Junior researchers engage in mentored research to generate evidence to strengthen the policy and practice of trauma care and injury prevention in Ghana and in LMICs more generally.

The KNUST-UW Fogarty grant has trained 23 long-term degree scholars, all of whom have remained in Ghana and are contributing to building the capacity of their institutions for injury research. Several KNUST departments (general surgery, orthopedics, emergency medicine, public health) and other institutions in Ghana now have increased capacity for injury research in the form of independent researchers with active research teams and with growing international collaborations. Their research has advanced trauma care and injury prevention in Ghana and has contributed to the global evidence base. A few examples are as follows:

1. A study of speeds of 20,000 vehicles gained national publicity when it demonstrated minimal compliance with speed limits in areas with high rates of pedestrian injuries. This increased popular and political will for speed control with a consequent increase in placement of traffic calming infrastructure (eg, speed bumps) at dangerous intersections.<sup>29</sup>
2. A preventable death review at KNUST's Komfo Anokye Teaching Hospital showed a high rate of preventable trauma deaths from causes such as inadequate shock resuscitation. This led to improved quality improvement activities. Data from this study were also used to successfully lobby for the creation of an emergency medicine residency at KNUST, the first in West Africa.<sup>30</sup>
3. An estimation of nationwide rates of surgery was one of the first in Africa and showed a low annual rate (869 operations/100,000) in comparison to the Lancet Commission on Global Surgery's benchmark of 5000. This study generated data now being used for national surgical planning by Ghana's Ministry of Health.<sup>31</sup>

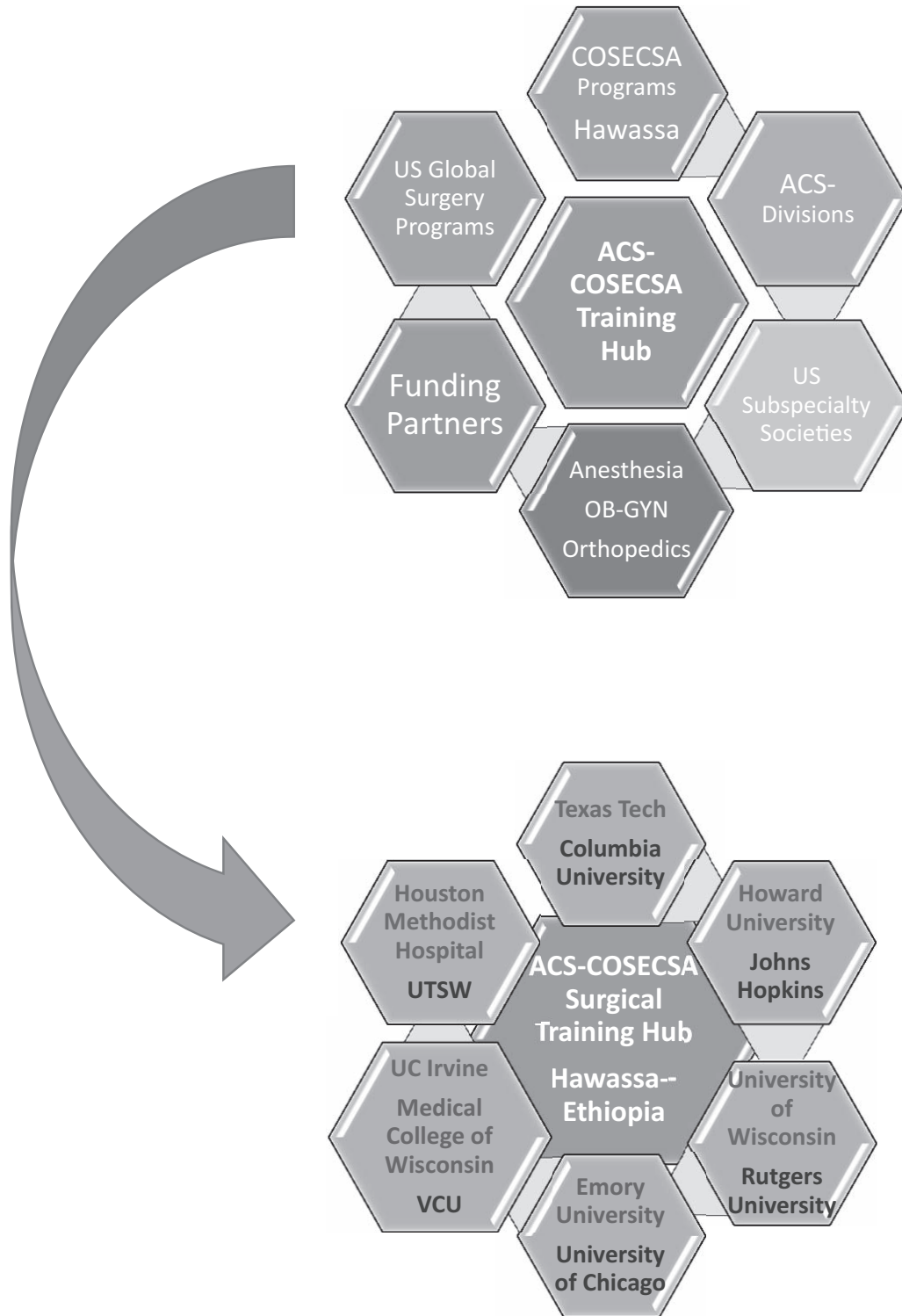
Given the success of the program, the grant is now based in Ghana, with KNUST as the prime recipient, interacting directly with NIH.

Challenges include: (1) Funding. More resources would allow wider scale-up of successful interventions. (2) Advocacy. Despite the above successes, efforts to engage government have been less than optimal, especially in promoting improvements in trauma care at smaller hospitals. This is in part due to turnover at higher levels of government, making sustained advocacy difficult.

In summary, despite challenges, the KNUST-UW partnership has increased the capacity of local institutions to conduct injury-related research that has impacted the policy and practice of trauma care and injury prevention in Ghana and has contributed to the global evidence base for these issues. A major contributor to this success is the respectful relations between the 2 institutions, with an emphasis on prioritizing the needs of KNUST and other local institutions.

### The Memorial Sloan Kettering Cancer Center Global Disparities Initiative in Sub-Saharan Africa

Memorial Sloan Kettering Cancer Center (MSKCC) began this initiative in the 1980s with a funded fellowship derived from philanthropy that brought surgeons from LMICs to MSKCC for a 3-month stay. This funded both airfare and stipend. Initially directed at the Middle East, the program evolved and has matured into a major program directed predominately to SSA. Most recently, this program has funded 17 Nigerian, Kenyan, and Tanzanian faculty in surgery, pathology, anesthesia, and radiology to spend 3 months at MSKCC before returning. The program has funded 2 (1 Nigerian, 1 Kenyan) faculty members to complete a Cornell Masters in Clinical Research.



**FIGURE 1.** ACS-COSECSEA Surgical Training Hub—Hawassa Collaborative.

In 2017, a Global Cancer Disparities surgical fellowship was initiated at MSKCC. That fellowship involves a candidate spending 6 months at MSKCC as a clinical fellow and 6 months in Nigeria. As far as we are aware, this is the first of its nature in the United States. Another similar fellowship will be added in 2020. This fellowship

is integrated into MSKCC’s International Surgical Oncology Fellowship which has operated formally since the 1980s and is open to fellows from all parts of the world but they must have the USMLE. In 2017 the first SSA surgeon graduated from this regular MSK international fellowship program.



**TABLE 3.** Shared Goals of the ACS-College of Surgeons of East, Central, and Southern Africa Surgical Training Hub-Hawassa Collaborative

Build local capacity for clinical service and research
Promote faculty development through research opportunities
Align with the Ethiopian Ministry of Health framework and goals for safe surgery
Standardize curriculum with clear goals and evaluation processes
Develop sustainable/transferrable systems and models
Initiatives should be Hawassa-led and applicable to the local setting and population
Recognize the interconnectedness of the 4 categories discussed
Establish relevant indicators that can be tracked
Consider clinical systems such as trauma system for other outcomes (NCDs, Oncology)
Robust baseline data are essential
Monitor and track outcomes regularly
Develop and promote local registries

Funding for these programs is always a challenge, but we have been fortunate to have philanthropic support, some institutional support, and Peter Kingham, who leads the program in Nigeria has a 5-year NIH UG3 grant. The on-ground coordinator in Nigeria is Dr. Isaac Alatise, a product of an observership experience at MSK. The majority of the grant resources are spent in Nigeria in efforts to improve early diagnosis and management of colorectal cancer. Other funding is directed to R21 submissions and career development awards to the American Society of Clinical Oncology and similar organizations. Department of Defense grant submissions have looked at the micro-biome of colorectal patients and have emphasized the success of our clinical research program, in which more than 3000 patients have been entered into prospective clinical studies.

MSKCC has institutional recognition of global health care as a pathway for academic promotion with approximately 20 faculties in all disciplines indicating their interest in such programs. As interest in global health develops, we find that young faculties are interested in joining our program regardless of specialty.

As just one example of how these efforts have benefited the LMIC partners, the Obafemi Awolowo University in Ile Ife, Nigeria has significantly upgraded the capabilities of its pathology laboratory and has started colorectal, liver, and pancreas surgery programs. It has also built its research infrastructure, which is being used by other research groups at the university. The annual ARGO conference serves as a vital update for cancer surgery for the whole country.

A major achievement by Dr. Kingham is the development of a consortium, The African Research Group for Oncology (ARGO), in 2013. They have an annual meeting strongly supported by MSKCC faculty with 14 participating in the meeting held in Nigeria in April 2019.

Although the educational observer program has been functional for over 30 years, funding surgeons from LMICs in all parts of the world, we have found in the last 10 years that a focused program beginning in 1 country and 1 site is the most viable. Once such a program is firmly established we have been able to move to other institutions within the same country and now other SSA countries. It is hoped that this program would be a prototype for others interested in such endeavors. The following published articles demonstrate the accomplishment of the partnership.<sup>32–38</sup>

### ACS-COSECSEA Surgical Training Hub-Hawassa Collaborative

Operation Giving Back (OGB) is the volunteer arm of the ACS. With approximately 80,000 members, the ACS is the world's largest professional and academic association of surgeons.<sup>39</sup>

OGB recognizes that surgical educators across HICs are increasingly interested in training surgical workforce in the LMICs; however, lack of funding has made this very difficult. Moreover, the shortage of resources, both financial and material, has led both academic and nonacademic organizations to function in institutional silos. This practice has further compounded the problems by causing inefficiencies, duplicating efforts, and wasting resources. Joining hands and forming Global Surgery Programs Consortium to work in the global environment was suggested by Debas.<sup>40</sup> The consortium creates several potential advantages. Developing sustained commitment to build capacity in one region can improve the quality of surgical training. Year-round presence of US-trained surgeons can provide continuity of patient care, a well-supervised and curriculum-based educational activity to surgical residents and students, and career development opportunities for junior faculty.

Supported by the decision of the Board of Regents of the American College of Surgeons on Global Engagement, OGB became a convening body and developed a framework for the formation of a consortium of Global Surgery programs. The focus of the group will be on surgical workforce development in SSA. This led to the creation of “ACS-COSECSEA Surgical Training Hub” at Hawassa University in Ethiopia. There were 3 critical steps in this process:

1. Identifying the African site by leveraging our existing relationship with the COSECSEA. A survey was used to assess human resources, infrastructure, training, patient population, existing partnerships, etc. Subsequently, a site visit to the 2 short-listed training sites was undertaken. The visit included discussions with all stakeholders including residents, faculty, leadership, and policy makers. Hawassa University Hospital was selected by the committee.
2. Consortium of US Academic Global Surgery Programs: Recruitment of like-minded global surgeons from several US academic programs was undertaken by individual committee members reaching out to several programs. This resulted in 14 US surgical programs willing to participate by providing onsite presence of a team for a month, allowing a continuous year-round presence of US surgeons at the Hub. The staffing schedule was developed and the program was initiated in January 2019. Figure 1 shows the participating institutions.
3. Develop Shared Goals for the Collaborative: A 2-day workshop was conducted at the ACS headquarters in Chicago to develop shared goals and a work plan in the areas of education, clinical service, quality, and research. Participants included Hawassa University leadership, representatives of US institutions, and OGB committee members. (Table 3).

#### Next Steps:

The project is well under way. The first 6 months will focus on relationship building and in-depth needs assessment. As the group continue to support and improve the quality general surgical training, several skills-based training programs will be delivered. Developing basic infrastructure for quality and research-capability building is a priority. We anticipate that the Hub will have a regional impact in skills and knowledge transfer using train-the-trainer model. Based on the result of this pilot program, OGB anticipates supporting additional regional Hubs in other parts of the world and sharing the experience with others who may want to use this model.

### CONCLUSIONS

US academic institutions have made significant contributions to their LMIC counterparts through mutually advantageous partnerships. Similarly, LMIC academic institutions have contributed to the

education and clinical experience of US students, residents, and young faculty. In addition, these partnerships provide unique opportunity for clinical and translational research for both parties. In this article, the authors, based on their collective experience and the literature, discuss how successful partnerships that foster mutual advantage, ethical behavior, and trusting relationships should be structured and implemented. They should develop financially sustainable long-term partnership based on mutually shared vision, patience, and flexibility. They should secure the support of the Ministries of Health and Education, whenever possible. Examples of successful partnerships between US and LMIC academic institutions are provided. These case studies and the related Table 2 demonstrate implementation of the principles discussed throughout the article, including the importance of developing respectful and ethical relationships, having strong leadership and identified faculty champions, formal structuring of the partnerships, and addressing sustainability.

### ACKNOWLEDGMENTS

The authors thank the ASA Council for their guidance; Rebecca Bonsaint, L.K. Coughlin, and Jon Blackstone for their logistical assistance; and Margaret Tarpley for editing of the manuscript.

### REFERENCES

- Mock C, Debas HT, Balch CM, et al. Global surgery: effective involvement of US academic surgery. Report of the American Surgical Association Working Group on Global Surgery. *Ann Surg.* 2018;268:557–563.
- Merson MH. University engagement in global health. *N Engl J Med.* 2014;370:1676–1678.
- Kanter P. Global health is important in a smaller world. *Acad Med.* 2008;83:115–116.
- United Nations. Sustainable Development Goals: About the Sustainable Development Goals. Available at: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>. Accessed March 27, 2019.
- Meara JG, Leather AJ, Hagander L, et al. Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. *Lancet.* 2015;386:569–624.
- Debas HT, Donkor P, Gawande A, et al. *Essential surgery; Disease control priorities, 3rd ed (Vol 1)*. Washington, DC: The World Bank; 2015.
- Sullivan R, Altise OI, Andersen BO, et al. Global cancer surgery: delivering safe, affordable, and timely cancer surgery. *Lancet Oncol.* 2015;16:1193–1224.
- Boum Ii Y, Burns BF, Siedner M, et al. Advancing equitable global health research partnerships in Africa. *BMJ Glob Health.* 2018;3:e000868.
- The Council of International Organization of Medical Sciences (CIOMS). *International Ethical Guidelines for Biomedical Research Involving Human Subjects*. Geneva, Switzerland: CIOMS; 2002.
- Sonderman KA, Citron I, Meara JG. Planning in the context of global surgery—the way forward. *JAMA Surg.* 2018;153:959–960.
- The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The Belmont Report. Ethical Principles and Guidelines for the Protection of Human Subjects of Research. Washington, DC; Department of Health, Education, and Welfare. 1979.
- Tarpley M, Hansen E, Tarpley JL. Early experience in establishing and evaluating an ACGME-approved international general surgery rotation. *J Surg Educ.* 2013;70:709–714.
- Louden RF, Anderson PM, Gill PS, et al. Educating medical students for work in culturally diverse societies. *JAMA.* 1999;282:875–880.
- Seibert PS, Sridh-Igo P, Zimmerman CG. A check list to facilitate cultural sensitivity and awareness. *J Med Ethics.* 2002;28:143–146.
- Anonymous. Culture and health. <https://cultureandhealth.wordpress.com/2010/12/23/icebergconcept-of-culture/>. Accessed June 21, 2019.
- Vanderbilt University. Procedures Manual Vanderbilt International Surgery (VIS); Elective Rotation for General Surgery Residents at AIC Kijabe Hospital. 2016. Available at: [https://prd-medweb-cdn.s3.amazonaws.com/documents/globalsurgery/files/Procedures%20Manual%20Vanderbilt%20International%20Surgery\\_2016.doc](https://prd-medweb-cdn.s3.amazonaws.com/documents/globalsurgery/files/Procedures%20Manual%20Vanderbilt%20International%20Surgery_2016.doc). Accessed July 6, 2019.
- Wall A. *Ethics for International Medicine: A Practical Guide for Aid Workers in Developing Countries*. Hanover, New Hampshire: Dartmouth College Press; 2012.
- O'Neill JA, Hansen EN, Nyagetuba JKM, et al. A plan for surgical education in low-middle income countries. *J Trauma Crit Care Med.* 2017;83:788–793.
- Van Essen C, Steffes BC, Thelander K, et al. Increasing and retaining African surgeons working in rural hospitals: an analysis of PAACS surgeons with twenty-year program follow-up. *World J Surg.* 2019;43:75–86.
- Langlois EV, Becerril Montekio V, Young T, et al. Enhancing evidence informed policymaking in complex health systems: lessons from multi-site collaborative approaches. *Health Res Policy Syst.* 2016;14:20.
- Burssa D, Teshome A, Iverson K, et al. Safe surgery for all: early lessons from implementing a national government-driven surgical plan in Ethiopia. *World J Surg.* 2017;41:3038–3045.
- Albutt K, Punchak M, Kayima P, et al. Access to safe, timely, and affordable surgical care in Uganda: a stratified randomized evaluation of nationwide public sector surgical capacity and core surgical indicators. *World J Surg.* 2018;42:2303–2313.
- Riviello R, Ozgediz D, Hsia RY, et al. Role of collaborative academic partnerships in surgical training, education, and provision. *World J Surg.* 2010;34:459–465.
- Graf J, Cook M, Schechter S, et al. Coalition for global clinical surgical education: the alliance for global clinical training. *J Surg Educ.* 2018;75:688–696.
- LeCompte MT, Goldman C, Tarpley JL, et al. Incorporation of a global surgery rotation into an academic general surgery residency program: impact and perceptions. *World J Surg.* 2018;42:2715–2724.
- Bandy G, Crouch C, Haenni C, et al. Building from common foundations—The World Health Organization and faith-based organizations in primary healthcare. WHO. 2008. Available at: [http://apps.who.int/iris/bitstream/10665/43884/1/9789241596626\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/43884/1/9789241596626_eng.pdf). Accessed February 20, 2019.
- Davis RE, Hansen EN, Newton MW. Faith-based organizations and academic global surgery's moral imperative. *JAMA Surg.* 2016;151:296.
- Adam MA, Muma S, Modi JC, et al. Paediatric and obstetric outcomes at a faith-based hospital during the 100-day public sector physician strike in Kenya. *BMJ Glob Health.* 2018;3:e000665.
- Damsere-Derry J, Afukaar F, Donkor P, et al. Assessment of vehicle speeds on different categories of roadways in Ghana. *Int J Inj Contr Saf Promot.* 2008;15:83–91.
- Yeboah D, Mock C, Karikari P, et al. Minimizing preventable trauma deaths in a limited-resource setting: a test-case of a multidisciplinary panel review approach at the Komfo Anokye Teaching Hospital in Ghana. *World J Surg.* 2014;38:1707–1712.
- Gyedu A, Stewart B, Gaskill C, et al. Improving benchmarks for global surgery: nationwide enumeration of operations performed in Ghana. *Ann Surg.* 2018;268:282–288.
- Olasehinde O, Alatise OI, Arowolo OA, et al. Surgical oncology at a major referral center in Ghana: burden, staging, and outcomes. *Eur J Cancer Care (Engl).* 2019;28:e12986.
- Gyedu A, Gaskill CE, Agbedinu K, et al. Establishing a cancer research consortium in low- and middle-income countries: challenges faced and lessons learned. *J Surg Oncol.* 2018;118:581–587.
- Fischer SE, Alatise OI, Komolafe AO, et al. Developing a breast cancer screening program in Nigeria: evaluating current practices, perceptions, and possible barriers. *Ann Surg Oncol.* 2017;24:627–631.
- Olasehinde O, Boutin-Foster C, Alatise OI, et al. Structural barriers to diagnosis and treatment of cancer in low- and middle-income countries: the urgent need for scaling up. *J Glob Oncol.* 2017;3:490–496.
- Cazap E, Magrath I, Kingham TP, et al. Establishing translational and clinical cancer research. Collaboration between high- and low- countries. *J Clin Oncol.* 2016;34:14–19.
- Kingham TP, Alatise OI. A comparison of colorectal cancer in Nigerian and North American patients: is the cancer biology different? *Ann Surg Oncol.* 2015;22:741–746.
- Saluja S, Alatise OI, Adewale A, et al. Cancer surgery in low-income countries: an unmet need. *Surgery.* 2014;156:305–310.
- The American College of Surgeons Volunteerism and Giving Back to Society among Surgeons Project: Phase Three—Survey of ACS Fellows. Report prepared by Operative Giving Back to ACS Governor's Committee on Socioeconomic Issues, 2002.
- Debas HT. The emergence and future of global surgery in the United States. *JAMA Surg.* 2015;150:833–834.