

The Medical Education Partnership Initiative: Strengthening Human Resources to End AIDS and Improve Health in Africa

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Abstract

Faced with a critical shortage of physicians in Africa, which hampered the efforts of the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the Medical Education Partnership Initiative (MEPI) was established in 2010 to increase the number of medical graduates, the quality of their education, and their retention in Africa. To summarize the accomplishments of the initiative, lessons learned, and remaining challenges, the authors conducted a narrative review of MEPI—from the perspectives of the U.S. government funding agencies and implementing agencies—by reviewing reports from grantee institutions

and conducting a search of scientific publications about MEPI. African institutions received 11 programmatic grants, totaling \$100 million in PEPFAR funds, to implement MEPI from 2010 to 2015. The National Institutes of Health (NIH) provided an additional 8 linked and pilot grants, totaling \$30 million, to strengthen medical research capacity. The 13 grant recipients (in 12 countries) partnered with dozens of additional government and academic institutions, including many in the United States, forming a robust community of practice in medical education and research. Interventions included increasing the

number of medical school enrollees, revising curricula, recruiting new faculty, enhancing faculty development, expanding the use of clinical skills laboratories and community and rural training sites, strengthening computer and telecommunications capacity, and increasing e-learning. Research capacity and productivity increased through training and support. Additional support from NIH for faculty development, and from PEPFAR for health professions education and research, is sustaining and extending MEPI's transformative effect on medical education in select African sites.

The shortage of health care workers, especially physicians, in sub-Saharan Africa is critical. According to the World Health Organization, that region had only 0.3 physicians per 1,000 population in 2013.¹ In contrast, there were 3.2 physicians per 1,000 population in Europe and 1.4 per 1,000 worldwide.¹ The 225,120 physicians in sub-Saharan Africa in 2013 represent just a fraction of the estimated current need for 867,876.² Significant shortcomings in medical education compound the overall shortage. The sub-Saharan African

Medical Schools Study, published in 2011, documented pervasive faculty shortages in basic and clinical sciences, poor physical and communications infrastructure, inadequate linkages with other medical research and education centers in Africa and abroad, and little use of external accreditation.²

The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) began in 2003 to alleviate the global epidemic of HIV infection and AIDS. By 2011, 3.9 million people had begun lifesaving antiretroviral treatment with PEPFAR support³; nonetheless, limitations in the number of health workers and the quality of their education were among the greatest constraints in achieving and extending these accomplishments, especially in sub-Saharan Africa where the burden of HIV infection and AIDS was the highest. To address this challenge, the first PEPFAR reauthorization in 2008 included a congressional mandate to train 140,000 new health care workers, including doctors, nurses, and other allied health professionals.⁴

Administration (HRSA) to establish the Medical Education Partnership Initiative (MEPI) to substantially support medical education at select medical schools in sub-Saharan Africa to boost the quantity of medical graduates, the quality of their education, and their retention where they are most needed—all while providing or enhancing research capabilities and ensuring sustainability.^{5,6} HRSA and NIH announced the first MEPI grants in October 2010 and invested a total of \$130 million over five years (2010–2015) to directly support medical schools in 12 sub-Saharan African countries.

Here, we describe the implementation, accomplishments, and effect of this first phase of MEPI and its related activities. We also explain some of the challenges, limitations, and lessons for future initiatives to support health professions education in sub-Saharan Africa, including considerations of the scale and time frame needed to effect significant, positive, population-wide changes in health outcomes.

Information Sources

This article represents a qualitative, narrative review of the first phase of MEPI

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In 2010, PEPFAR partnered with the U.S. National Institutes of Health (NIH) and the U.S. Health Resources and Services

implementation (2010–2015) and related activities. As mentioned, we have focused on the main objectives, accomplishments, critical success factors, and lessons learned. Our primary data sources for this article included the reports from the MEPI implementation sites, periodic programmatic summary documents, and the five-year summary report prepared by the MEPI grant recipient principal investigators (PIs).⁷

These sources provided information derived from a detailed monitoring framework established at the inception of MEPI. The framework included 161 quantitative indicators, such as the number of medical school graduates per year, and 42 qualitative indicators, such as descriptions of how MEPI helped increase the number of medical school graduates. Monitors conducted annual surveys and site visits, and PIs prepared annual school summary reports. The final survey was conducted in August 2015, so additional accomplishments accrued after the last survey and may not be reflected in this article.

Our article reflects our experiences—conducting site visits and holding discussions with MEPI PIs and implementation partners—as program officers, technical staff, and leaders for MEPI funding organizations. Our article also includes select findings from 58 articles (2010–2017) related to MEPI (which we discovered through an April 2017 PubMed search using the key words “MEPI” and “Medical Education Partnership Initiative”).

MEPI Funding and Grants

PEPFAR, which is administered by the Office of the Global AIDS Coordinator in the U.S. Department of State, funded the MEPI programmatic grants in 2010, providing \$100 million over a five-year period through 11 grants to 11 institutions in 10 countries (Appendix 1). Two HHS agencies were designated to administer MEPI based on their respective competencies. The Fogarty International Center (FIC) at NIH supported 7 of the grants, while HRSA’s HIV/AIDS Bureau managed the other 4. FIC, which facilitates global health research conducted by NIH, had been increasingly engaged with African medical research and educational institutions since the inception of the AIDS International

Training and Research Program in the late 1980s.⁸ HRSA, which largely focuses on improving access to and quality of care in the United States, had been increasingly engaged in Africa overseeing HIV/AIDS program implementation since the inception of PEPFAR. Concurrent with MEPI, HRSA had the lead role in implementing the companion PEPFAR-funded Nursing Education Partnership Initiative.⁶ In addition to the 11 programmatic grants awarded to African institutions, HRSA also provided funding to a U.S.-based coordinating center (George Washington University [GWU]) to facilitate and monitor MEPI; this funding was administered by HRSA through a cooperative agreement.

In addition, the NIH Common Fund and seven other NIH institutes, centers, and offices (ICOs; see List 1) provided \$30 million over a five-year period beginning in 2010 to build biomedical research capacity. With these funds, FIC administered an additional 6 linked grants in five of the countries with MEPI programmatic grants, plus 2 pilot grants in two countries that did not have MEPI programmatic grants, increasing the total number of MEPI grantee institutions to 13.

In sum, in the first phase of MEPI described herein, NIH awarded 19 foreign

grants (totaling \$130 million) to 13 institutions in 12 countries (Appendix 1). The funding amounts for the programmatic grants ranged from a total of \$8.6 to \$9.3 million per institution over the five-year implementation period, while the funding amounts for the linked and pilot grants ranged from a total of \$1.9 to \$2.5 million per institution over five years.

The grants resulted in a large number of substantive national, regional, and global partnerships, including many with U.S. universities. In addition, many of the PIs formed collaborative networks in their countries with other universities and with ministries of health and education that did not receive MEPI funds (see Appendix 1).

Coordination of MEPI

The U.S.-based MEPI coordinating center at GWU and its Uganda-based counterpart, the African Centre for Global Health and Social Transformation (ACHEST), supported the MEPI institutions by providing technical assistance, developing capacity in medical education research, supporting and coordinating the monitoring and evaluation of MEPI-funded programs and activities, organizing annual meetings, and fostering collaboration. According to

List 1

The NIH Institutes, Centers, and Offices Providing Funding for MEPI Institutions^a

The 7 NIH ICOs providing funding (\$30 million) for linked and pilot grants (2010–2015)

National Heart, Lung and Blood Institute
National Human Genome Research Institute
National Institute of Mental Health
National Institute of Neurological Disorders and Stroke
National Institute of Nursing Research
Office of AIDS Research
Office of Research on Women’s Health

The 9 NIH ICOs providing funding (\$36.5 million) through the MEPI Junior Faculty Program (2015–2020)

Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Heart, Lung, and Blood Institute
National Institute of Dental and Craniofacial Research
National Institute of Mental Health
National Institute of Neurological Disorders and Stroke
National Institute of Nursing Research
National Institute on Minority Health and Health Disparities
Office of AIDS Research
Office of Research on Women’s Health

Abbreviations: NIH indicates National Institutes of Health; ICOs, institutes, centers, and offices; MEPI, Medical Education Partnership Initiative.

^aMEPI was implemented at 13 sites in 12 African countries from 2010 to 2015. See Appendix 1.

site visit reports and survey results, GWU and ACHEST facilitated the formation of technical working groups in, initially, six areas: e-learning, physician tracking, medical education research, community-based medical education, competency-based medical education, and research support centers. Later working groups focused on monitoring and evaluation and on library information science. Within these eight areas, MEPI institutions established their own priorities and implemented their own plans to meet the MEPI goals in alignment with national policies and needs (Table 1).⁹

The PIs of the programmatic grants (n = 11), the PIs of the linked and pilot grants (n = 8), and the coordinating center came together in 2011 to form the MEPI PI Council. This council served as a leadership group for MEPI, provided a coordinated channel of communication among grantees and funding organizations, and established common policies for publication and

partnership agreements. The MEPI PI Council selected from among its membership a chair and a vice chair. Each chair and vice chair served for a one-year term, and the vice chair assumed the role of chair the following year. The MEPI PI Council met biannually at varying MEPI host institutions, including in an annual symposium organized to foster collaboration and share best practices and lessons learned in medical education and research. The MEPI PI Council further supported collaboration and communication by encouraging PIs to visit other schools as members of site visit teams. The annual symposium evolved into a major meeting on medical education and research in Africa with more than 250 participants from MEPI-funded programs, academia, governments, and national and international partner agencies.

In the third year of MEPI, much of the coordination role was transitioned to ACHEST and the MEPI PI Council as

a result of their demonstrated capacity; GWU continued to support networking by hosting webinars, maintaining the MEPI website, and publishing and distributing newsletters.

Increasing the Quantity and Quality of Doctors and Other Health Professionals

To increase the number of medical graduates, MEPI institutions employed a variety of strategies, such as increasing the number of enrollees, using new pedagogical methods, expanding teaching facilities, collaborating with other medical schools, and supporting the launch of new medical schools in their respective countries. For example, enrollment in internal medicine more than doubled in Zimbabwe and in Mozambique from an average of 10 students per year prior to MEPI to 75 in 2012.¹⁰ The number of new students at the MEPI schools peaked at over 2,500 per year from 2010 to 2015.⁷ Training and recruiting additional faculty

Table 1
Key Interventions and Examples Thereof Funded by the Medical Education Partnership Initiative (MEPI)^a

Intervention	Examples
Increasing the number of medical school enrollees	Recently opened schools supported by MEPI included Busitema University (Uganda); University of Botswana School of Medicine (Botswana); Copperbelt University, Cavendish University, and Lusaka-Apex Medical School (Zambia); and University of Lurio (Mozambique). Medical student enrollment increased 116% at University of Zimbabwe College of Health Sciences. ^{7,10}
Curriculum revision	Seven schools revised their curricula to follow the tenets of competency-based medical education. The template developed by the University of Ibadan in Nigeria was adopted by the entire country. ⁷
Faculty recruitment	In Zambia, 70 postgraduate students were enrolled to fill basic science faculty positions including at two new medical schools, the addition of which increased the number of medical students in Zambia from 54 to 250. ¹¹
Faculty development	Nine schools established or strengthened their medical education departments. ¹⁴ Three schools introduced master's degree programs in health professions education. ⁷
Use of clinical skills laboratories	Seven schools created or improved clinical skills laboratories. ⁷ At the University of Nairobi, 400 learners, including 47 faculty, from multiple health disciplines were trained in their skills laboratory.
Establishment of rural and community training sites	Seven schools enhanced community-based education. The Uganda MEPI consortium increased the number of community training sites by 43% to 162 sites in 72 districts. ⁷
Strengthening computer and telecommunications capacity	Eight schools enhanced capacity. Kilimanjaro Christian Medical University in Tanzania introduced fiber-optic connectivity, campus-wide wireless access, and computer tablets for medical students. ²⁶
Use of e-learning	Twelve schools adopted e-learning. In Ghana, the Kwame Nkrumah University of Science and Technology made didactic lectures and training modules available online and documented thousands of page views.
Interprofessional education	The University of Botswana School of Medicine and School of Nursing codeveloped a clinical skills lab, allowing medical and nursing students to practice in teams before encountering real patients.
Development of communities of practice	More than 40 schools in Africa and 20 in the United States collaborated in eight technical areas. The e-learning group and others developed a website and listserv and held multiple workshops and webinars.
Research support	All schools established research support centers and conducted courses on research. The University of Zimbabwe College of Health Sciences grant applications increased from 3 in 2011 to more than 15 in 2015.
Graduate tracking	Nine schools participated in the graduate tracking technical working group. Kilimanjaro Christian Medical University developed software to track all alumni retroactively and prospectively and assess urban-rural distribution. ⁷

^aThe Medical Education Partnership Initiative was implemented at 13 sites in 12 African countries from 2010 to 2015. See Appendix 1.

was required in some countries, such as in Zambia where 70 postgraduate students helped fill basic science faculty positions including at two new schools, the addition of which increased the number of students in Zambia from 54 to 250.¹¹ In Tanzania, faculty incentives and recruitment efforts increased the number of faculty members from 96 to 167 in under five years.⁷ Some countries focused on specialists according to national priority. For example, in Ghana, 15 emergency physicians and 59 emergency nurses were graduated, 500 medical students were trained in emergency medicine, and 300 district health care workers were trained in HIV/AIDS care in the emergency department.⁷ Ethiopia had already greatly increased the number of medical school enrollees,¹² so there the support from MEPI was largely focused on improving the quality of education, faculty training, retention, and research capacity.¹³

Curricula were reviewed and revised as needed at all MEPI institutions to adapt to new health care needs and new educational methods and technologies. Seven schools revised their curricula to follow the tenets of competency-based medical education, which prepares graduates to be able to apply specific competencies in care situations. Competencies may cover critical thinking, information management, communication skills, clinical skills, knowledge of population health, foundational scientific knowledge, and professional values and attitudes. The template that the University of Ibadan developed to tailor its curriculum to address core competencies became the national standard for Nigeria.⁷ HIV/AIDS was also integrated into training curricula. For example, the University of KwaZulu-Natal (UKZN) in South Africa incorporated HIV/AIDS training into degree programs in internal medicine, pharmacy, nursing, and family medicine.⁷ Makerere University in Uganda enhanced HIV/AIDS content and training in the community-based clerkship, while Kwame Nkrumah University of Science and Technology (KNUST) in Ghana incorporated training in recognizing and treating HIV in emergency settings into the curriculum.⁷

Faculty development, a critical component of improving faculty effectiveness and retention, was achieved mainly through short courses in

subjects including teaching methods, leadership, mentoring, epidemiology, and research. Nine of 13 schools established or strengthened medical education departments.¹⁴ Master's degree programs in health professions education were introduced at three schools.⁷ Twelve schools funded faculty conference registration and travel.⁷ Most schools also supported research mentoring, research seed grants, and the acquisition of computer hardware and other office equipment. Many faculty were supported to pursue additional advanced degrees. MEPI funds were used to hire 51 staff at six schools, of whom all but 4 were expected to be retained with other funds after the MEPI grant period.⁷

One of the MEPI technical working groups focused on e-learning, which was adopted at 12 of the 13 MEPI institutions.^{7,15} In Ghana, for example, KNUST made many of their didactic lectures and training modules available online—and then documented thousands of page views. Clinical skills laboratories and simulation learning, which allow students to learn without interfering with patient care, were established or strengthened at 7 MEPI schools, some of which served medical and nursing students in interprofessional teams.⁷ Library resources were strengthened at all schools. Improvements included providing librarian training; discarding outdated materials; purchasing new books; and procuring e-books, electronic journal subscriptions, and computer hardware, thereby establishing e-library information centers. In Kenya, for example, the library services at the University of Nairobi College of Health Sciences were improved in partnership with the University of Maryland Health Sciences and Human Services Library.¹⁶

Retention and Rural Placement

Retention of medical graduates in-country is a long-term goal that was not feasible to ascertain over the five-year MEPI implementation period; however, graduate tracking systems were established, and several key activities addressed this goal.¹⁷ In Tanzania, for example, nearly 100% of medical graduates were being tracked through alumni associations, social media, and other approaches.⁷ Further, the Year Five Report⁷ noted a shift in student attitude in Zimbabwe, where, at the beginning of

MEPI, most students (80%) indicated that they planned to leave the country, but by the end, most (82%) said that they planned to remain.

Most MEPI schools expanded community-based education to make training more relevant to the local context by adding new community sites and sending more students to the sites.^{18,19} The Uganda consortium, for example, increased the number of sites by 43% to 162 sites in 72 districts.⁷ Further, the MEPI consortium in Uganda included Mbarara University of Science and Technology, a new medical school, which, located in a rural area, strengthened Uganda's decentralized medical education model. In Ethiopia, MEPI provided resources, including a minibus for student transport and Internet access to decongest overcrowded classrooms and to support the training of students in rural areas.⁷ The University of Nairobi adapted a U.S. model for regional training to provide clinical training at 14 decentralized training sites throughout Kenya without requiring costly new construction.²⁰ Additionally, preceptorships or honorary teaching appointments were given to some rural practitioners in Nigeria, which boosted their morale and motivated them to remain in rural practice.⁷ Five schools targeted recruitment of students from rural or underserved populations as a strategy to increase retention of graduates in these communities. UKZN focused its research capacity building on rural sites to facilitate trainees returning there as mentors.²¹

HIV Service Delivery

Increasing capacity for high-quality services to prevent HIV infection and to provide care and treatment for people living with HIV was the principal reason for the establishment of MEPI and was a particular focus throughout both planning and implementation. According to the MEPI Year Five Report, activities included revising both undergraduate and postgraduate curricula to incorporate new HIV guidelines; providing preservice and in-service HIV/AIDS training for physicians, nurses, midwives, and others; and supporting myriad HIV-focused research activities.⁷ At UKZN, for example, MEPI supported 22 PhD candidates who conducted research projects on HIV clinical and

laboratory services and health systems. At Stellenbosch University in South Africa, faculty participated in a clinician mentoring program focused on HIV and tuberculosis coinfection. The University of Malawi trained colposcopy screeners, oncology nurses, palliative care nurses, clinical officers, and counselors who returned to their clinics to train their colleagues in HIV-associated cervical cancer screening and treatment through visual techniques (e.g., visual inspection with acetic acid) and cryotherapy. The program provided integrated services including cancer screening, family planning, and HIV care at three clinics delivering care to 15,000 HIV-infected women per year. In addition to the HIV/AIDS-focused research and training, another success is the number of people who received care. According to the Year Five Report,⁷ an estimated 12,000 people living with HIV/AIDS received treatment and care services from MEPI trainees in Mozambique, and in Zimbabwe, more than one million HIV prevention, care, and treatment services were provided from 2011 to 2014 by MEPI trainees.

Research Support

All MEPI institutions conducted courses on research-related topics such as research methods, the design of research studies (including in implementation science²²), data collection, data management and analysis, scientific manuscript and grant writing, and research ethics. According to one internal NIH report (November 2015), students from MEPI institutions in nine countries conducted 511 original mentored research projects. By 2015, a total of 376 publications were attributed to support from MEPI; of these, 307 had a MEPI school faculty member as the first author, 109 concerned medical education, and 51 focused on HIV/AIDS.⁷ By 2015, MEPI faculty had given over 400 presentations at scientific meetings worldwide, including at the African Conference on Emergency Medicine, the Third Global Forum on Human Resources for Health, and the World Health Summit.⁷ In MEPI year five (2015), nearly 3,000 undergraduates, 552 postgraduates, and 129 PhD candidates were reported to be participating in MEPI-funded research.⁷

At each MEPI institution, 5% of the programmatic grant funding was dedicated to strengthening research administration.

Many institutions established research support centers to assist faculty and students with designing research investigations, identifying and applying for funds, administering grants post award, and analyzing data.²³ Most MEPI institutions successfully applied for grants from the NIH and other international funders, such as the Wellcome Trust; overall, 10 schools reported 26 successful grant awards by 2015.⁷

Further, in 2014–2015, the NIH Common Fund and nine other NIH ICOs (List 1) committed an additional \$36.5 million (over and above the original \$130 million) from 2015 to 2020 to support early- and midcareer faculty in HIV/AIDS and other scientific areas at MEPI institutions under the MEPI Junior Faculty Program (Appendix 1). These 11 grants (awarded to 11 institutions in 8 countries) illustrate the strengthening research enterprise at MEPI institutions.

Partnerships

Grantees used MEPI funding to strengthen in-country partnerships with medical institutions to improve medical education and research training.²⁴ For example, Makerere collaborated with four other universities in Uganda; the five universities shared technical and faculty resources, and faculty from all five institutions worked together to revise curricula.²⁴ In Nigeria, more than 1,600 faculty, graduate students, and resident doctors (from a consortium of nine institutions) were trained in career development as part of a comprehensive alliance, heralding a new era of collaboration among research universities.²⁵

All MEPI institutions also worked closely with the ministries of health and ministries of education in their countries. Senior government officials regularly participated in in-country MEPI meetings and the international MEPI PI Council annual symposium. In Zambia, for example, MEPI worked with the Ministry of Health to adapt the obstetrical and neonatal guidelines developed for the university teaching hospital for use at the provincial and district levels.⁷ Additionally, MEPI institutions in Zimbabwe and Kenya worked with the ministries of health in those countries to strengthen disease outbreak investigations, responses,

and surveillance systems.⁷ In Tanzania, the Kilimanjaro Christian Medical University improved information and communications infrastructure through the successful establishment of e-learning with tablet computers for all medical students; as a result, the Ministry of Education planned to develop e-learning as a primary tool for all higher learning institutions and invested in providing Internet accessibility to all universities.²⁶

MEPI also supported interprofessional collaboration. Training across the MEPI network included thousands of nurses, midwives, laboratory technicians, pharmacists, and other allied health professionals. Additionally, MEPI institutions provided cross-discipline training, such as laboratory training for clinicians,²⁷ and use of skills laboratories for simulated learning for physician, nursing, and other health professions trainees.

Several international South–South partnerships occurred (Appendix 1). For example, KNUST in Ghana collaborated with UKZN in South Africa; KNUST faculty, residents, and nursing trainees shared their emergency medicine expertise while UKZN faculty, residents, and nursing trainees contributed their HIV expertise. In another international, South–South collaboration, Universidade Eduardo Mondlane in Mozambique established resident exchanges and collaborative research with the Universidade Federal da Bahia and Fiocruz in Brazil.

Finally, MEPI supported many North–South collaborations. Every MEPI programmatic, linked, and pilot grant included one or more collaborations with institutions in the United States, Canada, or Europe (Appendix 1).

Taken together, these MEPI-established partnerships and networks constituted a community of practice. This extended group of faculty and trainees interacted regularly through telecommunications and meetings to share common interests and innovative solutions to improve health professions education and research capacity. This community helped leverage resources, disseminate and implement more effective practices, and ensure relevancy and support over the long term.²⁸

Sustainability

Sustainability was a priority of MEPI from the outset. It was an important element in the MEPI grant review criteria and became increasingly important over the five-year implementation period. Sustainability and capacity building were particularly emphasized in the evolution of North–South collaborations. MEPI-supported activities, such as developing enrollment and retention policies, revising curricula, and reforming pedagogical methods, were integrated into the work of partner sub-Saharan African institutions. In Zimbabwe, for example, lectures on cardiovascular physiology were developed with visiting professors from a U.S. university, and teaching responsibility was gradually turned over to Zimbabwean junior faculty and postdoctoral fellows.⁷

Some MEPI institutions attracted monetary support from their governments and/or nonmonetary support from other donors to sustain select MEPI activities after the grant funding ended, but most anticipated having to scale down their programs. In response to a year five (2015) survey,⁷ most schools reported that they would have to cut back MEPI-supported programs, especially the research activities, by 25% to 50% when MEPI funding ended; however, no school said the number of faculty and students enrolled would be reduced. Six schools said that the most durable MEPI-funded resource was information and communication technology, making this the most common response.⁷

The 11 MEPI Junior Faculty Program grants (Appendix 1) were also important to consolidate and sustain the research capacity developed through the original programmatic, linked, and pilot MEPI grants.

Summary and Success Factors

MEPI was successful in achieving its primary goal: increasing the numbers of medical school enrollees and graduates in the institutions it supported. Additionally, numerous activities to increase the quality of education and retention and rural placement of medical graduates were successfully implemented. Capacity to conduct biomedical research was strengthened and scientific

productivity was increased through MEPI support. Lastly, several elements (e.g., partnerships, additional funding and support, enduring technology) to help ensure sustainability were successfully incorporated. Importantly, early indicators, such as additional grant funding, multiple publications, and ongoing international and intranational partnerships, have demonstrated MEPI's lasting impact on medical education in Africa.

One of the critical success factors (Table 2) for MEPI was ensuring the leadership of the African grantees and institutions by awarding the competitive grants directly to the leaders of the institutions themselves, rather than routing the funding through U.S.-based institutions. This direct funding allowed the African grantees control, thereby increasing their engagement and responsiveness and also enhancing the relevance of MEPI projects to local priorities. Partnerships and networking were also critical to the initiative's success. To illustrate, one PI commented, "MEPI demonstrates that North–South as well as South–South partnerships, with an

explicit focus on improving local health systems through better education, can be designed to empower partners in the South with support from collaborators in the North."²⁹ In-country partnerships and resource sharing with other schools of medicine and other health professions effectively multiplied the reach and effectiveness of the initiative.

The emergence of the robust network of MEPI PIs in the MEPI PI Council was another key factor in the initiative's overall success and sustainability. The group continues to communicate regularly, meet, share best practices, and coordinate activities in the newly formed African Forum for Research and Education in Health,³⁰ a direct successor to the MEPI PI Council.

The inclusion of research as a main component of MEPI was helpful to establish an academic foundation for activities and to engage and retain not only faculty at MEPI institutions but also international scholars. The research focus also helped to mobilize substantial additional resources from NIH institutes through the MEPI pilot and linked

Table 2

Factors Contributing to the Success of the Medical Education Partnership Initiative (MEPI)^a

Factor	Effect
Provision of grant funding directly to African institutions	Increased the following: (1) responsibility and engagement of African PIs and institutions, (2) program relevance and responsiveness to local priorities, and (3) program sustainability
Partnerships and networking	
In-country	Extended program engagement and impact to dozens of other schools of medicine and other health professions, increased interprofessional education, and enlisted government support—all of which increased sustainability
South–South	Strengthened regional collaboration, shared relevant expertise, increased sustainability
North–South	Engaged expertise and resources of more than 20 schools in high-income countries to strengthen program implementation
Development of the MEPI PI Council	Allowed PIs to assume leadership in program direction and coordination, leading to the creation of the AFREhealth, an interprofessional, Africa-wide network
Engagement of 13 NIH ICOs^b	Engaged staff and extramural researchers in medical education and health research through MEPI linked awards and/or the MEPI Junior Faculty Program
Support for research	Enhanced capacity for research to ensure evidence-based development, implementation, and evaluation of health professions education and health interventions

Abbreviations: PI indicates principal investigators; AFREhealth, African Forum for Research and Education in Health; NIH, National Institutes of Health; ICOs, institutes, centers, and offices.

^aThe Medical Education Partnership Initiative was implemented at 13 sites in 12 African countries from 2010 to 2015. See Appendix 1.

^bThe 13 NIH ICOs are provided in List 1.

awards and through the ongoing MEPI Junior Faculty Program. The benefits of strengthening research capacity in MEPI institutions are expected to have a lasting effect in the training of physicians through new, evidence-based approaches; in the provision of outstanding, cutting-edge care to patients; and in turn, in the creation of medical centers of excellence.³¹

Lessons Learned and Limitations

The coordinating center at GWU played an important role in not only supporting and providing technical assistance to the MEPI institutions but also incubating the community of practice. One drawback, however, was the perceived conflict of interest that arose from both evaluating and facilitating the MEPI institutions. In retrospect, designating separate institutions for facilitating and evaluating MEPI may have been advantageous. In addition, while each site reported substantial information, a limitation in the evaluation was the lack of systematic summary data across all sites across all five years. This idiosyncrasy in reporting is typical for separate NIH grants awarded under a single funding opportunity announcement, but it does limit our ability to report reliable quantitative summary data. Moreover, assessing the longer-term national effect of MEPI was beyond the scope of the required grant reporting. Future work could include national surveys to assess the number, retention, and rural placement of doctors, as well as the numbers of grants awarded to and publications emanating from MEPI institutions. Finally, as staff members of the funding and implementing agencies, we acknowledge the potential for bias in assessing and reporting the accomplishments and outcomes of MEPI.

Future Directions

The achievements in the first phase of MEPI have been considerable, and taken together, they provide a foundation for additional gains.³² These accomplishments align well with the vision articulated in 2010 by the Lancet Commission on the Education of Health Professionals for the 21st Century:

all health professionals in all countries should be educated to mobilize knowledge and to engage in critical

reasoning and ethical conduct so that they are competent to participate in patient and population-centered health systems as members of locally responsive and globally connected teams.³³

Major gaps remain in the quantity and retention of health care workers, in the quality of health professions education, and in the resources available for research to decrease the incidence of HIV/AIDS and meet other global health goals.¹ Future support for health professions education and research capacity building in Africa should seek to consolidate, broaden, and further improve the progress made to date. Additional investments (including domestic resources); international health workforce policy interventions (e.g., task shifting); and emphases (with goals measured by quantitative data) on performance, productivity, efficiency, quality, and innovation are all needed.¹ The long-term social and economic value of investments—including the creation of quality jobs in the health sector, leveraged domestic and foreign investment in health care and research, and improved health care and health outcomes—could be substantial.

With support from the NIH, the National Academy of Medicine convened a workshop in Uganda in 2016 with African health professions leaders to discuss extending the work of the MEPI PI Council and establishing an African association for health professions education and research. Interprofessional membership—including doctors, nurses, and other allied health professionals—would be a core feature of such an association. The 2016 workshop participants also recommended disseminating educational resources and sharing best practices in health professions education; encouraging research on educational methodologies and approaches; and integrating biomedical, behavioral, clinical, and operational research into health professions education and practice.³⁴

In addition to support for an African health professions education association,³⁵ additional programmatic support for high-HIV-burden, low-resource PEPFAR countries is anticipated. Such monetary support will further strengthen the quality of medical and nursing education, increase the retention of health professionals post training, fund research on best educational practices, and enhance the capacity of

students to conduct health research.³⁶ As with the first phase of MEPI, these activities are intended to be relevant and responsive to national and international needs and policies.^{1,37}

Conclusions

MEPI succeeded in increasing the number of graduates from African medical schools, in improving the quality of their education, and in enhancing the retention of physicians where they were most needed. Biomedical research capacity and productivity were also increased—and are being sustained with additional NIH support for junior faculty at 11 institutions in 8 countries. The transformative impact of MEPI on medical education in Africa will be extended with planned additional PEPFAR support for an African association for health professions education and research³⁵ and new programmatic grants³⁶ for interprofessional education and research in high-HIV-burden, low-resource PEPFAR countries.

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Appendix 1

The Countries, Institutions, Principal Investigators, Grant Types, and Partner Organizations Involved in the Medical Education Partnership Initiative (MEPI)

Country	Institution	Type of grant ^a (focus, if applicable)	Partner organization(s)		
			In-country/Africa	U.S./global	
Botswana	University of Botswana	Programmatic	—	Harvard School of Public Health; University of Pennsylvania	
Ethiopia	Addis Ababa University	Programmatic	Hawassa University; Haramaya University; Defense Forces Medical College	Emory University; Johns Hopkins University; University of California, San Diego; University of Wisconsin	
		Junior faculty (HIV, maternal–child health, noncommunicable diseases, mental health)	—	Emory University; University of Alabama, Birmingham; Johns Hopkins University	
Ghana	Kwame Nkrumah University of Science & Technology	Pilot (emergency medicine)	University of KwaZulu-Natal	University of Michigan	
Kenya	University of Nairobi	Programmatic and linked (maternal–child health)	Kenyatta University; Maseno University	University of Washington; University of Maryland, Baltimore	
		Junior faculty (HIV; maternal, newborn and child health; mental health)	Kenyatta University; Maseno University	University of Washington	
Malawi	University of Malawi College of Medicine	Pilot (cancer)	—	Johns Hopkins University; University of North Carolina, Chapel Hill	
Mozambique	Universidade Eduardo Mondlane	Programmatic	Universidade Zambeze; Universidade Lúrio	University of California, San Diego	
		Linked (surgery)	—	University of California, San Diego; Canadian Network for International Surgery; American College of Surgeons; World Health Organization	
		Junior faculty (HIV, neurosciences, child and family health)	Maputo Central Hospital; Stellenbosch University	University of California, San Diego; Universidade Federal da Bahia (Brazil); Instituto Nacional de Saude (Portugal)	
Nigeria	University of Ibadan	Programmatic	University of Jos; University of Nigeria; University of Maiduguri; Ahmadu Bello University; University of Lagos; AIDS Prevention Initiative in Nigeria	Harvard School of Public Health; Northwestern University	
		Junior faculty (HIV, genomics, neurology)	—	Harvard School of Public Health; Northwestern University	
		University of Jos	Junior faculty (HIV, reproductive health, genomics, cancer)	Ahmadu Bello University	Harvard School of Public Health; Northwestern University
		University of Lagos	Junior faculty (HIV, community medicine, genomics, biomedical engineering)	AIDS Prevention Initiative in Nigeria	Harvard School of Public Health; Northwestern University
South Africa	Stellenbosch University	Programmatic	University of Cape Town Lung Institute; Makerere University	Johns Hopkins University	
	University of KwaZulu-Natal	Programmatic	Stellenbosch University; Kwame Nkrumah University of Science & Technology; University of Zimbabwe	Columbia University	
	—	Junior faculty (HIV, mental health, health systems, health professions education)	—	—	
Tanzania	Kilimanjaro Christian Medical Centre	Programmatic	—	Duke University School of Medicine	
		Junior faculty (HIV, noncommunicable diseases, maternal–child health)	Catholic University of Health and Allied Sciences	Duke University, Duke Global Health Institute; Weill Cornell Medical College	

(Appendix continues)

Appendix 1

(Continued)

Country	Institution	Type of grant ^a (focus, if applicable)	Partner organization(s)	
			In-country/Africa	U.S./global
Uganda	Makerere University College of Health Sciences	Programmatic	Gulu University; Kampala International University; Busitema University; Mbarara University of Science & Technology	Johns Hopkins University
		Linked (cardiovascular)	Uganda Heart Institute; Mbarara University of Science & Technology	Case Western Reserve University; Yale University
		Junior faculty (HIV, malaria, noncommunicable diseases)	Uganda Cancer Institute; Uganda Heart Institute	Case Western Reserve University; Johns Hopkins University
	Mbarara University	Junior faculty (HIV, cardiovascular disease, mental health)	—	Harvard School of Public Health; Massachusetts General Hospital
Zambia	University of Zambia	Programmatic	Copperbelt University School of Medicine; Cavendish University, Zambia; Lusaka Apex Medical University	Vanderbilt University; University of Alabama, Birmingham; University of Maryland
		Linked (maternal–child health)	Center for Infectious Disease Research in Zambia	University of North Carolina; University of Alabama, Birmingham
Zimbabwe	University of Zimbabwe	Programmatic	University of KwaZulu-Natal	University of Colorado; Stanford University; Howard University
		Linked (mental health)	University of Cape Town	University College London; King's College London
		Linked (cardiovascular)	University of Cape Town	University of Colorado Denver; Stanford University
		Junior faculty (HIV, cardiovascular diseases, mental health, women's health)	University of Cape Town	Stanford University; University of Colorado, Denver; University College London; King's College London
United States	George Washington University	Coordinating center	African Centre for Global Health and Social Transformation, Uganda	—

^aProgrammatic grants (2010–2015) were the main program grants funded by the President's Emergency Plan for AIDS Relief. Linked grants (2010–2015) were additional grants funded by the National Institutes of Health to build biomedical research capacity. Pilot grants (2010–2015) were similar to linked grants made to institutions that did not have main program grants. Junior faculty grants (2015–2020) were funded by the National Institutes of Health to provide support early- and midcareer research faculty.