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ORIGINAL RESEARCH

An International Collaboration for the Training of Medical Chief Residents in Rwanda

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Abstract

BACKGROUND The year-long position of chief medical resident is a time-honored tradition in the United States that serves to provide the trainee with an opportunity to gain further skills as a clinician, leader, teacher, liaison, and administrator. However, in most training programs in the developing world, this role does not exist.

OBJECTIVES We sought to develop a collaborative program to train the first medical chief residents for the University of Rwanda and to assess the impact of the new chief residency on residency training, using questionnaires and qualitative interviews with Rwandan faculty, chief residents, and residents.

METHODS The educational context and the process leading up to the appointment of Rwandan chief residents, including selection, job description, and necessary training (in the United States and Rwanda), are described. One year after implementation, we used a parallel, mixed methods approach to evaluate the new chief medical resident program through resident surveys as well as semistructured interviews with key informants, including site chief residents, chief residents, and faculty. We also observed chief residents and site chief residents at work and convened focus groups with postgraduate residents to yield additional qualitative information.

RESULTS Rwandan faculty and residents generally felt that the new position had improved the educational and administrative structure of the teaching program while providing a training ground for future academicians.

CONCLUSIONS A collaborative training program between developing and developed world academic institutions provides an efficient model for the development of a new chief residency program in the developing world.

KEY WORDS education, medical, internship and residency, leadership

INTRODUCTION

Formal postgraduate medical education is the continuation of a process of lifelong learning, through which residents are expected to acquire skills that will enable them to incrementally improve their professional abilities and knowledge throughout their careers. Achieving mastery of clinical medicine thus involves more than just patient care; it also requires leadership skills, critical self-reflection, and the ability to teach and motivate others. In the United States, preparation for and

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participation in chief residency provides an opportunity to develop these skills,[1] but these opportunities have not commonly been available within sub-Saharan African training contexts. Medicine in Africa is often particularly challenging because of the resource and personnel shortages that many health systems face. The challenge is even greater in sub-Saharan medical schools, where scarce faculty members are often stretched by clinical, educational, and administrative responsibilities. Effective educational leadership and mentorship is therefore often given a lower priority level or omitted altogether. The training, recruitment, and retention of indigenous medical leaders is also vital for the sustainability of quality medical education. This has led to this initiative to develop a Rwandan chief resident program, in partnership with Yale University and the University of Rwanda, to train Rwandan senior residents into academic leaders, and to measure its impact on medical training as perceived by local stakeholders.

Background. ***Educational context in Rwanda and relationship with Yale University.*** In Rwanda, most postgraduate training programs are sponsored and funded by the Ministry of Health and all are offered through the University of Rwanda, with graduates awarded a master's of medicine degree in various medical specialties. The internal medicine program is a 4-year program, first offered in 2006, and is based in 4 hospitals: the university teaching hospitals in Butare and Kigali, King Faisal Hospital, and the Rwanda Military Hospital. Most trainees are graduates of the bachelor of medicine and surgery program at the College of Medicine and Health Sciences, University of Rwanda. Training is primarily based on the inpatient wards and is oriented both toward general medicine and subspecialty medicine with the goal being to train generalist physicians by the end of the 4 years. In addition to clinical rotations, mentored by faculty at the bedside, there are also structured didactic conferences, which include morning report, journal club, morbidity and mortality conferences, bedside clinical teaching programs, and a video-conferenced weekly lecture series on a 2-year curriculum cycle. The internal medicine program had graduated between 1 and 5 trainees each year from 2009-2014, with an upscaling of resident numbers since 2012 resulting in a growth of the program to include 63 current trainees. Until 2013, there had never been a chief resident role in the Rwandan training system.

The collaboration between our 2 universities began in 2010, through funding from the Johnson and Johnson International Health Scholars program. Through this program, third-year Yale internal medicine or fourth-year pediatric medicine residents travel to Rwanda for 6-week rotations where they receive training in the care of patients with tropical illnesses. In turn, they provide bedside teaching in clinical medicine and evidence-based medicine alongside their counterparts in Rwanda. This collaboration has evolved to enable both US and Rwandan faculty to travel to the other's institutions to share experience in bedside teaching, evidence-based medicine, small and large group teaching, and resident evaluation and mentorship. The collaboration has been further strengthened by Yale University's participation in a US–Rwanda Ministry of Health Human Resources for Health program to train faculty for Rwanda's health professions training institutions.[2]

Rationale for Chief Residency in Rwanda. Through our collaboration, Rwandan and US faculty began to have discussions about the potential value of having chief residents in the Rwandan system. It was noted that Rwanda has a critical shortage of teaching faculty and that alternative career paths, within the nongovernmental and private sectors, compete for the few graduates. The gifted potential teachers within the system are thus often sidetracked into other roles before fully developing their teaching skills. Additionally, the rapid increase in internal medicine residents in training pointed to the need to involve more senior residents in the education of their junior colleagues. Chief residency provides an opportunity to identify, mentor, and develop skills for those who may become future researchers, educators, or faculty, with the goal of strengthening medical education in Rwanda permanently. The leadership of the College of Medicine and Health Sciences was approached and a decision was made to pilot the chief resident role in the 2014-2015 academic year.

General Description of the Chief Resident Role. In the United States, the position of chief resident is either given to a trainee in the final year of training or offered as an additional year of training on top of postgraduate residency with the general goals of growing in a number of ways through roles as a leader of fellow residents; as a teacher of residents, students, and faculty; and as an administrator. Additionally, chief residents may also have roles akin to junior faculty, functioning as attendings on the wards or in clinic, participating in faculty meetings, and helping to make decisions relating to the welfare of other, more junior, house officers.[3,4]

The chief resident role is critical to the proper functioning of a training program. The chief resident functions in both a resident and faculty role, bridging that gap and allowing for smooth transfer of information in both directions.[5]

At Yale, chief residents are responsible for running a variety of resident and student conferences (including morning report). They serve as an independent attending on the inpatient medical service, design and maintain inpatient and outpatient resident rotation schedules, and act as a mediator to help resolve resident conflict. They also participate in all faculty meetings, including discussions relating to resident progress and remediation.

Although the planned role in Rwandan was similar, it was necessary to contextualize the job description to meet the specific training needs of the setting. It was decided that the chief position in the Rwandan model would be folded into the fourth year of training because no additional funding was available to appoint them for an extra year as chief residents after completion of training. A phased rollout was also planned, by which site chief residents would be introduced before the appointment of the first chief resident.

Rwandan Site Chief Resident Role. Although establishing the chief resident role in Rwanda was the goal of the novel training collaboration described here, the establishment of a site chief resident at each of the 4 Rwandan teaching hospitals was initiated and piloted the year prior. The site chief resident was a third-year resident, nominated by peers and approved by the faculty, whose main focus was administrative, centering around the design of the inpatient and outpatient schedules for each of the residents rotating at the site. Thus, leadership, teaching, and advocacy for residents were not goals for the site chief, but rather components individual site chiefs could pursue independently. Similarly, career and clinical skills mentorship was variable, depending on the interest of faculty and site chiefs at the various locations.

Proposed Role of the Chief Resident in Rwanda. A proposed role for the medical chief resident in Rwanda was to provide and coordinate resident education (such as morning report, team-based learning), oversee resident administration, help to develop future Rwandan teaching faculty, and empower residents to oversee themselves and to have personal accountability for their own professional development. The proposal also outlined the chief resident serving as resident leaders and role models and playing a critical role in the education of medical students during their clinical clerkships and formal lectures.

With the role of chief resident housed during the fourth year of training, the clinical and academic requirements of residency still had to be fulfilled, including the completion of their dissertation. Oversight and support for the chief resident role would be provided by the clinical heads of department at each training site and the overall head of the Department of Medicine at the University of Rwanda. The clinical heads at each hospital are responsible for leading the local clinical operations of the faculty and residents, and the head of the department is responsible for the operation of the entire residency program and all academic, professional, and clinical aspects of medical education provided by the program.

Selection Process for the Chief Resident. By mutual agreement, it was decided that the first chief resident would be selected by the Rwandan faculty. The criteria used for selection included leadership skills, academic excellence, clinical ability, teaching ability, facility in English, and proven desire to teach and lead.

Outline of Training Program for the Rising Chief Resident. The chief resident selected for the position was invited to come to the United States for a 4-week module 4 months before taking up the new role (Appendix A). This program was designed through the collaboration of Rwandan faculty, the Rwandan chief resident candidate, US-based faculty, and US-based chief residents.

The program was designed to allow for the Rwandan resident to shadow the US chief resident counterparts in their leadership, clinical, administrative, and teaching roles. As examples, the Rwandan resident observed how morning report was led and shadowed the chief residents as they worked in their outpatient clinics and as inpatient attendings. The resident also sat in on medical student teaching sessions, faculty meetings, and physical diagnosis resident tutorials. The resident, in addition, shadowed faculty members as they prepared and led bedside rounds and teaching sessions including morbidity and mortality conferences and attending rounds.

During the stay in the United States, Rwandan and US faculty, along with the Rwandan chief candidate and the US chief residents, were all able to communicate on a regular basis, both by email and by phone call, to discuss the program during its development and execution. This enabled us to modify the process to achieve the project goals. At the end of US-based program, the Rwandan chief

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resident candidate led morning report in the US format and prepared a progress report for presentation, both for US faculty as well as for the Rwandan faculty upon return to Rwanda.

Return to Rwanda With Description of the Program in Rwanda. At the end of the 4-week module in the United States, the Rwandan chief resident candidate returned to Rwanda, accompanied by one of the Yale medical chief residents with whom the resident had worked in the United States. The Yale medical chief resident stayed in Rwanda for 4 weeks. The goals of the return trip were 2-fold for the Rwandan chief resident: to practice the leadership, clinical, administrative, and teaching skills learned in the United States while working side by side with the US counterpart and to develop the outline for what the Rwandan chief residency would be. The chief resident structure development involved both the Rwandan and American chief residents collaborating with the chief of medicine and the dean of the School of Medicine at the University of Rwanda in order to develop a document that outlines the selection process for future chief residents. Additionally, this document spells out the roles, responsibilities, and avenues for mentorship from faculty for the chief resident (available from authors on request).

After further collaborative discussion on the chief resident position in Rwanda and given the projected growth in the program, it was decided that 2 fourth-year postgraduates should fill the chief resident role each year and that they would each have a 6-month rotation at the 2 major university teaching hospital sites, University Central Hospital of Kigali (CHUK) and University Central Hospital of Butare (CHUB).

METHODS

One year after the selection, training, and implementation of the chief resident position in Rwanda, a US chief resident visited Rwanda to conduct a follow-up evaluation using a mixed methods approach to assess reflections of participant experiences. In particular, evaluation sought to assess the various roles performed by a chief resident as described above. A composite evaluation of the program from the merged data analysis is presented in Results as "reflections" from each stakeholder.

Quantitative Analysis. Postgraduate residents were purposefully selected from residents currently on inpatient services at CHUK and CHUB to ensure they had exposure to the chief medical resident. Attitudes of postgraduate residents were assessed using an 8-item questionnaire that was designed to target the impact of the chief resident on commonly described areas, such as medical education, teaching, quality of educational conferences, and overall opinion. There were no identifiable survey tools that existed for our assessment, so questions were modified from the Safety Attitudes Questionnaire, which is a psychometrically validated tool.[6] Residents were also asked whether the chief residents were good role models, good leaders, people they would feel comfortable approaching for help, and if it was a position they would consider taking. Responses were chosen from a 5-point Likert scale.

Qualitative Analysis. Qualitative information to evaluate program effectiveness was gathered through multiple methods, including focus groups with postgraduate residents; semistructured interviews with site chief residents, chief residents, and faculty; and participant observation of site chief residents and chief residents. Given that this was the first year of program implementation, qualitative information sought to maximize perspectives from all stakeholders.

Focus groups were used to allow residents to interact and engage with each other in reflection about their individual experiences with the chief medical resident. Two groups, involving a total of 13 residents, were conducted, recorded, and analyzed for emerging themes regarding programmatic implementation.

Individual semistructured interviews were conducted with site chief residents, faculty, and chief medical residents to further probe the effectiveness of chief medical residents in their myriad roles. Interviews were analyzed iteratively using an immersion/crystallization approach[7,8] by 2 US chief residents on the research team who had directly participated in Rwandan chief resident training and evaluation, with emerging themes about program effectiveness prompting additional probes in subsequent interviews.

Lastly, participant observation techniques were incorporated to observe the site chief residents and chief medical residents engaging in educational conferences and ward rounds. Observations were analyzed and interpreted with respect to the framework that chief medical residents typically fulfilled roles mentioned earlier.

Table 1. Postgraduate Assessment of Chief Resident Roles

Question	Responses, mean		
	Seniors (N = 8)	Interns(N = 5)	Overall (N = 13)
1. I have noticed an improvement in my medical education this year (compared with last year) because of having a CMR.	2.38	n/a	2.38
2. I have noticed an improvement in the teaching in our training program this year (compared with last year) because of having a CMR.	4	n/a	4
3. I have noticed an improvement in the quality of education conferences this year (compared with last year) because of having a CMR.	3.75	n/a	3.75
4. The CMRs are good role models.	3	3.2	3.08
5. The CMRs are good leaders for the postgraduate training program.	3.25	3.4	3.31
6. I would feel comfortable approaching a CMR for help or to talk about problems.	3.5	3	3.31
7. The chief resident position is one I would want to do.	3.38	3.2	3.31
8. Overall, having a chief resident this year has improved the training program.	3.5	n/a	3.5

1, strongly disagree; *2*, disagree; *3*, neither agree/disagree; *4*, agree; *5*, strongly agree.

RESULTS

In total, 13 residents from all training levels (including 8 "senior" postgraduate residents who had completed intern year) were selected by convenience sample from the 2 sites with chief resident presence, CHUK and CHUB, for a focus group (Appendix A) and a brief Likert scale–based questionnaire (Appendix B) surveying medical education, teaching, and quality of educational conferences compared with the year prior (Table 1). Of the 8 senior residents surveyed, 63% agreed or strongly agreed there was an overall improvement in the residency training program, within which 75% of respondents rated the specific area of "teaching" as having the most notable improvement compared with the year prior.

When asked about the chief resident role regarding role modeling, leadership, and desirability of the role itself, 5 of 13 (38%) residents either agreed or strongly agreed the current chief residents were good role models, with 6 of 13 (46%) agreeing or strongly agreeing that they would be comfortable approaching their chief resident for help. Only 4 of 13 (31%) residents agreed or strongly agreed the current chiefs were good leaders for the training program. When asked for general feedback about the chief system, the majority of senior residents reported disagreement with the faculty-driven chief selection process and that chiefs would be viewed as more representative leaders or role models for the house staff if the house staff were able to contribute to the selection.

The selection process had actually been modified for the second chief cycle to take resident opinion into consideration in selecting future chiefs. The residents surveyed expressed unanimous support for a revised chief selection process, wherein residents would nominate peers for the 4 site chief positions that are then faculty approved, with chiefs being selected by faculty for the following year from this group of peer-nominated site chiefs.

Reflections From Current Rwandan Chiefs and Site Chiefs. The 4 recurrent themes that emerged from interviews with the Rwandan chiefs and site chiefs highlighted (1) the necessity of detailed role definition between the 2 leadership positions, (2) the challenge of incorporating a chief year into residency training, (3) the crucial impact of faculty mentorship and programmatic support, and (4) the importance of future academic opportunities.

The primary unanticipated challenge the new chief residents faced in accomplishing administrative, leadership, and teaching skills this year was incomplete task differentiation, communication, and coordination with the site chiefs. Given that site chiefs were accustomed to functioning autonomously at the 2 sites without chief residents (Rwandan Military Hospital and King Faisal Hospital), the addition of a chief resident at CHUK and CHUB occasionally resulted in duplication, confusion, or overlooking of tasks. This obscurity and the resultant scheduling mishaps led to frustration for chiefs, site chiefs, and faculty, with 1 site chief explaining, "Everybody's business means it's nobody's business." After several trials of task delegation, the overwhelming consensus between site chiefs and chiefs interviewed is that the site chiefs should continue with all scheduling when they are on rotations allowing them to do so (ie, not intensive care unit or away electives), with final approval by the chiefs. During time-intensive or external rotations where the site chief needed to focus

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on clinical care of patients (eg, intensive care unit), the chief would take over scheduling responsibilities. In contrast to the site chiefs, the chiefs should focus primarily on leadership and educational programs, such as preparing cases for morning reports, journal clubs, grand rounds, morbidity and mortality conferences, and leading clinical sessions for teaching medical students and residents ultrasound, physical exams, skills at the bedside, and team-based learning.

A second challenge universally reported by site chiefs and chief residents pertained to the compressed timeline of incorporating the chief year into the final year of residency in Rwanda, as opposed to a postresidency year in the US. The fourth and final year of residency in Rwanda has traditionally been busy, with senior residents focused on completing the master's thesis required for graduation and studying for final exit exams (similar to US Board exams) while balancing clinical duties and patient care responsibilities. The current chiefs had an especially challenging start to the year juggling these competing research, clinical, and academic obligations with their new chiefly responsibilities. In addition to increased stresses from tackling the tasks themselves, 1 current chief also reported feeling disconnected from the chief role and residency program while focused heavily on clinical duties during a 2-month intensive care rotation. Because of constraints within the Rwandan medical education system, the chief year is unlikely to become a postresidency position. Instead, there is an effort to encourage residents to start research projects 1 year earlier in order to decompress their fourth year schedule. From the chiefs' perspective, all site chiefs and chiefs interviewed thought clear delegation of scheduling tasks to site chiefs would also decrease the chief workload and allow for greater focus on educational and leadership opportunities.

Faculty and programmatic support were the third recurrent theme, with chiefs and site chiefs desiring regular, structured meetings with faculty. Chiefs and site chiefs also expressed desire for more support in terms of direct observation, feedback, and career mentorship. Chief and site chief mentorship, feedback, and meeting frequency this year were variable at the different sites, with variation largely driven by the individuals at each site. Although faculty had committed to being available when requested, regular follow-up meetings with the faculty mentor at one site where they reviewed a journal of reflections benefitted 1 site chief by helping her conceive, develop, and implement a new coverage strategy for resident emergencies, which is now being discussed at every site. Similarly, programmatic support in the form of resources (such as conference room availability, white boards, chief offices, etc) are limited, which means leadership support becomes more important for resident-led initiatives. In 1 instance, a chief resident was unable to launch a resident case teaching series because of difficulty securing a location and reflected on his experience that "If you set an objective and don't meet it, the energy goes away." He also reported on the key requirement for more faculty mentorship in leadership and clinical skill building, stating, "I have been asked to do Journal Club, but I do not know personally how to do it. So I can do it, but if it is bad, then I do nothing—[sic] leave it as is." He further reflected on the need for good role modeling by successful faculty to guide personal and professional growth, stating, "If faculty work hard, they try to help you work hard to make it perfect, to bring you up."

As part of chief year mentorship, the rising Rwanda chiefs are also given the opportunity to train as chiefs for a month at Yale in the United States. During this month abroad, they work extensively with US faculty and chief residents to understand the chief resident role and hone skills in leadership, education, and middle management necessary to succeed in their new position. Thus, they practice delivering morning reports, with detailed faculty feedback, and participate in physical exam/bedside teaching, attending rounds, and administrative meetings with faculty, chiefs, and program directors. Although the focus is not on clinical learning, they join rounds and learn about different health care systems, medical education learning environments, and patient care approaches. For 1 chief resident, this difference in the culture of medicine and respectful communication between different groups of people made a large impact: "People communicated with respect for each other: attendings, residents, students, even to the people cleaning the floors." Observation of a different learning culture also left an impression: "Good teaching is discussion, not just sitting in presentations with other people 'vomiting' [information] at you." She commented positively on the hand-washing culture of safety and on resident participation at teaching sessions and case-based discussions, rather than lectures. Since her return, she has endeavored to incorporate more patient-centered care into clinical practice and learner-centered teaching into educational conferences. Her co-chief agreed that the

focus should not be on clinical medicine during the 1-month US-based training, but rather that "they should focus to know how to improve the system, not improve [their own] knowledge; like how to do better screening, or how to help the students go up…"

The fourth area of consensus related to the need for future opportunities in medical education as a way to attract, train, and retain future faculty. According to 1 chief, "I have a drive for education. Teaching is very favorable for me, but I think many PG [postgraduate residents] don't like teaching. To have a chief resident is important. You feel yourself responsible for the program. My request is to keep the chief resident growing into the department, to mix generations of new into the system with others there from before."

Reflections From Rwandan Faculty. From the Rwandan perspective, chief residency helps fulfill a key strategic need of increasing both the number and quality of academic leaders within the department. When interviewed, Rwandan faculty reported similar concerns to those of chiefs and site chiefs, namely the importance of role definition, timing of chief year, mentorship and programmatic support, and opportunities for future career advancement. As a new program, several faculty mentors were reluctant to impose constraints on the new chiefs given their compressed year, but supported a more structured mentorship role with regular meetings and feedback.

Reflections from US Chiefs. During the 2-year development, implementation, and evaluation of the chief resident role in Rwanda thus far, 1 US chief based at Yale each year has worked closely with the rising chief cohort to help facilitate the training process and adaptation of the US chief role into one tailored for Rwanda. As liaisons, the US chiefs collaborated with both Rwandan and US faculty to help train, support, and provide feedback to the rising chiefs during the US-based month of chief preparation and accompanied the rising chiefs to Rwanda for further troubleshooting, revision, and evaluation of the role. The international experience and fieldwork for both US and Rwandan chiefs was helpful for the initial establishment of the chief role, as it allowed a US chief familiar with chief resident culture and tasks in the US to collaborate with and empower Rwandan chiefs to assess needs, challenges, utility, and sustainability.

Future Directions. Overall, the introduction of a Rwandan internal medicine chief residency has provided a valuable project with both direct and indirect benefits to medical education in Rwanda. Other residency programs in Rwanda have since copied the model, with pediatrics and obstetrics and gynecology programs both in their infancy. Over time, it is hoped that a fully locally contextualized program will emerge, where all needed training can be conducted in Rwanda, and the role can evolve in ways that most suit the particular challenges and opportunities of the Rwandan training context.

CONCLUSIONS

We found that an international collaborative effort between our 2 medical schools was able to develop a comprehensive, hands-on, 2-month training program for the development of the first medical chief residents in Rwanda. The lead-in to the on-site training, with input from both academic centers, was critical to the efficient conduct of the training, both in the United States and Rwanda. Once the program started, we were able to rapidly adjust the training as needed to better meet educational, administrative, and counseling goals. The return trip to Rwanda for both US and Rwandan chiefs was critical in continuing the training in the local setting in order to provide pertinent follow-up training to prepare for the upcoming academic year. Our plan is to reevaluate our initiative midway through this next chief residency year to better enable us to prepare for the next group of Rwandan chief resident candidates before their travel to the United States. Our goal is to develop enough local experience to allow the entirety of chief residency training to eventually take place in Rwanda.

We believe that this international model can be replicated for other sites to develop their own a robust training program tailored to the local needs of the residency program and chief resident candidate.

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SUPPLEMENTARY DATA

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