


A Successful US Academic Collaborative Supporting Medical Education in a Postconflict Setting

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Patricia McQuilkin, MD¹, Roseda E. Marshall, MD²,
Michelle Niescierenko, MD³, Venée N. Tubman, MD³, Bradley G. Olson, MD⁴,
Donna Staton, MD, MPH¹, Jackson H. Williams, MD⁵,
and Elinor A. Graham, MD, MPH⁶

Abstract

This article describes a model employed by the Academic Collaborative to Support Medical Education in Liberia to augment medical education in a postconflict setting where the health and educational structures and funding are very limited. We effectively utilized a cohort of visiting US pediatric faculty and trainees for short-term but recurrent clinical work and teaching. This model allows US academic medical centers, especially those with smaller residency programs, to provide global health experiences for faculty and trainees while contributing to the strengthening of medical education in the host country. Those involved can work toward a goal of sustainable training with a strengthened host country specialty education system. Partnerships such as ours evolve over time and succeed by meeting the needs of the host country, even during unanticipated challenges, such as the Ebola virus outbreak in West Africa.

Keywords

international educational exchange, developing countries, graduate medical education, delivery of health care

Introduction

The disparities that exist in health care expenditures between materially poor and wealthier nations exemplify the mismatch between health care workforce supply and burden of disease.¹ This is most evident in Africa, which has 24% of the world's burden of disease, but only 3% of the world's health care workforce.² The effects of this disparity are highlighted by the fact that, despite a 47% global decline in under-5 child mortality since 1990, under-5 mortality in sub-Saharan Africa (SSA) is still the highest of any region at 98 deaths per 1000 live births.³ Improvement in mortality is hindered by an insufficient number of health care workers to meet the challenge of providing both clinical care and training in settings of limited infrastructure and staffing. Many developing countries will be unable to remedy these workforce shortages without extensive linkages to established educational institutions and resources.⁴ African medical schools graduate approximately 10 000 students per year, far fewer than are needed for the population of the continent. In a recent survey, the 2 most significant barriers identified to increasing the number

of medical graduates were lack of physical infrastructure and too few faculty to train the next generation of physicians.^{5,6}

These barriers are apparent in the West African nation of Liberia, which endured 2 grueling civil wars between 1989 and 2003. The only medical school, the A.M. Dogliotti College of Medicine of the University of Liberia, graduated only 110 physicians between 1983 and 1994, for a population of nearly 4 million. No physicians graduated between 1994 and the end of war in 2003. In 2003, there were only 50 practicing physicians

¹University of Massachusetts Medical School, Worcester, MA, USA

²University of Liberia Dogliotti School of Medicine, Monrovia, Liberia

³Boston Children's Hospital and Harvard Medical School, Boston, MA, USA

⁴SUNY Upstate Medical University, Syracuse, NY, USA

⁵Baystate Medical Center, Springfield, MA, USA

⁶University of Washington School of Medicine, Seattle, WA, USA

Corresponding Author:

Patricia McQuilkin, UMass Memorial Medical Center, University Campus, 55 Lake Avenue North, Worcester, MA 01655, USA.
Email: Patricia.McQuilkin@umassmemorial.org



in Liberia, and faculties at the medical school were severely reduced. By 2009, in a country where half the population was under the age of 18 years, there were still no fully trained practicing Liberian pediatricians. With no pediatric faculty to train the next generation of physicians, the outlook for generating a sustainable pediatric workforce was bleak.

In 2008, a consortium of US academic medical centers (AMCs) formed to help address the severe pediatric workforce shortage in Liberia. The goals of this collaboration are (a) to address the severe shortage of pediatric faculty and practicing pediatricians in Liberia by enhancing both the quantity and quality of medical graduates and (b) to build a pediatric post-graduate training program, which will train pediatric faculty members and make the training of physicians locally sustainable.

In this article, we examine the first 7 years of this ongoing collaborative effort established to support pediatric medical education in postconflict Liberia. We will address successes and challenges experienced thus far, including managing the Ebola outbreak. This effort involves faculty from multiple AMCs, the University of Liberia, and the John F. Kennedy Medical Center (JFKMC), Liberia's 300-bed public national referral hospital in Monrovia. Ours is a successful model for academic partnership with limited funding using short-term but repeated teaching rotations by US faculty in a workforce-rebuilding effort. Our focus transitioned over time based on the changing needs of the host country.

Methods

In 2008, the idea of expanding capacity for pediatric care in Liberia was daunting. There were fewer than 10 Liberian specialists practicing in the country and none were pediatricians. Most physicians were general practitioners or were non-Liberians working with one of several international medical organizations that provided health services during the war. Pediatric faculty and residents from several US academic institutions were invited to voluntarily provide clinical services at JFKMC. Through clinical work, relationships were formed between the US pediatric faculty and the Dogliotti Medical School faculty. Together, this faculty conducted a joint assessment of educational and faculty development needs. The most useful roles for the US academic partners were identified as assisting with clinical duties, providing clinical and classroom teaching for Liberian medical trainees, and mentoring medical school faculty.

To address the identified needs in an organized and cohesive manner, faculty volunteers from 6 US institutions formed the Academic Collaborative to Support

Table 1. Affiliations of US Faculty Members in the Academic Collaborative to Support Medical Education in Liberia (ACSMEL).

Institution	Academic Affiliate
Baystate Medical Center	Tufts Medical School
Boston Children's Hospital	Harvard Medical School
Mount Sinai Medical Center	Mount Sinai Medical School
Harborview Medical Center & Seattle Children's Hospital	University of Washington Medical School
SUNY Upstate Medical Center	SUNY Upstate Medical School
University of Massachusetts Medical Center	University of Massachusetts Medical School ^a

^aCoordinating institution.

Medical Education in Liberia (ACSMEL; Table 1). The mission of the collaborative is to strengthen and support medical education and to foster the development of a well-trained, self-sustaining workforce in Liberia. ACSMEL partners hosted monthly phone calls for program planning and enabling recently returned faculty volunteers to "sign out" to subsequent volunteers regarding clinical and teaching issues. A Web site was created to facilitate information sharing, educational materials, rotation schedules, and practical travel information. In preparation for work in Liberia, residents and faculty were required to attend structured 1-day predeparture meetings. US faculty, including some Liberian-Americans, addressed travel and safety logistics, ethical and cultural challenges, and diagnosis and management of commonly encountered tropical diseases. ACSMEL faculty met twice per year at this meeting for strategic planning and to assess project progress. Furthermore, ACSMEL faculty ensured meetings and regular communication with Liberian partners, allowing goals to remain focused on the needs of the host institutions.

Following the needs assessment, the roles of US physicians evolved. In collaboration with Liberian physicians, US pediatricians attended on the inpatient pediatric ward, the neonatal intensive care unit (NICU), emergency department (ED), and outpatient pediatric clinics. Visiting faculty supervised both Liberian trainees, including medical students, interns, and medical officers, and US residents. In most instances, US faculty provided on-site supervision for the US residents in an effort to reduce the burden on Liberian faculty and staff of orienting and supervising visiting trainees.

With faculty rotating monthly, significant logistical support was required to arrange for lodging, transportation, visas, and local medical licensure. The collaborative worked with a Liberian-American nongovernmental

Table 2. Numbers and Types of US Pediatric Clinicians Rotating to Liberia, 2008-2013.

	2008	2009	2010	2011	2012	2013	Total	Percent Repeating
Resident	4	10	11	16	10	10	61	8%
Fellow	2	5	3	2	1	1	14	50%
Faculty	3	5	7	11	12	16	54	46%
Total	9	20	21	29	23	27	129	

organization (NGO), Health Education and Relief Through Teaching (HEARTT). HEARTT was established following Liberia's civil war to educate and assist local health care providers in rebuilding and improving health care in Liberia. HEARTT provided logistics in-kind. Institutional support from some US medical schools was critical to allow faculty large blocks of time and, in some cases, travel support. Faculty without institutional support funded their volunteer teaching and travel expenses independently.

Results

Expanded Capacity for Pediatric Care

Prior to this initiative, a few dedicated Liberian general practitioners staffed the pediatric services at JFKMC. These clinicians had specific interest in Pediatrics, but lacked specific training: they planned to enter pediatric residency training in Liberia should it become available in the future. Specialist support was provided by more senior Liberian physicians who had completed internship with rotations in pediatrics outside of Liberia, though none had completed a full pediatric residency. This was not a stable situation for improving quality of pediatric care or training.

Standardization of Clinical Care and Support for Undergraduate Medical Education

Over the first 7 years of this effort, 129 faculty, fellows, and residents from the ACSMEL collaboration traveled to Liberia to provide care and clinical medical education at the JFKMC. Many clinicians volunteered for one or more rotations that ranged from 2 to 6 weeks in duration (Table 2). Several residents have returned more than once with some continuing beyond their transition from trainee to faculty. A core group of 7 faculty and fellows have provided continuity by returning annually or multiple times per year. With a core group to provide continuity, long-term efforts to standardize clinical care were supported.

During the initial year of the project, the major focus was on provision of direct clinical service for the pediatric ward, nursery, and emergency department. Regular

Table 3. Joint US and Liberian Faculty Educational Activities.

Clinical teaching on pediatric services
Clinical practice guideline development
Case conferences
Journal clubs
Mortality and morbidity conferences
Grand rounds
Classroom lectures
Third-year medical school curriculum
Fourth-year medical school curriculum
Administration of pediatric clerkship exams
Written exams
Oral exams
Curriculum design
Revision of medical school pediatric curriculum
Pediatric graduate medical education curriculum
Board review sessions for physicians taking WACP qualifying exam

teaching rounds and clinical conferences were instituted for Liberian medical officers and students. To standardize delivery of care between visiting and local staff, clinical practice guidelines were adapted from World Health Organization protocols and have subsequently been updated yearly through the combined effort of US and Liberian faculty and trainees.

During the second year of the collaboration, efforts to support medical education were integrated into the initiative. A partnership with the medical school was established enabling ACSMEL faculty members and residents to provide classroom lectures to third and fourth year medical students. A formal teaching schedule was implemented and US faculty were incorporated into preparing the end of clerkship written and oral exams (Table 3). This partnership was critical for improving clinical education of medical students and became a benchmark for the development of similar partnerships in the Departments of Medicine, Surgery, and Obstetrics and Gynecology. This effort was paired with a planned expansion of the medical school class size (Figure 1). Whereas the size of the medical school faculty remained constant, ACSMEL clinicians helped offset additional teaching responsibilities.

Quality Improvement and Professional Development

During subsequent years, additional efforts have been directed toward quality improvement, faculty development, and the implementation of research projects. Several initiatives have been implemented to improve the delivery of clinical care. Immediate efforts were

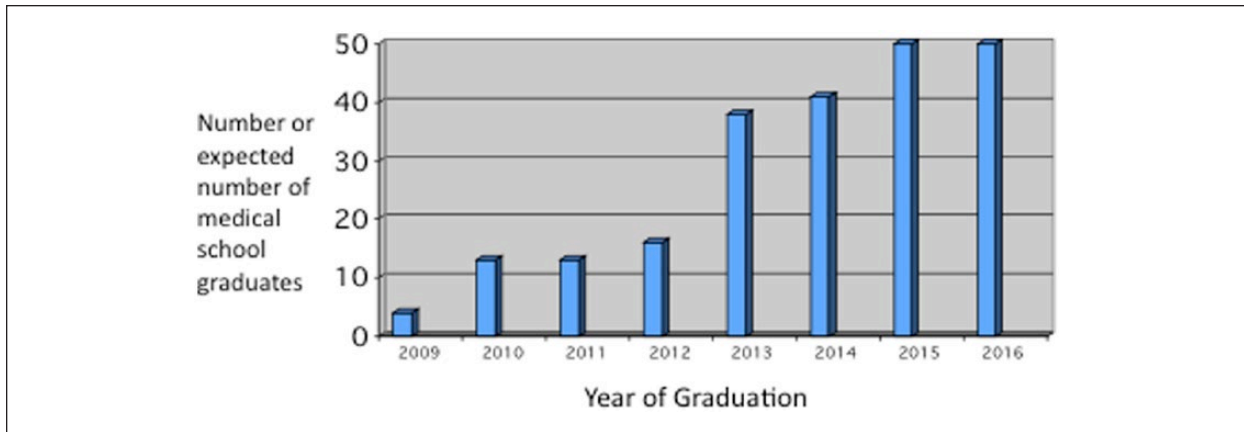


Figure 1. Liberian physician pipeline.

made by US faculty and trainees to improve bedside charting of vital signs, medical record documentation, and organization. A database was organized to characterize admissions and deaths to enable quality improvement efforts. Targeted efforts to support triage and assessment and newborn resuscitation for nurses facilitated improved resource utilization. Skill trainings were conducted for house officers and nurses in CPR, point of care laboratory evaluations, multiple pediatric procedures, and emergency ultrasound evaluation.

ACSMEL has helped generate funding by supporting the development of applications for philanthropic support to fund a variety of clinical programs. A chronic illness clinic providing preventive care for children with chronic illness has been established in partnership with Liberian colleagues and is supported by a joint award. Nearly 400 children with conditions such as sickle cell disease, seizure disorders, cerebral palsy, developmental disabilities, diabetes, asthma, and congenital heart disease receive ongoing care in this clinic. A grant-funded well-child care clinic provides frequent clinic and home visits for teen mothers and their infants. These programs also provide clinical teaching settings for Liberian residents to learn about chronic diseases in children and normal child growth and development.

Similarly, ACSMEL efforts have led to the development of research collaborations with teams consisting of Liberian and US co-investigators. A newborn screening program to identify sickle cell disease was implemented and will serve as a basis of research sickle cell disease in Liberia. Other jointly launched research projects that have been undertaken include a study looking at severe malaria in young children and screening for antimalarial drug resistance in this population. These studies represent some of the first postwar clinical investigations undertaken at JFKMC.

ACSMEL faculty have supported continuing education for their Liberian colleagues. Members of the Liberian faculty have attended and presented in US academic forums related to global health, such as the American Academy of Pediatrics (AAP) and Pediatrics Academic Society meetings. US faculty helped secure funding for their Liberian colleagues to attend these meetings and have encouraged networking and collaboration on research initiatives. Whereas much of the research and clinical work is difficult with the limited infrastructure often found in Liberia, US faculty have supported and advocated for improved administrative staff, office supplies and equipment, including computing and teaching equipment. They have also been available to connect to US subspecialty consultants to assist in patient care and teaching.

Support for Pediatric Graduate Medical Education (GME) in Liberia

In September 2013, the Liberia Post Graduate Medical Residency Program (LPGMRP) and the newly formed Liberia College of Physicians & Surgeons inaugurated residency training in Pediatrics, Surgery, Obstetrics and Gynecology, and Internal Medicine. Until this time, specialty training was not available in Liberia. Initial funding came from the Liberian government and the World Bank. Each specialty enrolled 4 to 5 residents for a 3-year training program. Eligible physicians were required to have completed their national service and passed a basic medical knowledge examination to qualify for residency training. The programs were structured to meet the requirements of the West African College of Physicians and Surgeons, the accreditation body for residency training in West Africa. The goals of these training programs are 2-fold: to train physicians equipped to practice

medicine in the rural areas and government hospitals of the country and to train physicians who will pursue academic appointments at the medical school and become clinical teaching faculty. By providing in-country specialty training, these programs will prevent “brain drain” to training and careers outside of the country.

The ACSMEL faculty has worked closely with the LPGMRP throughout the development of these training programs. They have assisted with writing the residency training curricula and competencies. To secure funding for the GME programs ACSMEL faculty have assisted in writing proposals, budgets, and equipment lists. US faculty have also assisted residency candidates to gain entry into the newly developed GME programs by providing teaching and materials for review courses designed to help trainees pass required entrance exams.

As the GME program expands and additional clinical teaching sites are added, the collaborative will play a large role in providing the necessary generalist and subspecialty faculty to meet the needs of these training programs. ACSMEL will continue this partnership until Liberia has developed sufficient faculty to make these training programs self-sustaining.

Impact of Ebola Virus Outbreak on the Collaborative

As demonstrated above, over 6 years, the ACSMEL collaborative evolved from a small group of volunteer clinicians providing pediatric care in a near vacuum, to an effective academic network supporting postgraduate training in multiple disciplines led by Liberian clinicians. Throughout, the collaborative has adjusted to meet the needs of the local clinicians and the population. Presently, the Ebola virus outbreak in West Africa is another unexpected event that represents a major challenge to the already stressed health care system in Liberia. The ACSMEL collaboration will continue to adapt to meet the needs of Liberian clinicians and patients.

The Ebola virus was first reported in rural Liberia in March 2014. By June 2014, cases appeared in urban areas. Many hospitals and health care facilities did not have personal protective equipment (PPE) or isolation and decontamination procedures in place to manage this virus which is associated with a 50% case fatality rate. Though international aid organizations brought much needed funding and supplies, these were largely directed toward Ebola treatment centers. A gap in comprehensive training of health workers, decontamination of health facilities, public education, and a strategy for triage and isolation in urban areas thus persisted. By the end of August, among the thousands who had been affected by

Ebola, approximately 10% of the affected and 10% of the deaths were among health care workers, including 3 faculty members from the Liberian residency training program. The human toll to both the health care system and the country at large has been staggering.

The government closed the medical school and residency training was suspended at the end of June. As one hospital after another experienced outbreaks, they were closed. All preventive health care services and clinics were suspended. In lieu of providing direct patient care, residents working at training hospitals throughout the country were trained to coordinate decontamination activities at hospitals. As logistics and financial support for this training evolve, these residents will play a critical role in reestablishing hospitals as safe places to receive care.

In April 2014, US AMCs suspended sending volunteers to Liberia due to safety concerns, but efforts have continued from the US side. ACSMEL faculty have maintained regular contact with colleagues in Liberia and have continued to provide support in many different ways. As a first step, funds were raised to ship much needed personal protective equipment (PPE) to faculty and colleagues in Liberia. Critical information, such as the World Health Organization guidelines on management of Ebola outbreaks, was sent to the heads of specialty training in Liberia. This information was also distributed widely throughout the country and to medical officers working in rural areas. Triage and personnel training systems were developed for the trainees.

In the United States, ACSMEL faculty have written editorial pieces for US newspapers, spoken to the media, and to medical and community groups to raise awareness of the tragedy. The faculty has capitalized on existing relationships with the Liberian-American community. ACSMEL collaborated with the Liberia College of Physicians and Surgeons to develop a series of short public service videos that have been shared with Liberians around the world in hopes that accurate information can be disseminated widely. ACSMEL faculty have hosted a weekly Ebola response conference call to shape continuing efforts to help Liberia overcome this outbreak.

Discussion

We describe here our success with a 7-year partnership between faculty from 6 medical institutions in the United States and the national medical school in Liberia. The primary results of this long-term collaboration have been (a) standardization of clinical care and education, (b) support for undergraduate and graduate pediatric curricula, (c) support for African pediatric faculty and

leadership, (d) collaborative research and quality improvement projects, and (e) assistance in the implementation of Liberia's first pediatric residency program. Unlike many partnerships between AMCs in developed and developing countries, this partnership has taken place in a postconflict setting where much of the medical education and health infrastructure were destroyed and initially there were no locally trained pediatricians.

A similar, well-established medical training partnership in a postconflict setting exists between the University of Health Sciences in Laos and the US NGO, Health Frontiers.⁷⁻⁹ Initiated in 1991, 15 years after the armed conflict in Southeast Asia ended, this partnership brought US physicians to Laos for one year to support GME. Sixty-eight Lao pediatricians and 50 internists have graduated and now work at government centers throughout the country.¹⁰ After 2 decades, enough academic faculty have been trained to staff all main referral centers. Such partnerships serve as successful models to nascent GME programs such as Liberia's, whose goals include providing well-trained pediatricians to areas beyond the capital city.

Another example of a very successful international health partnership is the long-standing partnership between Indiana University and Moi University in Kenya.¹¹ Begun in 1989, it has grown into a multi-institution collaborative, the Academic Model Providing Access to Healthcare (AMPATH).¹² This program initially augmented teaching at the medical school, then evolved to support teaching for pediatric residency training in 2006. Like ACSMEL, AMPATH has allowed a number of smaller US pediatric residency programs to offer global health experiences to their residents. Differing from our model, US pediatric faculty in AMPATH teach abroad for at least 1 year. However, our model of utilizing faculty who return on a rotating basis has been able to meet many, though not all, local needs. The clinical, cultural, and health system experience gained by repeat visits allows these faculty volunteers to be effective while minimizing the burden to our host colleagues.

A unique component of the Kenyan partnership is bidirectional faculty and resident exchange where Kenyan physicians travel to the United States for training electives (E. Liechty, personal communication, October 2010). Two other pediatric partnerships recently developed in Haiti, the St. Damien Collaborative to Improve Pediatrics in Haiti, and in Mozambique, the Mozambique-UCLA Program in Global Health, also feature bidirectional resident exchange (J. Gautier, personal communication, May 2014; E. Hartford, personal communication, May 2014). Several institutions and state laws in the United States have restrictions that

make it very difficult for physicians from developing countries to have meaningful rotations on US clinical services. Furthermore, funding is often challenging. We have not yet attempted to integrate bidirectional exchange in Liberia, but we hope that our institutions will be able to offer this experience to Liberian residents in the future.

Since 2010, the Medical Education Partnership Initiative (MEPI), supported by the National Institutes of Health (NIH), has generated multiple partnerships between US medical centers and countries in the SSA with the ultimate goal of creating a sufficient and well-trained medical workforce in Africa.^{13,14} It will be several years before MEPI's impact on workforce capacity and quality of health care is known but close study and comparisons of these efforts will be helpful. Liberia was not eligible for involvement in MEPI because Liberia does not qualify for the President's Emergency Plan for AIDS Relief (PEPFAR), the primary source of MEPI funding.

Our model also aligns well with established guidelines for good partnerships from host countries.^{15,16} Factors that have allowed this academic collaborative model to be successful include close collaboration among physicians from US academic institutions, frequent consultation with Liberian health system leaders, and ability to adapt focus over time based on national priorities.

One important limitation to our program is that ACSMEL was initiated and has largely been carried out without major funding. This is in contrast to a recently initiated partnership program, the Human Resources for Health Program in Rwanda, that was started at large scale and with substantial funding for a 7-year period.¹⁷ Unlike Liberia, the Rwandan genocide is nearly 2 decades in the past, the health care system is being rebuilt, residency training is established, and Rwanda has many more physicians per capita. Our experience shows that initiation of a partnership can be started without major funding but that the focus of the partnership will change and transition over time. Residency training requires subspecialist teachers and is hard to sustain on a volunteer basis. Like Rwanda, the Liberia GME program will need to be supported by continuing academic partnerships and major outside funders for a decade or more.

As this article is written, the final toll from Ebola on the people, the health care system, and training in Liberia is not known but there is no question that it will be enormous. With suspension of preventive care and vaccinations, we know that there will be increased outbreaks of measles, tetanus, pertussis pneumonia, and other preventable diseases over the next few months and that malnutrition in children will increase. There currently is high collateral

mortality from pregnancy complications and common diseases such as malaria, gastroenteritis, typhoid fever, pneumonia, and sepsis with the closure of hospitals and clinics. Understanding that the international aid community will rightfully leave once the crisis is over, our partnership will need to be expanded in scope and effort to meet the many consequences of the Ebola epidemic.

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Declaration of Conflicting Interests

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