

Findings: Adjusting for basic amenities, basic equipment, and capacity for diagnosing NCDs, our final model indicates significant associations between EM-NCD availability and geographic region, health facility type, managing authority, and range of HIV services. Adjusting for other variables such as facility type and amenities, private for-profit facilities' number of EM-NCD is 124% higher on average than public facilities ($p < .001$). General hospitals and referral health centers had 80.5% ($p = .017$) and 110% ($p = .006$) higher EM-NCD counts than the lowest level facilities, respectively. Facilities in the Northern and Eastern regions have significantly lower EM-NCD counts than those in the capital region ($p = 0.015$ and $p = 0.003$, respectively.) Offering HIV care and support services was associated with 35% lower average EM-NCD counts ($p = 0.006$), though offering HIV counseling and testing was associated with 57% higher counts of EM-NCD ($p = 0.048$).

Interpretation: By conducting the first Poisson analysis using SARA data, we have identified multiple disparities in the availability of EM-NCD in Uganda. Our findings can be used by health system planners and policymakers to guide the distribution of limited resources. While the primary purpose of SARA is to assess and monitor health services readiness rather than produce data for statistical analyses, we show that it can also be an important resource for answering more complex research and policy questions.

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Improvement in User Confidence and Competency in Novice Endoscopists with the Use of a Smartphone-based Endoscopy Training Application

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Program/Project Purpose: Global endoscopic capacity is limited by a lack of providers skilled in these relatively complex procedures. Endoscopy is useful in early detection and treatment of gastrointestinal cancers. With rising rates of gastrointestinal cancers, there is an urgent need for providers trained in the performance of endoscopy. Current methods of endoscopic training, based on an apprenticeship model, are inadequate to prepare trainees to meet advancing competency expectations.

Structure/Method/Design: We have developed an interactive smartphone-based endoscopy teaching application that focuses on endoscopic techniques and management of commonly encountered GI pathology. The goal is to create a central resource where clinicians can access information required to successfully perform endoscopy which adheres to the standards described by the major gastroenterology societies. The application can provide guidance (through demonstrative videos and verbal instruction) on the technical aspects of performing endoscopy; it also contains information about the cognitive aspects i.e. identifying and managing GI diseases. The application is currently being evaluated by a group of six first-year gastroenterology fellows at Baylor College of Medicine (Houston, TX) to determine feasibility of this novel training tool.

Outcome & Evaluation: We have conducted a “pre-test” survey with the study participants to assess user confidence and knowledge

regarding commonly encountered GI conditions. After four weeks of unlimited use of the application, we will conduct a “post-test” survey to examine these same areas of interest and also to obtain feedback regarding the application itself.

Going Forward: We plan to expand this tool to cover a wider range of pathology and to include other procedures such as colonoscopy. We envision that this tool can have important global health applications. Cell phones are increasingly utilized in underserved global regions - we hope to take advantage of this to provide a unique platform for delivery of education. Specifically, we will develop this tool so providers with varying levels of training (i.e. non-gastroenterology trained physicians and even nurses), practicing in low-resource settings, can receive detailed information on how to perform basic gastrointestinal procedures. Future aims would also include development of this tool for other, non-GI procedures that can be encountered in low-resource settings and also for patient-centered education to promote compliance and enhance public health efforts worldwide.

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Human-centered Strategic Planning at a Rural Rwandan Medical School: A Case Study for Navigating Institutional Challenges and Strengthening Community and National Population Health in Low and Middle Income Countries

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Program/Project Purpose: Human-centered design (HCD) for strategic planning of educational, infrastructural, and financial objectives can provide a framework for medical schools throughout LMICs to efficiently increase in-country healthcare providers while concurrently contributing to community and national healthcare priorities. We undertook an HCD strategic planning process for the University of Gitwe Faculty of Medicine and Allied Health Sciences in Gitwe, Rwanda, the first rural medical school in Rwanda, opened in 2013.

Structure/Method/Design: The HCD framework of “empathetic needs finding, definition of challenges, idea-generation, iterative prototyping, and testing-retesting of solutions” was employed. Needs finding through semi-structured interviews of patients, physicians, nurses, University of Gitwe and Teaching Hospital staff, educators, students, community leaders, water and electricity managers, architects, financial planners, and international partners were conducted. A 15-year phased model was proposed with priorities elaborated and debated in multiple sessions. An architecture advisor evaluated Rwandan and East African Community Teaching Hospital standards to assess “needs” for infrastructure versus existing conditions. Similarly, this was done for medical education facilities. Local epidemiology was analyzed against national health priorities. Financial planning considered current budgetary circumstances, capital projects, and student and faculty financial positions.

Outcome & Evaluation: Educational, infrastructure and financial objectives were identified and elaborated into a three phase, 15-year plan. Educational strategic objectives emphasized stability of student enrollment, clarity of academic programs, overcoming limited availability of qualified physician educators including their recruitment and retention, implementation of digitized “flipped-classroom” curriculum, student-services provision, and government-academic partnerships. Infrastructure emphasized national accreditation standards for healthcare facilities and human-centered built infrastructure for education and patient care. Local epidemiology was considered to determine ordering and scale of addition of patient facilities and specialty services. Financial objectives included stability of annual budgets, establishment of borrowing, savings and debt strategies, development of capital projects including opening of University Development and Alumni Affairs bureaus, and growth of faculty and staff salaries and student aid.

Going Forward: The qualitative process of human-centered design coupled with quantitative analysis of infrastructure and financial assets and needs empowers nascent institutions to plan for growth, operating beyond timescales and the perspective of immediate challenges for the realization of the long-term institutional vision and mission.

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Assessing Clinician Compliance with National Guidelines for Pediatric HIV Care and Treatment in Rwanda

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Background: Children infected with HIV in resource-limited settings such as Rwanda do not fare well; it is estimated that, without treatment, more than half of HIV-infected children in sub-Saharan Africa will die before age two. Over the past decade, Rwanda has made great strides in increasing access to antiretroviral therapy (ART), however, obstacles remain, particularly for children, including difficulties with early HIV diagnosis, commencement of a treatment plan, and retaining children in long term care.

Methods: A retrospective cohort of 932 pediatric patients (<15 years old) who commenced ART between 2007 and 2009 were analyzed for adherence to National HIV Treatment Guidelines, specifically whether standard protocols were followed for: recording weight before and during ART treatment; prescribing Bactrim prophylaxis to all; screening and providing treatment of tuberculosis (TB); meeting eligibility criteria for starting ART; and whether the correct ART regimen was prescribed. 90% compliance with these measures is the minimum expected threshold for providers in the country.

Findings: While 97.1% of patients had their weight checked at ART start, only 47.5% had their weight checked at every subsequent visit (i.e., 6, 12, 18, and 24 months and the most recent visit). For Bactrim prophylaxis, 94.8% of patients were correctly prescribed medication, but 3.0% did not have documentation. 92% of children

were screened for TB at ART initiation. Of those that screened positive, 25.1% were treated for active TB and 15.2% did not have any documentation. Overall, only 73.4% of patients met all of the eligibility criteria for starting ART according to the national guidelines. Of those that did not meet the criteria, 79.0% started ART earlier than recommended, and 21.0% did not have documentation. Additionally, only 67.0% of ART regimens were correctly prescribed based on national guidelines. Of the patients co-infected with TB, only 53.5% received a compatible ART regimen.

Interpretation: Although Rwanda has surpassed many other sub-Saharan African countries for scaling up ART, further efforts focused on educating providers about current national protocols will be necessary to obtain the best HIV-related outcomes for the population.

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The Naiku Dee (Good Teacher) Training Project for Medical Educators in the Lao People’s Democratic Republic

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Program/Project Purpose: Lao PDR has set a goal to, “Ensure that all the Lao people have access to healthcare,” as part of their Health Strategy 2020. However, non-qualified health providers and shortages of medical educators continue to be an obstacle. The *Naiku Dee Training Project for Medical Educators* is a four year educational and mentorship program directed by Health Leadership International (HLI) to create a cohort of Lao medical educators to address this need.

Structure/Method/Design: The program will take place between January 2017 and December 2020. Participants consist of four current medical residents with an interest in medical education at the University of Health Sciences in Vientiane, Laos. The program faculty are volunteer physician members of HLI. The residents will be paired up with HLI physician mentors throughout the four year project. Yearly, two-three week training sessions will be held where residents will learn theories and different teaching modalities, participate in a Medical Educator Training of the Trainer course, and serve as HLI co-faculty in the Emergency Clinical Training course at Colleges of Health Sciences in Lao PDR. The Lao residents will then participate in a 4-6 week faculty development and skill enhancement short-term fellowship in the United States.

Outcome & Evaluation: Evaluations to assess the resident’s understanding and ability to apply acquired knowledge will be performed through yearly pre-post tests and peer and faculty evaluations. Residents will maintain a reflective journal log to document their application of course content in both their clinical and teaching practices. They will also identify new areas of learning to be covered during the yearly HLI training sessions. This ongoing evaluation of the project will help in improving the resident’s daily clinical practice and their future roles as medical educators.