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ORIGINAL CONTRIBUTION

Creating Change Through Collaboration: A Twinning Partnership to Strengthen Emergency Medicine at Addis Ababa University/Tikur Anbessa Specialized Hospital—A Model for International Medical Education Partnerships

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Abstract

Background: Morbidity and mortality due to the lack of an organized emergency medical care system are currently high in Ethiopia. Doctors, nurses, and other medical staff often have limited or no formal training on how to handle emergencies. Because of insufficient human and resource capacity needed to assess and treat acutely ill patients, many who are injured may die unnecessarily, at the site of injury, during transport, or at the hospital.

Objectives: This article describes the development of a twinning partnership between Addis Ababa University (AAU), the University of Wisconsin-Madison (UW), and the nonprofit organization People to People (P2P), to strengthen emergency care at Tikur Anbessa Specialized Hospital (TASH) and increase the number of trained emergency medical professionals.

Methods: The partnership applied the six-phase twinning partnership model, with the overall goal of enhancing and strengthening emergency and trauma care by building institutional and human resource capacity. This was achieved by 1) developing local leaders in emergency medicine (EM), 2) creating training modules adapted to the Ethiopian context, 3) launching an emergency training center, and 4) supporting academic program development. The authors evaluated the program's effectiveness based on our achievements toward these goals.

Results: Results include: 1) eight Ethiopian faculty completed a condensed EM fellowship in the United States. Now six Ethiopian physicians serve as EM faculty and two as pediatric EM faculty. 2) Nine emergency training modules were adapted to the Ethiopian context. 3) An emergency training center was opened in 2010 and to date has trained over 4,000 Ethiopian medical professionals. 4) Two academic training programs (EM residency and masters nursing programs) were initiated.

Conclusions: With many complex factors affecting the burden of emergency care, innovative and interdisciplinary collaborations are needed in Ethiopia to train medical workers, build local leadership capacity, strengthen infrastructure, and inform policies. The short-term achievements of this twinning model could suggest that long-term, institution-to-institution collaborations that are driven by local stakeholders are an effective strategy to create equitable relationships and build sustainable health systems and may serve as a model for other global health partnerships.

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Increasingly in low-income countries, the lack of trained health care professionals has become a priority over merely the provision of material resources to meet the growing need for emergency health care services.[1] In a 2011 report of hospitals in six sub-Saharan countries, none of the surveyed hospitals had adequate infrastructure to meet the World Health Organization's minimum standards of practice essential for the provision of emergency and surgical care, and fewer than 50% had 24-hour services.[2] In many sub-Saharan countries where access to organized medicine is limited, the emergency department (ED) often serves as the first point of entry for patients. Poorly equipped and short-staffed EDs limit the quality of services provided to patients.[3] There is also a high rate of trauma that burdens an already inefficient health care system.[4] Moreover, sparse resources have been allocated to build and strengthen EDs in Ethiopia and elsewhere in sub-Saharan Africa. Doctors, nurses, and other medical staff often have limited or no formal training on how to handle emergency care in prehospital or hospital settings.

The Ethiopian Federal Ministry of Health recognized the gap between the need for emergency services and the lack of resources available to deliver quality care and identified strengthening human resource capacity as a critical step to create an emergency medical system.[5,6] The country is developing a comprehensive national system, giving priority to building human capacity and developing infrastructure for training and education. This call to action by the Federal Ministry of Health to increase the number of trained health professionals in emergency medical care guided the development of a global health collaboration to strengthen existing emergency care at Addis Ababa University's Tikur Anbessa Specialized Hospital (AAU/TASH). This article describes the development of a twinning partnership between AAU, the University of Wisconsin-Madison (UW), and the nonprofit diaspora organization People to People (P2P), to strengthen emergency care and develop emergency medicine (EM) as a specialty at TASH in Addis Ababa, Ethiopia.

APPROACH USED IN THE DEVELOPMENT OF EM IN ETHIOPIA

There are two approaches commonly considered when organizing an ED.[7] The traditional way of delivering EM is often referred to as the multidisciplinary model.[7] This model has a conventional system of triage and patient flow, which takes place in the emergency room (ER). With the multidisciplinary approach, patients are evaluated by an on-call physician and, depending on the condition presented, are seen by a specialist physician such as a trauma surgeon, internist, gynecologist, or pediatrician. Under this model, the ER consists of several medical specialties that rely on each other to provide comprehensive medical care. One of the weaknesses of this model is that there is a lack of ownership from a single department, which may create system inefficiencies, decrease ownership from faculty as their time is divided between multiple departments, and leave a leadership vacuum.[7] Additionally, physicians are trained to respond to patient needs from their separate specialties rather than a single specialty of EM, affecting how they respond to the complex conditions that often present in emergencies.

Increasingly, international EM programs have supported the development of EM as a single specialty. The specialty model is an "organizational system in which EM is viewed as a uniquely integrated horizontal body of medical knowledge and skills."[8] This approach brings in specialist physicians who complete residency training programs in EM. Not only are medical professionals trained differently, but also the location of where they practice changed locations from the "emergency room" to the "emergency department." This suggests that medical emergencies are diverse and require more than a single room for comprehensive care. The specialty model of EM considers the whole system that is required to deliver patient care, including prehospital and ambulatory services, triage systems, training and education for medical professionals, evidence-based practice, and quality improvement in the clinical setting.[9] This may be the strongest and most effective response in resource-limited settings, as it prevents loss of staff from other departments.

THE CHALLENGES OF FUNDING INTERNATIONAL COLLABORATIONS

Brought together by a shared concern about the challenges in delivering emergency medical services in Ethiopia, AAU/TASH, UW, and P2P formed a twinning partnership in the fall of 2009. A twinning partnership happens when two or more academic institutions or community organizations share collective knowledge and resources to address issues and concerns.[10] They are based on peer-to-peer relationships among health care (or another discipline) professionals to design technologically and economically appropriate solutions to problems in the host country (see Table 1).[10] The twinning partnership model was chosen for this collaboration because its principles aligned with partners' values, and previous global health partnerships had achieved positive outcomes when adapting it to similar resource-limited settings.[11] This model differs from traditional professional exchanges or global health partnerships in that it involves all partners in the decision-making process, emphasizes long-term relationships, builds collective efficacy, requires significant volunteer time from all partners, and values the experience and knowledge of all.[10]

Global health initiatives have mobilized vast resources to address complex public health issues.[12] However, at times these funding sources and agencies have been criticized for weakening existing health systems because they can lead to internal "brain drain," they may operate independently from existing national plans, and they may utilize resources inefficiently as they duplicate efforts due to corruption and lack of communication and coordination.[13–15] Furthermore, they may require that host countries establish new coordination structures, work outside of the existing health systems, limit the authority or participation of existing leadership, minimize local stakeholder engagement, ignore cultural values, and fail to strengthen communication and trust among members.[12,16] Fewer global health funding agen-

Table 1
Principles of a Twinning Partnership Example[10]

The model for building a twinning partnership is grounded in shared guiding principles that emphasize the importance of building long-term relationships. These principles include:

1. Community involvement and volunteerism, with partners on both sides making significant in-kind contributions of staff time, materials, and resources and demonstrating investment in the process.
2. Broad-based institutional relationships, where partners commit the resources of entire organizations or institutions, including contributions of the time, knowledge, and clinical expertise of their individual members.
3. Peer-to-peer collaborative relationships, where partners work together as equals, finding mutually beneficial solutions and opportunities to establish trust and build a multidisciplinary team.
4. Professional exchanges and mentoring for transferring and sharing knowledge, ideas, and skills to disseminate information.
5. Nonprescriptive, demand- and process-driven partnerships that empower partners on both sides by giving them ownership of the programs being jointly created, thereby encouraging sustainable capacity development.
6. Local political support, whereby the program is a recognized activity and fits within broader programming efforts by the Ministry of Health and leverages private-sector resources.

cies have rewarded partnerships that are based on equality, reciprocity, shared responsibility, and long-term relationships.[16] The lack of collaborative relationships may limit the effectiveness of programs to address health issues that require local leadership and comprehensive, multisectorial approaches. It has been recognized that a new approach to international aid is needed, one that seeks to create the conditions where internal and transparent leadership and equitable relationships can flourish rather than simply having ideas imposed from outside interests.[17,18] To achieve this, governments, research institutions, and others have looked to build collaborative partnerships as a means of working together to achieve a good greater than any one agency could otherwise achieve on its own.[12,19–21] Collaborations, such as those modeled upon twinning partnerships, can work to improve transparency, streamline efforts with other donors, and involve in-country government leadership to improve program sustainability and effectiveness.[22]

The overall goal of the Ethiopia EM twinning partnership was to strengthen the human and resource capacity to deliver quality emergency care to HIV-positive and all patients at AAU/TASH. This partnership was made possible through the generous support of the American people with funding from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and the U.S. Centers for Disease Control and Prevention (CDC/Ethiopia). During the first phase of PEPFAR, grants funds were allocated to programs that focused singularly on preventing and controlling the transmission of HIV/AIDS. Phase 1 achieved great results and expanded access to HIV prevention, care, and treatment services, particularly to people in limited resource settings. Using the lessons learned from the first 5 years, PEPFAR developed a new strategic approach to HIV/AIDS prevention and treatment for phase 2.[23] During Phase two, PEPFAR transitioned from an emergency response model that focused solely on care and treatment of HIV to one that promoted sustainable country programs directed by national priorities. This was important to this twinning partnership because funds could be used to work toward an integrated and sustainable approach to address HIV/AIDS and other health concerns within a country-specific context.

The twinning partnership concepts of collaboration, building local leadership capacity, and prioritizing long-term relationships aligned well with PEPFAR's Phase two goals. The partnership activities were modeled in a way to satisfy the Ethiopian Federal Ministry of Health's priorities and were led by local leaders to be sustainable even after funding expired.[19] Given a limited budget and the need to adhere to funding guidelines, activities were restricted to education and outreach priorities and only a small portion of funds were allocated to fund staff, capital, and other infrastructure resources. To enhance the work of the partnership given limited funding, an extensive network of committed volunteers was tapped to carry out the majority of program activities.

THE ANATOMY OF A TWINNING PARTNERSHIP

The structure of the twinning partnership to develop EM at AAU/TASH was designed according to the model developed by the American International Health Alliance (AIHA), a U.S.-based nongovernmental organization that manages global health twinning partnerships (see Figure 1).[24] The six phases to developing a twinning partnership are: 1) initiate the partnership, 2) develop a shared work plan, 3) implement the program, 4) monitor outcomes, 5) evaluate results, and 6) disseminate information. The Ethiopia EM partnership followed the six-phase twinning model to address the entire spectrum of emergency services needed.

Phase 1: Initiate a Partnership

The vision for enhancing emergency services in Ethiopia first came from the Ethiopia Federal Ministry of Health and its leadership. However, it was not until four AAU/TASH physicians from different specialties were commissioned to form an EM task force that the concept of creating EM as a single specialty was able to move forward. The task force was then given full responsibility to develop an EM program and involve stakeholders.

The initial work of the task force was to articulate a shared goal and understanding of responsibilities among the different departments at AAU and the Federal Ministry of Health. The creation of a local task force provided the opportunity for:

1. Local leaders to define and develop a program that could have a significant effect on improving health outcomes.

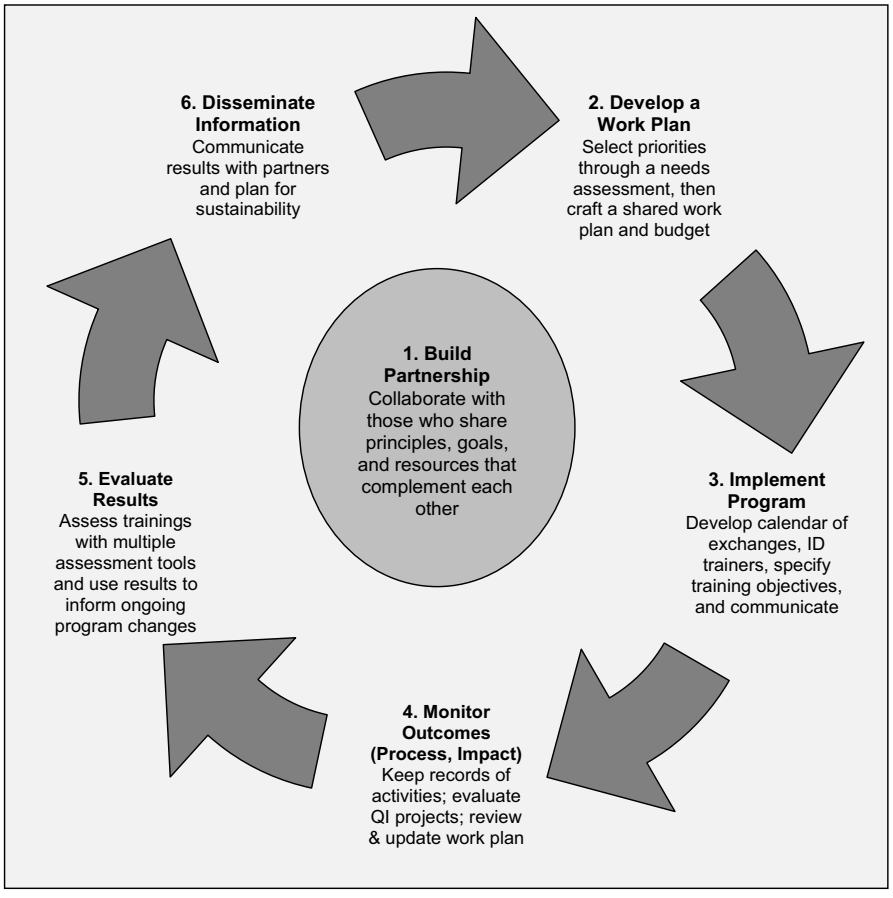

Figure 1. A twinning partnership model.[24]

2. Multiple disciplines to work toward a common goal and develop a shared strategy with a hospital-wide vision. Task force members came from the disciplines of anesthesia, surgery, medicine, orthopedics, pediatrics, and obstetrics/gynecology, but were all devoted to the practice of EM.
3. Plans could be implemented and achieved because clear leadership roles were defined and Task Force members came from positions of authority.

Lessons to be learned in phase 1 are shown in Table 2.

Table 2
Lessons From Phase 1

The vision for strengthening emergency services needs to come from and be led by local leaders, including linking activities with Federal Ministry of Health initiatives and working with leaders identified by in-country institutions.
Assemble a committed team of people with common goals and relevant experiences. Consider the time they can commit and institutional support/resources they bring to program activities over the duration of the program.
The effectiveness of twinning partnerships can be enhanced when they build upon existing relationships to ensure that trust is maintained. Involvement of the diaspora can help facilitate cultural awareness and understanding.
Find out who else shares your vision, and work to align your efforts with them.

It was out of previous collaborative projects with the task force that the twinning partnership was jointly initiated among AAU/TASH, UW, and P2P. Membership in the partnership included people who shared a commitment to program goals, were experienced medical professionals, and demonstrated prior experience with global health projects, including (but not limited to) quality improvement, clinical services, research, residency program leadership, and pediatric EM. A key strategy employed was to align efforts with other foreign institutions working to strengthen emergency care in Ethiopia. Including these institutions helped to coordinate efforts, maximize resources, and avoid duplication of efforts.

Ethiopian diaspora health care professionals, who have long been a part of improving the delivery of health care services in Ethiopia, were an important asset. Diaspora professionals provided unique contributions to the partnership, such as the voluntary nature of their input, the cost-effectiveness of their interventions, and the likelihood of continued involvement after the end of the grant-funded partnership. Additionally, their enhanced cultural awareness of the setting, institutions, and people helped bridge cultural and values gaps when developing and delivering educational programs. Involving the diaspora network differentiated this partnership from traditional twinning partnership models, allowing partners to tap expertise from beyond the

institutions officially represented on the grant project. This resulted in a "multiplier effect," exponentially growing the network of people involved and enabling contributions from individuals who had a long-term investment in Ethiopia (Table 3).[25]

Phase 2: Develop a Shared Work Plan

Upon commencement of the project, the first step was to conduct a systematic needs assessment for emergency services at AAU/TASH. Data gained from the assessment guided program activities, objectives, and outcomes for the first and subsequent years. The original needs assessment addressed the following areas of inquiry: 1) organizational structure; 2) record-keeping; 3) staffing and human resource capacity; 4) training and curriculum programs and practice guidelines (for physicians and nurses); and 5) existing relationships and collaborations, both within and external to AAU/TASH.

Following the needs assessment, an advisory group was formed with representatives from each institution. This group created the initial work plan, which set clear objectives, indicators, and outcomes to guide program efforts to train, organize, and manage the TASH ED. The advisory group was composed of medical professionals from AAU/TASH, UW, and P2P who had knowledge and understanding of the Ethiopian health care system and could develop realistic goals and mechanisms for sustainability. An attribute of having an engaged advisory group is that there was shared responsibility and accountability built into the partnership, which were maintained through regular conference calls, an annual work plan meetings, and regular exchange trips between Ethiopia and Wisconsin.

Often work plans are simply the paper documents that record the goals, objectives, and strategies that a partnership will perform in a given time period. But this twinning partnership viewed the work plan as a dynamic process, creating a goal-oriented document that was continually reviewed and updated with feedback from assessments performed during each exchange trip. The assessments identified training and mentoring needs at AAU/TASH, such as clinical issues in emergency and acute medical care, clinical management, organization, equipment and supplies, leadership, quality improvement, and supportive supervision of ED staff. The regular assessments served to identify ongoing improvements as well as needs that were going unmet. Lessons from phase 2 are shown in Table 4.

Phase 3: Implement the Program

Leadership Training and Development. The partnership conducted a condensed competency-based EM fellowship training for eight Ethiopian physicians and eight nurses at UW. The duration of the fellowship training was 4 weeks for the nurses and 10 to 12 weeks for the physicians; they were conducted at the same time to foster communication and teamwork between nurses and physicians. The curriculum was designed for experienced Ethiopian physicians and nurses. The Ethiopian physicians each had more than 5 years of patient care experience and were all trained in specialties including anesthesiology, internal medicine, surgery, Obstetrics/Gynecology, and pediatrics. The Ethiopian nurses were experienced clinical nurses, and their training was targeted toward building knowledge and capacity to serve as leaders in their evolving roles in the ED.

In designing the fellowship, the advisory group first identified the physicians and nurses from TASH who would participate and their professional needs. The fellowship initially emphasized competencies relevant to the U.S. context, but it quickly became apparent that the fellowship needed to be learner-centered and adapted to the Ethiopian context. Core competencies were developed that were modeled after U.S. national standards in adult and pediatric EM, but with these adaptations to the local context. This adaptation came through

Table 3
Description of the Ethiopian Diaspora[25]

The human resource challenges facing Africa may seem daunting, particularly with the substantial emigration from the continent of educated health care professionals. But there is also growing recognition that skilled migrants and diasporas make meaningful contributions to development efforts in their countries of origin through donations of their time, talents, and resources. Diasporas frequently have the contacts, knowledge, and personal commitment to undertake sustainable efforts.
According to the 2008 U.S. Census Bureau, there were 137,012 Ethiopian immigrants in the United States, and about 30,000 native-born U.S. citizens claimed Ethiopian ancestry. The Ethiopian immigrant population in the United States has grown dramatically over the past three decades from 7,516 in 1980 to 34,805 in 1990 and 69,531 in 2000. Ethiopians are the second largest immigrant group from sub-Saharan Africa in the United States after immigrants from Nigeria. Compared to other immigrants, Ethiopian-born immigrants aged 25 and older tend to be better educated: 59.0% had some college education or higher compared to 43.5% of all immigrants. The Ethiopian diaspora extends beyond the United States to other countries.
In recent years, engaging the diaspora in Ethiopia's development has become an important priority for the Ethiopian government. A key challenge has been involving members of the diaspora who do not wish to return permanently to Ethiopia but who are still enthusiastic about contributing their time, skills, and energies. Volunteer medical missions by diaspora professionals are a common mechanism that allows diaspora professionals to contribute to improving living standards in Ethiopia and helping the country progress toward the Millennium Development Goals. Experience suggests that these missions are a potentially powerful resource, but they often lack sustainability, broader impact, and coordination with other similar or related efforts.

Table 4
Lessons From Phase 2

Use the work plan as a dynamic process to continually assess and redirect program activities as needed.
Establish regular communication processes to discuss partnership updates, activities, and goals. This helps strengthen communication among partners and also hold partners accountable to assigned tasks.

discussions and revisions of the fellowship curricula with each successive fellowship cohort. The curriculum integrated clinical experience, mentorship pairings, research training, quality improvement, and administrative and leadership sessions.[26,27] As a result of completing this fellowship, physicians and nurses gained skills and confidence needed to assume leadership roles in this emerging subspecialty at AAU/TASH to improve delivery of emergency and critical care services to patients.

Launch of an EM Training Center. To increase human capacity of AAU/TASH and surrounding institutions to deliver emergency medical care and education, it was vital to establish a well-functioning training center. This center would provide instruction and certification in EM courses, keep existing health care workers' skills up to date, and expand the EM workforce, now and in the future. The Emergency Medicine Training Center (EMTC) was launched at AAU in February 2010, the first such training facility in the Horn of Africa. It was a low-fidelity simulation center with two task trainers, classroom space, audiovisual capabilities, and administrative offices. To help ensure its sustainability, a business plan was written and implemented from the beginning to guide the goals, structure, performance indicators, and future growth.

The EMTC was the site of the majority of technical exchanges during years 1 and 2 and was intended to provide education and certification for Ethiopian medical professionals. These exchange trips emphasized skills training in nine emergency modules and included train the trainer sessions to develop a cadre of local instructors. In year 1, the instructors for these courses were from the United States or South Africa. In year 2, Ethiopian instructors worked together with U.S./South African trainers to adapt the courses to the local context. By year 3, the EMTC was functioning independently of instructors from outside of Ethiopia, because a critical mass of local instructors had been developed to manage the delivery of all nine training modules (see Table 5 for training modules and trainee output).

The process of training local instructors was critical to program effectiveness and sustainability. Local instructors were better aware of the medical cases, cultural context, and available medical supplies and resources. Further, building local leaders was a better use of financial resources as they would have ownership of the programs and ensure continuity. The EM training modules included pre- and post-tests to monitor changes in knowledge and a qualitative component to assess participant satisfaction. The course evaluations were used to improve program delivery and content. This helped the Ethiopian and U.S. partners make continual program improvements. The AAU EMTC is working to attain international accreditation of the training modules to ensure quality and consistency of courses delivered.

Table 5
AAU EM Training Center Modules and Trainee Output: January 2010-June 2013

Module	2010–2011	2011–2012	2012–2013	Total
1. Cardiac resuscitation*	25	83	198	306
2. Advanced life support in obstetrics	117	10	62	189
3. Ethiopia trauma resuscitation†	25	32	164	221
4. Introduction to life support‡	240	475	588	1,303
5. Pediatric resuscitation§	111	116	124	351
6. Advanced Life Support in infectious disease¶	57	-	38	95
7. Prehospital trainings	114	622	679	1,415
8. Emergency ultrasound	20	24	12	56
9. Quality improvement	185	104	65	354
TOTAL: 4,290				

AAU = Addis Ababa University.
*Based on a modified Advanced Cardiac Life Support curriculum.
†Based on a modified Advanced Trauma Life Support curriculum.
‡Based on a modified Basic Life Support.
§Based on modified Emergency Triage Assessment and Triage (ETAT) and Pediatric Advanced Life Support.
¶Curriculum module developed by partnership.

Academic Program Development: EM Residency and Masters Nurses Programs

The Ethiopia EM twinning partners worked to train physician and nurse leaders who could improve ED systems in order to build sufficient human capacity. will depend on building sufficient human capacity to carry out this mission. The partners believed that establishing a residency program in EM was one strategy to ensure sustainability. Thus, Ethiopia's first EM residency program was established in September 2010, with five residents enrolled. The curriculum was modeled after the UW EM residency curriculum , providing the Ethiopian educators with a matrix for how to form the program, including clinical schedules, didactics, goals and objectives, and an evaluative methodology. However, it was adapted to the local setting and practice. The didactic portion of the residency curriculum was developed with assistance and resources from the University of Toronto. Sharing an EM residency curriculum was effective because it gave the Ethiopian partners a framework that they could fit and adapt to their local setting and resources. Additionally, this process of sharing and adapting an existing curriculum enabled AAU/TASH to accelerate implementation of its program and make it relevant to the local context (e.g., lectures, examinations). Although the UW curriculum served as a model, it was critical at this stage for the Ethiopian educators to develop and own the curriculum. In year 3, the emphasis of exchange trips shifted toward clinical mentoring of the AAU residents and faculty. Skilled EM physicians from the United States and Canada worked with AAU/TASH physicians, residents, and nurses in their ED to model teamwork, communications, leadership, research methodology, ethics, and professionalism. The first cohort of residents will have graduated in October 2013.

Simultaneous to the launch of the residency program was the commencement of a Masters in Emergency Nursing training program. In 2009, AAU/TASH began

development of this graduate-level program. It included a modular-type design and was intended to be completed over 2 years. In 2010, the program enrolled 20 students in its first cohort. Of these, 18 nurses successfully completed the program and graduated in 2012. The program continues to enroll approximately 20 new students each year. Graduates of this program are expected to have the knowledge and skills to identify critically ill or injured patients. They then become the front line of emergency care, thereby improving quality patient care, advancing the development of emergency systems throughout Ethiopia through regional deployment, and allowing for task-shifting given the limited number of physicians. By the end of 2013, there will be 40 graduates of this program. Lessons learned from phase 3 are shown in Table 6.

Phase 4: Monitor Outcomes

The partnership included a monitoring and evaluation framework with targets, indicators, data sources, and individual/institutional responsibility for reporting. This monitoring and evaluation framework was based upon goals and objectives outlined in the work plan and complied with reporting guidelines from the CDC/PEPFAR, the funding agency.

In addition to these evaluation indicators, a program for assessing change at the department level was created. As part of the U.S.-based training for the Ethiopian physicians and nurses, 20 hours of instruction and a certificate in quality improvement was provided. The quality improvement course was conducted in a workshop format that used adult learning methods, with topics including 1) definition and dimensions of quality, 2) standards development through participatory processes, 3) measurement of compliance with standards and outcomes, 4) team strategies, and 5) leadership in developing a culture of quality. These quality improvement projects enabled the AAU/TASH faculty and staff to assess current conditions, define quality in their context, and set local goals and indicators. Each Ethiopian identified and developed a project, presented the topic, and received financial and mentorship support for implementation the project at AAU/TASH. The quality improvement projects gave participants the tools to critically evaluate and make changes in their hospital system. Lessons from phase 4 are in Table 7.

Phase 5: Evaluate Results

Midway through the grant cycle, the partnership conducted a program evaluation using pre- and post-test results from EM module trainings, attendance forms from workshops, surveys of program participants, and key informant interviews. The first comprehensive program evaluation was conducted during the spring of 2011 (16 months into the program) and shared with project partners at the annual work plan meeting. The information was used to guide program improvements and make adjustments for the remainder of the grant cycle.

The evaluation was guided by feedback from a group of key stakeholders including the AAU/TASH EM Task Force, UW faculty, and the AIHA Twinning Center staff. It was goal-based and included both process and outcome indicators, gathering data from pre/post surveys, training attendance sheets, and a self-assessment that analyzed participant satisfaction. The self-assessment surveys from EM fellowship participants identified changes in practice (both personal and the AAU/TASH ED) that had occurred as a result of the quality improvement training. Examples of reported changes include:

- Implementation of infection prevention protocols in the ED and training for all staff.
- Development and utilization of triage forms by TASH ED nursing staff. This included training ED nursing staff in triaging patients and completing the forms.
- Provision of communication tools within the ED (in this case, cell phones) so that staff can communicate across the department with greater speed and efficiency.
- Posting a white board to record patients and identify staff assignments to improve work flow and communication.
- Creation of a computerized intranet to track patient work flow in the ED.

Lessons from phase 5 are in Table 8.

Phase 6: Disseminate Information

The partnership took a systematic and long-term approach to improving emergency care at AAU/TASH.

Table 6
Lessons From Phase 3

Take time to assess local resources and make adaptations. Keep in mind how knowledge and leadership will either be transferred or sustained in the local community. This may require adjusting expectations or the speed at which the program occurs.
When developing training programs for adult learners, create the educational objectives and competencies with them at the table. Training programs should meet students' personal and professional needs, and be appropriate to the local context.
You do not need to create everything from scratch. Use an existing curriculum, and have partners work together to adapt it to the local context (culture, language, resources, etc.).
When recruiting volunteers to participate in technical exchange trips, it is helpful to develop a cadre of people who are able to return multiple times to build professional relationships and reduce host fatigue of orienting new people.

Table 7
Lessons From Phase 4

As a partnership team, identify what indicators are meaningful and important to monitor.
Quality improvement can provide health care workers with the tools and confidence to critically evaluate their environments. As described by one participant, "*Our quality improvement projects have been a mirror to see ourselves and helped us bring improvements to our departments.*"

Program activities reflect this commitment to education and mentorship to strengthen the capacity of not only individual health care providers at the AAU/TASH ED, but the entire team. At the beginning, the partnership emphasized the provision of training opportunities in emergency care to AAU/TASH faculty and staff to build the newly formed ED. The partnership accomplished this and then expanded to include a more comprehensive approach to address a broader spectrum of hospital-wide EM needs: pharmacy services, medical equipment and supplies, quality control and assurance, pediatric emergency and critical care, leadership training, and retention of Ethiopian medical professionals.

It was important to the partners to consider how this project fit into broader strategies of the Ethiopia Ministry of Health. This required effective communication, a willingness to collaborate, and marketing of program achievements. The partners shared information with other institutions, hosted open meetings, and conducted a national EM symposium to highlight the work of faculty and staff. There were also media pieces developed to communicate partnership achievements, which allowed multiple participants to share their stories and describe the value and meaning of the partnership. Finally, program achievements were actively communicated with each institution's administrative leaders, members of the Ethiopia Federal Ministry of Health, and the international network of emergency professionals. This helped connect the work with broader initiatives, institutions, and people to foster ongoing exchanges of ideas and innovation. Lessons from phase 6 are in Table 9.

LESSONS LEARNED

One of the fundamental principles of a twinning partnership is that information is mutually exchanged and both partners have something to learn and share from their relationship.[10] Perhaps the greatest challenge with a twinning partnership is how to ensure that knowledge (power) is shared equally by all partners and how to place greater value on the relationships that are built (process) and not just the outcomes themselves. For these challenges to be overcome, partners may need to reconsider their roles and recognize how both institutions are changed by such partnerships. Through program evaluations and key informant interviews with program staff and trainees, key themes emerged as being critical "challenges" and "successes" that led to the achievements and sustainability of the partnership.[28]

This twinning partnership worked to build relationships to ensure that a comprehensive, systems-level approach was taken to support emergency training, education, research, and infrastructure. These global health efforts can offer value to Ethiopian health care providers and patients, but require institutional support, without which these efforts will not substantially contribute to developing the country's emergency and critical care systems. Unfortunately, funding often does not exist to encourage such collaborative, equitable partnerships between African and U.S. counterparts to respond to health care crises. The preliminary achievements of this twinning model could suggest that long-term, institution-to-institution partnerships may be effective to create quality relationships and build sustainable systems.

Table 8
Lessons From Phase 5

Use program evaluation surveys to gather feedback from all stakeholders, document unanticipated program achievements, and examine the strengths and weaknesses of the program.
Communicate and discuss the results with all program staff to ensure that recommendations are implemented, improvements are made, and information is transparent to everyone.

Table 9
Lessons From Phase 6

Identify important communication and media outlets to share program achievements. This enables partners to tell their stories and can help connect the work with broader initiatives and like-minded individuals.
Share best practices with others to reduce redundancies and strengthen a larger body of evidence about effective program strategies.

CONCLUSIONS

With many complex factors affecting the burden on Ethiopia's medical system, innovative and interdisciplinary global health collaborations are needed to train medical workers, strengthen infrastructure, and inform policies to coordinate efforts. The Ethiopia emergency medicine twinning partnership with the University of Wisconsin and People to People responded to priorities as defined both by the Ethiopia Ministry of Health and local partners at Addis Ababa University's Tikur Anbessa Specialized Hospital. In doing so, it was able to effectively build relationships and systems to ensure a sustainable approach to support emergency training, faculty development, research, and infrastructure. The partners' activities demonstrated a commitment to education and mentorship that not only built the capacity of individuals at the Addis Ababa University's Tikur Anbessa Specialized Hospital ED, but also strengthened the overall organizational and management of the ED and other hospital departments. Future activities include continued development of the EM residency program, a critical care fellowship. This includes the emergency medicine residency program, a critical care fellowship, nursing training and empowerment, pediatric emergency and critical care, quality improvement, and leadership. The short-term achievements of this twinning model could suggest that long-term, institution-to-institution partnerships that are driven by local stakeholders are an effective strategy to create equitable relationships and build sustainable health systems and may warrant translation to similar environments.

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