



Published in final edited form as:

*Educ Health (Abingdon)*. 2013 ; 26(2): 109–114. doi:10.4103/1357-6283.120703.

## Investing in Community-Based Education to Improve the Quality, Quantity, and Retention of Physicians in Three African Countries

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### Abstract

**Context**—The Medical Education Partnership Initiative (MEPI) is a \$US 130 million program funded by the United States government supporting 13 African medical schools to increase the quantity, quality, and retention of physicians in underserved areas. This paper examines how community-based education (CBE) is evolving at MEPI schools to achieve these goals.

**Methods**—We utilized data from the first two years of site visits and surveys to characterize CBE efforts across the MEPI network and provide detailed descriptions of three models of CBE among the MEPI programs.

**Results**—There is widespread investment in CBE, with considerable diversity in the goals and characteristics of training activities among MEPI schools. Three examples described here show how schools are strengthening and evaluating different models of CBE to achieve MEPI goals. In Nigeria, students are being sent for clinical rotations to community hospitals to offload the tertiary hospital. In Uganda, the consistency and quality of teaching in CBE is being strengthened by adopting a competency-based curriculum and developing criteria for community sites. At Stellenbosch University in South Africa, students are now offered an elective year-long comprehensive rural immersion experience. Despite the diversity in CBE models, all schools are investing in e-learning and faculty development. Extensive evaluations are planned to examine the impact of CBE strategies on the health workforce and health services.

**Discussion**—The MEPI program is stimulating an evolution in CBE among African medical schools to improve the quality, quantity, and retention of physicians. Identifying the strategies within CBE that are reproducible, scalable and optimize outcomes will be instructive for health professions training programs across the continent.

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**Conflict of Interest:** No.

## Keywords

Community-based education; competency-based education; health system strengthening; medical education; Nigeria; retention; South Africa; Uganda

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## Context

It is increasingly recognized that a sufficiently sized and well-trained health workforce is key to improving health outcomes in Sub-Saharan Africa especially given the critical need for more doctors in rural and underserved areas. To meet the current health workforce needs, global health leaders have called on training institutions to scale up the production of health workers with curricula that are community, competency and team-based.<sup>[1]</sup> A common strategy used by medical schools to improve the quality of education and increase graduate retention in underserved areas after graduation is community-based education (CBE). CBE is defined as “learning activities that use the community extensively as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the educational experience”.<sup>[2]</sup> A variety of CBE models have been used to teach skills such as community diagnosis, public health, and primary care. While evaluation of these experiences is limited, studies generally report positive experiences for students and communities.<sup>[3–7]</sup> The challenges reported include inconsistent quality of education, inadequate facilities, and high financial costs.<sup>[3–5]</sup>

The Medical Education Partnership Initiative (MEPI) is a \$US 130 million, five-year program (launched in September 2010), funded by the United States President’s Emergency Plan for AIDS Relief (PEPFAR) and the US National Institutes of Health (NIH). MEPI is administered by the NIH and the US Health Resources and Services Administration (HRSA). Additional funding was awarded to the George Washington University and the African Center for Global Health and Social Transformation to act as the Coordinating Center for MEPI. The goals of MEPI are to increase the quantity and quality of health workers, to improve the retention of graduates in underserved areas after graduation and to enhance the capacity for locally relevant research. Thirteen schools in 12 African countries were awarded grants; some grantee schools chose to form in-country consortia, resulting in a network of 25 African medical schools supported by MEPI [Table 1]. The MEPI schools are undertaking a broad spectrum of activities such as curricula revisions, faculty development programs, establishment of e-learning, and strengthening of CBE to meet the health workforce goals of MEPI. The MEPI coordinating center has established Technical Working Groups on topics that are of common interest, including CBE, that provide a platform to share strategies, innovations, and resources through a listserv and at the MEPI Annual Symposium. The objective of this paper is to examine how CBE is evolving among MEPI schools, with a particular focus on MEPI programs in three African countries.

## Methods

The MEPI coordinating center annually conducts a survey and site visits to all MEPI schools as part of its monitoring and evaluation role. The survey collects data from all 25 schools in

the MEPI network with detailed questions about the characteristics of CBE programs (e.g., duration, competencies, and location). Round 1 of the survey, which provided baseline data, was implemented between February 9, 2011 and March 31, 2011, and round 2 was implemented between April 23, 2012 and June 15, 2012. The annual site visits follow preset guidelines designed to gather qualitative information on the progress of activities.

In this analysis, we utilize data from the first two years of site visits and surveys to characterize CBE efforts across the MEPI network. In addition, we focus on three specific examples selected by the conveners of the CBE Technical Working Group as they exemplify different models and innovations in CBE. Faculty closely involved in the management of these programs provided program descriptions. All data and descriptions were approved by the Principal Investigators at each MEPI school involved and the MEPI coordinating center.

## Results

Despite the diversity of interventions funded by MEPI, CBE has emerged as a common activity. Data from the annual surveys indicate that 20 out of the 25 schools have included expansion or strengthening of CBE as one of their funded activities, resulting in 168 MEPI-supported community training sites. Table 2 illustrates some of the characteristics of CBE among MEPI schools. While the majority of schools provide less than six months of training in the community, a few schools offer longer experiences. The competencies addressed at community sites are similar. Almost all of the schools teach public health skills, clinical skills and research skills, and two-thirds offer management training during community rotations. While the majority (58%) of CBE sites are in rural areas, over 40% are in urban areas. The supervision of students during CBE rotations is largely provided by faculty from the medical school but in some cases, clinicians working at these clinical settings provide oversight.

### Descriptions of Three Community-Based Education Programs in the MEPI

What follows are descriptions of how MEPI funding is supporting the evolution and evaluation of CBE in three African countries.

**University of Jos, Nigeria: Moving clinical training into the community**—One of the greatest challenges of healthcare in Nigeria is the urbanization of the health workforce, particularly in the northern regions of the country. About 80% of the health workforce in Plateau State practice in the capital city of Jos, which accounts for only 23.4% of the state's population according to the 2006 census.<sup>[8]</sup> Three-quarters of the medical doctors in the capital city are employed by the government-owned university teaching hospital. In contrast, many general hospitals outside the capital city are poorly resourced and staffed. Additionally, the teaching hospitals are overwhelmed with a large number of students, house officers, and resident doctors, whose learning is hampered by too few patients per trainee. This overcrowding is creating competency deficits and fuelling calls to cut student numbers.<sup>[9]</sup>

In Nigeria, CBE has existed for over 30 years and accredited medical schools are required to include some form of CBE in their curricula.<sup>[10]</sup> Historically, CBE curricula typically focus

on public health skills such as understanding environmental-related health risks and diagnosing community health.<sup>[11]</sup> In contrast, the MEPI-funded model of CBE at the University of Jos is driven by a need to offload tertiary hospitals and therefore focuses on clinical skills. In addition to increasing the capacity for clinical rotations, this model of CBE is intended to bridge competency gaps in the existing undergraduate training, to encourage the retention of health workers in rural hospitals by engaging them in academic activities and to provide increased access to health services in rural areas.

The MEPI-funded CBE rotations require 4<sup>th</sup> and 5<sup>th</sup> year students to complete 8-week clinical rotations at community hospitals. These general hospitals, in rural settings in Plateau State, currently function as active human immunodeficiency virus and tuberculosis treatment centers and have recently been renovated and given more equipment by the PEPFAR program. To ensure high quality learning experiences at these community hospitals, MEPI is providing e-learning resources for these facilities. The Departments of Family Medicine and Pediatrics have begun sending resident doctors and medical students along with supervising consultants to these hospitals. Other departments including Surgery, Nursing, and Medical Laboratory Sciences will follow. To evaluate this CBE intervention, students' competencies and future career plans will be tracked through yearly exit surveys and the impact on health services will be captured by tracking data such as changes in the utilization of health services and availability of medical doctors at the community hospitals.

#### **Uganda: Improving the quality and consistency of community-based**

**education**—Like most countries in Sub-Saharan Africa, Uganda faces a critical shortage of human resources for health. Only 58% of approved clinical, administrative, and support staff positions in the public health sector are filled. Inequitable distribution of health workers compounds the situation with nearly 70% of doctors and dentists, 80% of pharmacists, and 40% of nurses and midwives working in urban areas serving just 13% of the population.<sup>[12]</sup>

CBE has been implemented in undergraduate medical training in Uganda since 1989 with the aim of equipping students to provide high-quality, community-based care, and encouraging careers in rural health service. Table 3 provides an overview of CBE at each medical school in Uganda. While students at Gulu and Mbarara do one CBE rotation during training, students at Makerere and at Kampala International University go into the community every year of training. In all cases, the rotations are less than three months per year and are a required component of training.

The MEPI grant in Uganda triggered a nation-wide partnership of medical schools called the *Medical Education for Equitable Services to All Ugandans Consortium* (MESAUC), with technical support from Johns Hopkins University. MEPI funding is being used to provide a more consistent high-quality CBE experience across all MESAUC schools. One strategy to achieve this is the establishment of minimum standards for community sites, which include having an operational outreach program and safe accommodation for students. Curricula across the schools have been revised to be competency-based with integration of content on leadership and management, research, and family medicine. Supervisors and preceptors are being trained in order to enhance the quality of teaching. Learning environments are being improved through the provision of computers and internet connectivity.

MESAU is also using MEPI funding to evaluate the impact of CBE on the health workforce and health services. The metrics that will be assessed include the impact of CBE on the utilization of health services, community participation in health, and the professional practice and motivation of site staff. Data emerging from the on-going CBE evaluation baseline study indicate that during their placements, students interact significantly with community health workers and have a role in mobilizing the community to encourage positive changes in health and health seeking behaviors. The CBE experience, therefore, has the potential to transform students from learners to change agents who can motivate improvements in community health.

**South Africa: A comprehensive rural immersion experience**—South Africa's human resources for health are characterized by a poor distribution of health workers between the private and public sectors, and between rural and urban areas. While 44% of the population resides in rural areas, only 12% of doctors and 19% of the country's nurses serve these regions.<sup>[13]</sup>

Cognizant of the prevailing reality and with the belief that greater exposure will lead to larger numbers of graduates electing to practice in a rural setting, Stellenbosch University's (SU's) Faculty of Medicine and Health Sciences launched the Ukwanda Centre for Rural Health in 2002, which initially supported two-week rotations for students.<sup>[14]</sup> In 2011, after years of negotiation with health services stakeholders, including representatives from the provincial government and hospital administrators, the Ukwanda Rural Clinical School was established paving the way for implementing an innovative comprehensive rural experience for SU's medical students, the first of its kind in South Africa.

The Ukwanda Rural Clinical School hosts a year-long CBE immersion experience for final year (6<sup>th</sup> year) medical students who choose between two educational models. One option is to attach to a regional hospital where they follow 'traditional' rotations, have a weekly primary health care clinic and conduct home visits. Alternatively, they can select a longitudinal clerkship at a district hospital managed by the hospital's chief family physician.<sup>[15]</sup> In this model, the curriculum is prescribed by the patient that enters the hospital each day. While all students at SU are required to complete a short-term rural exposure rotation, this year-long immersion experience is optional and only a small proportion of students opt to participate. The smaller numbers enable individualized learning compared with rotations at the academic hospital.

MEPI funding is supporting students and clinician teachers at the Ukwanda Rural Clinical School, establishing an e-learning platform and providing faculty development. In addition, funding is being used to conduct a robust, five-year longitudinal evaluation of the innovation. In year one, baseline data was collected from the students, clinician teachers, staff at the hospitals, and community care workers from the primary health care clinics that students attend. The study was replicated in 2012 and will continue annually until 2015. Contact will be maintained with each cohort through email, telephone, and face to face interviews to determine the extent to which their rural experience prepared them for practicing in the public health system and influenced decisions to practice in rural

communities. Preliminary findings highlight the potential of CBE to provide a rich, transformational learning experience leading to a change in practice and attitude.

## Discussion

The descriptions above highlight the diversity of CBE among MEPI schools in Africa. Experiences range from brief rotations focused on public health, such as that in Uganda, to year-long rotations providing comprehensive training in rural health at SU. The University of Jos model is yet a different approach to CBE showing how CBE can support the decentralization of clinical training.

The evolution in CBE among these three MEPI programs is driven by demands to improve the quality of education, to train more students, and to improve the retention of graduates in underserved areas. The common areas of investment among these schools supports findings in the literature that the challenges of CBE include inconsistencies in the quality of education, the quality of community sites, and the high cost of training in the community. All the three schools are investing in technology to bring better access to resources at community sites and in training for faculty. Since the high cost of CBE often comes from the need to support both students and faculty at remote sites, it is interesting to note that a number of schools, including SU, are using supervisors from the community and many of the MEPI-funded sites are in urban areas, potentially minimizing accommodation and transportation costs.

All three highlighted programs are using MEPI funding to evaluate the impact of their CBE investments, particularly on rural retention. The diversity of models provides an opportunity to compare the effectiveness of different strategies and their impact on the health workforce. How long do students need to spend in the community to influence career decisions? Do students feel more prepared for rural service by focusing on public health skills or clinical skills? Does an elective year-long immersion for a handful of students, provide a better return on investment than short CBE rotations required by all students? For schools that invest in CBE, answers to these questions will be informative.

MEPI schools are also evaluating the impact of CBE on communities. How are communities affected by different models of CBE? How is the access to and quality of health services affected when students, residents, and supervisors participate in care? An estimated 10 thousand to 11 thousand students graduate from African medical schools each year.<sup>[16]</sup> Their contribution during training is an unmeasured human resource for health. The extensive evaluations by MESAU and SU could provide a link between CBE and improved health outcomes.

As the first large-scale investment in the physician workforce in Africa, MEPI is witness to an evolution in community-based medical education as medical schools seek to improve the quality, quantity, and retention of graduates in rural and underserved areas. MEPI schools are investing in evaluating the impact of this investment on both the health workforce and health services. Identifying the strategies within CBE that are reproducible, scalable, and



optimize outcomes will be instructive for health professions training programs across the continent.

## Acknowledgments

The funding for this work came from the United States Government (Office of the U.S. Global AIDS Coordinator (OGAC), National Institutes of Health (NIH) and Health Resources and Service Administration (HRSA)) funded Medical Education Partnership Initiative (MEPI) grant.

**Source of Support:** Nil.

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Table 1

## Medical Education Partnership Initiative Network institutions

Country	Primary MEPI school	Partnering schools/institutions	Managed by
Botswana	University of Botswana PI: Oathokwa Nkomazana	Harvard School of Public Health and the University of Pennsylvania	HRSA*
Ethiopia	Addis Ababa University PI: Milliard Derbew	<i>Consortium of Ethiopian Medical Schools</i> Hawassa University, Haremaya Universities, and the Defense Forces Medical Colleges, <i>In the US:</i> Emory University, Johns Hopkins University, University of California, San Diego, and University of Wisconsin, Partner for Ethiopia University of Alabama-Birmingham	HRSA
Ghana	Kwame Nkrumah University of Science and Technology PI: Peter Donkor	Ghana Ministry of Health, KomfoAnokye Teaching Hospital, Ghana College of Physicians and Surgeons, and Ghana Ambulance Service. <i>In the US:</i> University of Michigan	NIH**
Kenya	University of Nairobi PI: James Kiarie	<i>In the US:</i> University of Washington and the University of Maryland	NIH
Mozambique	Universidade de Eduardo Mondlane PI: Emilia Noormahomed	Universidade Lurio, Universidade Zambeze, the World Health Organization, the Canadian Network for International Surgery <i>In the US:</i> University of California, San Diego (UCSD), the American College of Surgeons	NIH
Malawi	University of Malawi College of Medicine PI: Dr. S Kazima	University of Cape Town <i>In the US:</i> University of North Carolina, Johns Hopkins University Bloomberg School of Public Health	NIH
Nigeria	University of Ibadan PI: David Olaleye	<i>Consortium of Nigerian medical schools</i> University of Jos, University of Nigeria, University of Maiduguri, Ahmadu Bello University, University of Lagos <i>In the US:</i> Northwestern University and the Harvard School of Public Health	NIH
Tanzania	Kilimanjaro Christian Medical University College (KCMUC) PI: Moshi Ntabaye	<i>In the US:</i> Duke University School of Medicine	HRSA
South Africa	University of KwaZulu-Natal PI: Umesh Laloo	<i>In the US:</i> Columbia University	NIH
South Africa	Stellenbosch University PI: Jean Nachege PI: Marietjie de Villiers	The University of Cape Town Lung Institute, Makerere University	HRSA
Uganda	Makerere University PI: Nelson Sewankambo	<i>Consortium of Ugandan Medical Schools</i> Mbarara University, Kampala International University, Busitema University and Gulu University. Medical Research Council at Uganda Virus Research Institute <i>In the US:</i> Johns Hopkins University, Case Western Reserve University, Yale University	NIH
Zambia	University of Zambia PI: Yakub Mulla	<i>Consortium of Zambian Medical schools:</i> Copperbelt University, Cavendish University, Lusaka Apex Medical School <i>In the US:</i> Vanderbilt University and University of Alabama-Birmingham	NIH
Zimbabwe	University of Zimbabwe PI: James Hakim	University of Cape Town, University College London and King's College London, Institute of Psychiatry <i>In the US:</i> University of Colorado-Denver and Stanford University	NIH
The MEPI Coordinating Center	PI: Fitzhugh Mullan PI: Seble Frehywot	<i>In Uganda:</i> The African Center for Global Health and Social Transformation PI: Francis Omaswa	HRSA

MEPI: Medical Education Partnership Initiative, HRSA: Health Resources and Services Administration, NIH: National Institutes of Health

**Table 2**

Overview of community-based education in the MEPI network

<b>Total number</b>		<b>Count (%)</b>
	<b>Duration</b>	
25 schools	<than 2 months	10 (40)
	2–5 months	11 (44)
	>than 6 months	3 (12)
	<b>Competencies</b>	
25 schools	Clinical	22 (88)
	Research	20 (80)
	Public health	24 (96)
	Management	16 (64)
	<b>Site location</b>	
168 sites	Rural	97 (58)
	Urban	69 (42)
	<b>Supervision</b>	
168 sites	Medical school faculty	105 (63)
	Site clinician	52 (31)

MEPI: Medical Education Partnership Initiative

**Table 3**

Overview of community-based education in selected MEPI programs

Country	School	School information	Descriptions of CBE program supported by MEPI
Uganda	Gulu University	Public, since 2004	4 <sup>th</sup> year, once during the program, 5 weeks, required
	Kampala International University	Private, since 2006	All years of study, once during each academic year for each program, 5 weeks, required
	Makerere University College of Health Sciences	Public, since 1923	1 <sup>st</sup> to 4 <sup>th</sup> year, once during each academic year for each program, 4–8 weeks, required
	Mbarara University of Science and Technology	Public, since 1989	Different years of study for different programs, once during each program, 5 weeks, required
South Africa	Stellenbosch University	Public, since 1956	6 <sup>th</sup> year of study, one year immersion, elective
Nigeria	University of Jos	Public, since 1981	Community rotation: 4 <sup>th</sup> and 5 <sup>th</sup> year of study, 8 weeks clinical rotation, required

MEPI: Medical Education Partnership Initiative