Building and Sustaining Partnerships in Health Workforce and Research Capacity in Rwanda

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ABSTRACT
Rwanda’s ambitious Human Resources for Health (HRH) program comes to an end this year, having made great strides towards achieving its aim to create a large, diverse and competent health workforce, and will have graduated over 4,500 healthcare professionals since its inception in 2012. The HRH program was based on strong collaborative relationships between Rwandan and United States academic institutions and faculty and now stands poised to enter a new phase focused on sustaining the many gains achieved. Fostering career development of new Rwandan faculty and building health research capacity are key components to sustaining the mutually beneficial partnerships that have been forged over the past seven years, with the goal of creating strong Rwandan health researchers that can advance knowledge of best practices for patient care and public health, appropriate to the Rwandan context and other resource-limited settings.

KEYWORDS: human resources for health, medical education, resource-limited, Rwanda, research capacity-building

INTRODUCTION
From 1989–1997, the average life expectancy for citizens of the East African nation of Rwanda was less than 30 years - the lowest of any nation in the world. However, during the past two decades intensive reconstruction in Rwanda’s health sector has yielded markedly steep declines in premature mortality for its population of approximately 12 million people. Backed by the Rwandan government’s “Vision 2020” initiative launched in 2000 that established health equity as a fundamental priority among other key goals for the country, numerous investments and programs in healthcare have been made; as a result, Rwanda’s average life expectancy is now over 67 years – substantially higher than its surrounding neighbors – and continues to improve each year. Today, the majority of Rwandans have health insurance, and there is near-universal coverage for childhood vaccinations as well as access to highly active antiretroviral therapy (HAART) for people living with human immunodeficiency virus (HIV). The country has been hailed as “beacon of hope” by many, including former Prime Minister of the United Kingdom Tony Blair, for the many advances in health that the country has achieved since the devastation of the 1994 Rwandan genocide which claimed the lives of over 800,000 people.

HUMAN RESOURCES FOR HEALTH IN RWANDA
Prior to 2011, Rwanda had fewer than 0.84 health providers (physician, nurse, or midwife) per 1,000 people. Rwanda was far from meeting the World Health Organization’s target minimum number of health providers (4.45/1,000 people) laid out in the Sustainable Development Goals. While the country had greatly expanded access to basic health care through a robust community health worker system, there remained an enormous need for trained health providers as well as specialists.

The creation of a strong health education infrastructure was recognized as a key priority in order to produce a high-quality health workforce and thereby sustain the improvements in health outcomes achieved in Rwanda. In 2012, the Rwandan Ministry of Health’s (MOH) Human Resources for Health (HRH) workgroup developed a strategy to “develop and implement long-term plans to increase...
the quantity, quality and diversity of healthcare training. Together with the Clinton Health Access Initiative and a consortium of 22 United States academic training institutions, a 7-year (2012–2019) partnership was formed to train the next generation of Rwandan health professionals. Funding for this program was primarily provided by the US Centers for Disease Control and Prevention and the Global Fund for HIV, TB, and Malaria.

Faculty from the Warren Alpert Medical School of Brown University were among the core international faculty that partnered with Rwanda’s HRH program to lead new training programs in emergency medicine, internal medicine as well as pediatrics. Other specialties prioritized for training programs in collaboration with other US academic institutions were in general surgery, obstetrics and gynecology, anesthesiology, psychiatry and neurosurgery as well as training programs in nursing, health management, and oral health. Core visiting faculty typically were deployed for 6–12 months, with visiting faculty paired or “twinned” with a Rwandan faculty member to share academic and teaching responsibilities. The program was designed so that new graduates of HRH training programs would longitudinally replace visiting faculty, with the goal that all teaching and care delivery would be assumed by Rwandan faculty at the conclusion of the program. To ensure retention, graduates are required to sign a mandatory 4–5 year contract in the public sector. Now, nearing the projected end of the HRH program, it will have graduated over 4,500 students.

In November 2018, the first class of Rwandan emergency medicine specialists graduated, joining graduates from multiple other specialties, and marking the formal handover of the emergency medicine residency training program to the new Rwandan faculty. However, the partnerships and professional connections forged over the past seven years are planned to continue in the form of intermittent visiting faculty to assist the teaching duties, as well as in growth of research collaborations between Rwandan and US researchers. These partnerships, especially in research, are key to sustaining the growth of Rwanda’s academic medical institutions and for creating strong clinical researchers that will drive evidence-based improvements in patient care and public health appropriate to the sub-Saharan African context.

**RESEARCH CAPACITY IN LMICS**

Key and complimentary to the development of a sustainable healthcare workforce is the investment in and development of research programming. This requires knowledge-generating infrastructure for research which engages and empowers healthcare providers to be able to address the most important, impactful and appropriate issues existing in these settings. Although research is recognized as necessary for health system development in LMICs, to date, barriers to effective research implementation persist particularly in the African context. These barriers are multifactorial but driven largely by financial, infrastructure and human resource aspects as well as prioritization of clinical care to research needs. In the financial domain there has been a historic disconnect of priorities among funders from high-income settings in which financial support has not been most efficiently allocated to meet local research needs. Furthermore, in most LMICs there is limited infrastructure to support research endeavors. This limitation is demonstrated in the forms of limited availability of accessible research training programs, institutional research agendas and review boards able to provide ethical oversight. In relation to human resources there exist fewer trained researchers per capita in LMICs versus HICs despite the fact that the majority of morbidity and mortality globally occurs in LMICs. Associated with this deficiency is a resultant lack of guidance and mentorship resources in LMICs, all of which is compounded by frequent migration of trained researchers.

It has been increasingly realized that research conducted primarily in HIC settings cannot be feasibly translated to LMIC settings, and in some cases, simply implementing guidelines designed for HIC to LMIC settings may even be harmful. One of the most notable instances of this phenomenon was the landmark FEAST trial from 2011 that showed that among pediatric patients with sepsis in sub-Saharan Africa intravenous fluid bolus administration actually increased mortality risk, contrary to findings from HICs. Similar findings showing discrepancies in outcomes between HIC and LMIC settings have been shown in a multitude of other studies and urge for research appropriate to LMIC contexts to be significantly scaled up.

**RESEARCH CAPACITY IN RWANDA**

Health research in Rwanda has historically been neglected due to a lack of sufficient staff, greater prioritization of clinical care, and paucity of mentorship. The HRH program has made significant impact on research, largely through the development of research curriculums integrated in residency programs, and by fostering collaborative research projects, which have resulted in a substantial number of publications to date. Additionally, several teaching hospitals (Kigali University Teaching Hospital, Butare University Teaching Hospital, King Faisal Hospital, Rwanda Military Hospital) have now formalized the position of a Research Division serving as an Institutional Review Board/ethics Committee in charge of coordinating all research endeavors in the teaching hospitals.

To date, more than 80 studies have been published from partnerships between Rwandan and US researchers including research on the use of a simplified echocardiogram strategy for heart failure diagnosis, the epidemiology and outcomes of trauma patients, and predicting mortality risks among intensive care unit patients. Notably, the impact
on clinical care of the HRH training programs has also been shown, most recently with a study that showed a significant decline in ED mortality from 6.3% to 1.2% after the implementation of the EM residency program.\textsuperscript{19} Research such as the development of the Kigali modification of the Berlin definition of acute respiratory distress syndrome (ARDS) as well as for the use of the quick sepsis organ failure assessment (qSOFA) score in assessing risk of mortality among ED patients show promise for the creation of context-appropriate clinical tools specific to resource-limited settings.\textsuperscript{18,19}

Efforts to bolster research capacity in Rwanda have focused primarily on research curriculum development and research support. Each resident physician in Rwanda is required to complete a research project as part of their Master of Medicine (the degree received upon completion of residency program) thesis requirement. As an example of the research programs spearheaded by individual specialties, within the emergency medicine training program, research training has been supported by the Tina and Richard V. Carolan Grant for Emergency Care which has facilitated the creation of a module-based research course that has been integrated into the didactic curriculum. The Carolan Grant has also provided funding for a research coordinator fellowship; this dedicated Carolan research fellow teaches the research curriculum and assists Rwandan residents with their research theses. Finally, the Carolan grant provides funding for seed grants that residents can use to support their own research projects or so that they can present their research at regional and international conferences, and also funded a backup medical supply project to help trainees obtain the material supplies needed to provide patient care and reduce stockouts. The results of these projects have been presented by Rwandan EM residents at the Society for Academic Emergency Medicine (SAEM) Annual Meeting and at the International Conference for Emergency Medicine (ICEM) in Seoul, South Korea this year.

Residents have displayed great enthusiasm and creativity in their research projects. Recently completed projects designed and implemented by current residents include an evaluation of gender differences in patterns of injury and trauma, an association between tuberculosis diagnosis during Rwanda’s dry versus rainy season (a topic previously studied but still poorly understood in many regions of the world), and evaluating mortality outcomes in patients with traumatic intracranial bleeding by operative or non-operative management. The success of the research capacity-building programs has most recently been exemplified by a grant that was obtained by two Rwandan emergency medicine physicians (faculty Dr. Chantal Uwamahoro and resident Dr. Vincent Ndebwanimana) to study interfacility transfers between district hospitals to Kigali University Teaching Hospital.

**FUTURE DIRECTIONS FOR TRAINING AND RESEARCH IN RWANDA**

Retention of new graduates is fundamental to maintaining a strong health workforce in Rwanda. In order to retain graduates, continued professional development and leadership programs are needed as well as funding to support increased numbers of faculty and to improve equipment and supplies available in teaching hospitals. With regard to career development, Rwandan faculty have had opportunities to give lectures abroad, and Rwandan trainees have participated in clinical rotations in the United States and also have had the opportunity to engage in regional and international conferences. Furthermore, as an example of reciprocal educational exchange, the Rwandan EM residents recently led the fourth “Emergency Medicine in the Tropics” course – an educational program designed and led by Rwandan clinicians and trainees to teach tropical medicine to their counterparts from high-resource settings. Rwanda has also recently begun to host trainees from other sub-Saharan African countries within their residency programs.\textsuperscript{20} Other efforts to expand and improve the quality of the healthcare workforce are initiatives to develop Rwanda’s pre-hospital emergency care system through dedicated training for pre-hospital providers.

Future goals for research development in Rwanda include leadership training and expanded opportunities for Rwandan resident physicians and faculty to disseminate their research. Leadership training is important for building administrative capacity and producing caring, charismatic and effective individuals. As a part of leadership training efforts, international researchers from academic institutions...
work one-on-one with Rwandan faculty and resident physicians to provide guidance, counselling and mentorship. The Carolan grant also provides funding for an annual EM leadership retreat.

CONCLUSIONS

Putting in place measures to sustain Rwanda's achievements in health education and research is a foremost priority of both the Rwandan MOH and the HRH program. A key part of strengthening the capacity of Rwanda's academic medical institutions will be to support career development of Rwandan faculty through continued mentorship and leadership development, as well as to maintain existing partnerships between Rwandan and US institutions in fostering improved research capacity. Research studies designed and led by Rwandan faculty and trainees are especially needed, with continued mentorship from experienced researchers in order to develop strong Rwandan principal investigators who can produce evidence on how to address the most pressing health concerns facing the region. Also crucially needed are the resources to continue to increase access to residency programs, and increased support for Rwandan trainees with interest in academic medicine.

References


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