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The role of the University of Cape Town, South Africa in the training and retention of surgeons in Sub-Saharan Africa



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ABSTRACT

Background: Sub-Saharan Africa (SSA) has a shortage of surgeon specialists. Many SSA countries lack specialty training programs but South Africa, an upper middle-income country, has several post-graduate surgical training programs. The primary objective of this study was to describe the retention rates of non-South African SSA surgical trainees from the University of Cape Town (UCT) on the African sub-continent. The secondary objective was to describe advantages and disadvantages of foreign surgical trainees on the UCT surgical training programs.

Methods: This was a two-part cross-sectional survey administered via email between June 1, 2018 and March 1, 2019 to UCT 1) surgical residents and fellows who graduated between 2007 and 2017 and whose country of origin was in SSA but outside South Africa, and 2) UCT surgical division heads.

Results: Thirty out of 78 (38%) trainees responded; 83% (n = 25) were male. There was a 96% retention rate of surgical trainees in SSA, 80% (n = 24) returned to their country of origin after training, 83% (n = 25) worked in the public sector, and 90% (n = 27) in teaching hospitals. Seven out of ten surgical division heads responded. Reported advantages of SSA trainees included more junior staff (n = 5, 71%) and the establishment of SSA networks (n = 4, 57%). Disadvantages included increased training responsibilities for educators (n = 2, 29%) and fewer cases for South African trainees (n = 2, 29%).

Discussion: Retention on the African sub-continent of surgeons who trained at UCT was high. SSA doctors can utilize South African post-graduate surgical training programs until their own countries increase their training capacity. The majority of trainees returned to their countries of origin, utilizing their skills in the public and academic sectors, and contributing to the teaching of more trainees. These training partnerships also contribute to knowledge-sharing and facilitate a regional network of African surgeons. Active recruitment of more female trainees is needed to ensure gender equity.

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Introduction

The Lancet Commission on Global Surgery identified that five billion people lack access to safe surgical care worldwide and that 2.2 million more surgeons, anesthesiologists, and obstetricians are required to address this unmet surgical need.¹ The greatest burden of unmet surgical need lies in Africa.^{1–3} Sub-Saharan Africa (SSA), in

particular, has a dearth of surgeons with few countries equipped to provide surgical training. In some SSA countries, training is often discontinuous and compromised by a lack of resources and inadequate infrastructure, encouraging SSA trainees to utilize training programs in other countries.⁴ Doctors from SSA countries that do not have their own training programs have four options for surgical training: 1) programs located in high-income countries (HICs), 2) programs located in SSA that are funded and supported through HIC partners, 3) programs located in SSA run by regional accreditation bodies, or 4) university-based surgical programs in another SSA country.

The first option are post-graduate surgical training programs

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located in HICs. HIC surgical training programs have been established for many years and have the advantages of having many supervisors, resources, and the opportunity to learn more specialized and complex operations compared to African programs.⁵ However, the burden of surgical disease and the type of treatments offered may not be similar to those in the African trainees' country of origin, making the training less applicable when returning to their home environment. In addition, other studies have reported that low- and middle-income country (LMIC) trainees stay in the HIC where they trained, making this pathway a threat to surgeon retention within SSA.^{6,7}

The second option are hybrid training programs located in SSA but which use HIC surgeon-trainers. Two examples are the Pan-African Association of Christian Surgeons (PAACS) and Human Resources for Health (HRH) Rwanda. PAACS is a program based in rural Christian mission hospitals located throughout East and Central Africa. Each PAACS hospital has its own training program sustained by donor-funding and partially staffed by HIC surgeon-trainers.⁸ PAACS aims to train and hire SSA surgeons who are willing to stay on the subcontinent as surgeons and/or contribute to increasing surgical capacity. HRH Rwanda is a US government-sponsored initiative established in 2012 to assist in building health education infrastructure and workforce in Rwanda, through temporary funding.⁹ The program trains specialist doctors, including surgeons, in Rwandan hospitals and relies on US faculty to mentor Rwandan trainers.^{10,11}

The third training option are programs run by African regional accreditation bodies, such as the College of Surgeons of East, Central, and Southern Africa (COSECSA), which offer online-based curricula coupled with clinical supervision at local hospitals by local surgeon-trainers. This model boasts high retention rates of 85.1% within the country of trainee origin and a 93.4% retention of surgeons within Africa overall.¹² Clinical training offered at COSECSA-approved hospitals vary by the availability of operations and trainers on-site. In addition, the online curriculum is limited by the availability of the internet and the lack of individual feedback for the content. The West African College of Surgeons is another organization, similar to COSECSA, that runs a regional accreditation program with clinical training by local surgeon-trainers at hospitals in West Africa.

A fourth training option involves participating in a surgical training program in another SSA country. South Africa is a middle-income country with eight well-established surgical training programs¹³ and non-South African trainees account for approximately 30% of surgical trainees in South African programs.^{14,15} The University of Cape Town (UCT) is the oldest university in South Africa and has offered postgraduate surgical training since 1943. All UCT postgraduate clinical training programs require foreign trainees to be medically qualified in their country of origin and to register with the Health Professions Council South Africa. Additional requirements are program- and division-specific.¹⁶ Despite a few previous studies on experiences of SSA trainees in a South African training program,^{14,17} advantages and disadvantages of SSA trainees to the program itself and place of work after graduation have not been previously reported.

Programs located in HICs can result in permanent relocation of critical healthcare workers away from Africa. Hybrid programs between HIC partners and local hospitals rely on external funding and/or surgeon-trainers that may not be sustainable. Programs that couple online didactic courses and local hospitals may lack surgeon-trainers and the variety of cases a large teaching hospital offers. This fourth option, training at an established South African university, could be an attractive pathway for SSA doctors to become surgeons as they offer a wide range of operative experiences in similarly low resource-settings without leaving the region.

The main objective of this study was to assess retention rates of SSA surgical trainees on the African sub-continent after completion of a surgical post-graduate training program at UCT. The secondary objective was to describe the advantages and disadvantages, of non-South African SSA trainees for the surgical training programs at UCT.

Material and methods

This was a retrospective cross-sectional study conducted at the UCT Department of Surgery which has ten surgical divisions: General Surgery, Cardiothoracic Surgery, Neurosurgery, Ophthalmology, Pediatric Surgery, Orthopedic Surgery, Otorhinolaryngology, Plastic and Reconstructive Surgery, Urology, and Emergency Medicine (included in the UCT surgical specialty list as the Emergency Medicine residents rotate through surgery). There were two participant groups: SSA trainees and departmental division heads. Trainee participants were non-South African SSA doctors who completed a surgical residency or fellowship in any one of the ten UCT surgical divisions between 2007 and 2017. The contact information of SSA trainees were obtained from surgical division databases and the postgraduate office. Heads from each of the ten surgical divisions were invited to participate. Once consent was obtained, a link to the appropriate survey was sent to participants by email. Surgical trainees were asked about their country of origin, the division they trained in, and the country and sector (academic, private, or public) where they currently practiced (see [Appendix 1](#)). UCT surgical division heads were asked about advantages and disadvantages of training SSA trainees for the program and the source of funding for these trainees. Division head respondents all served as their respective program directors and directly supervised South African and non-South African trainees. The majority of survey questions were multiple-choice; however, additional comments could be written in as well (see [Appendix 2](#)). Ethics approval for this study was obtained from the UCT Human Research Ethics Committee. No identifying data were reported to ensure participant confidentiality.

Data were collected in Research Electronic Data Capture (REDCap 8.4.3, 2019, Vanderbilt University) and exported for data analysis to Stata 15 SE (College Station, TX, USA). Descriptive statistical analysis was performed and presented as proportions, means, and medians.

Results

Seventy-eight trainees were identified over the ten-year period, of which only 13 (17%) were female (see [Table 1](#)). Thirty trainees responded to the survey (38%) and originated from Botswana, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Namibia, Rwanda, Uganda, and Zimbabwe (see [Fig. 1](#)). There was a 29 of 30 (96%) retention rate of SSA surgical trainees within the sub-continent. This included 25 (83%) who returned to their country of origin and another 4 (13%) who practiced in a SSA country other than their own after graduation.

Trainees received various means of funding and sponsorship with 14 (47%) funded by their home government or academic institutions, 10 (33%) funded by private scholarship programs or non-profit organizations, and the remaining 6 (20%) self-funded. One (3%) trainee emigrated to a HIC, Canada. Of the trainees who stayed on the sub-continent, 25 (83%) reported working in a public sector and 27 (90%) reported working in an academic institution.

Seven out of ten (70%) surgical division heads responded to the survey. Division heads who responded were from the following surgical specialties: Urology, Orthopedic surgery, Ophthalmology, Neurosurgery, Otorhinolaryngology, General Surgery –

Hepatobiliary division, and Emergency Medicine. Division heads reported that advantages of having SSA trainees included increasing the surgical workforce ($n = 5$, 71%), providing opportunities for future clinical partnerships ($n = 4$, 57%), and gaining future research collaborators ($n = 3$, 43%) (see Table 2). Division heads reported disadvantages of having SSA surgical trainees that included increased training demands on educators ($n = 2$, 29%), fewer surgical cases for South African trainees ($n = 2$, 29%), and personal and financial strain on SSA trainees ($n = 1$, 14%) (see Table 2).

Discussion

SSA has a lack of surgical training programs especially in many of its lower-income countries. South African universities, such as UCT, provide surgical training for SSA doctors and this study reported retention rates and some of the advantages and disadvantages of this training option. Our study found that the vast majority of SSA surgeons who graduated from a UCT South African surgical training program remained in SSA, confirming findings from a previous UCT study that reported most SSA medical trainees (surgical and non-surgical) planned to return to their country of origin to work.¹⁴ This is in contrast to trainees who leave for HIC programs and often do not return to their country of origin leading to brain-drain.⁶ In a recent study, 56% of surgical residents from LMICs who enrolled in United States programs did not intend to return to their countries of origin after completing their surgical training, mostly for professional reasons related to better surgical training, facilities, and opportunities in comparison to their countries of origin.¹⁸

Hybrid programs, or those supported by HIC funding and/or surgeon-trainers but located in SSA hospitals, also have high SSA retention rates. For example, PAACS reported a 100% retention rate of graduates within Africa and 79% retention rate within country of origin.¹⁹ These programs increase the surgical workforce in SSA and aim to hire their graduates as educators. However, since they rely on external funding and, at least partially, on HIC surgeon-trainers, they may not be scalable to train all the surgeons needed for the region.²⁰ Programs in middle-income countries such as South Africa can augment the SSA workforce by training surgeons who are expected to return to their country of origin and contribute to strengthening the health system.^{14,15} Our study found that more than three-fourths of UCT SSA surgical trainees returned to their countries of origin, some to work in public and/or academic hospitals as surgeon-trainers. For example, two surgeons from Botswana who graduated from the UCT general surgery training program, in 2016 and 2017 respectively, are now employed as surgeon-trainers at the University of Botswana and helping to start the country's first accredited general surgery program.²¹

Additionally, Fagan reported that all SSA trainees who had completed a one-year head-and-neck fellowship at UCT returned to their countries and established head and neck services that previously did not exist in those countries.²²

Programs that use the online curriculum of regional accreditation bodies and local surgeon-trainers may lack sufficient numbers of surgeon-trainers and the variety of operations that a university program provides. In a survey of Zambian COSECSA trainees, 50% rated aspects of training as poor or fair. Trainees were unsatisfied with the limited availability of supervisors, lack of proper equipment necessitating the alteration of procedures, and lack of internet access, as a significant proportion of COSECSA training occurred online. While online training is gaining traction worldwide, the importance of linking academic curricula and clinical training with a local university is crucial to ensure accountability.²³ University programs like UCT provide didactic and clinical training by the same surgeon-trainers allowing integration of the two learning modalities. Only one-third of division heads reported that foreign SSA trainees placed additional demands on educators, suggesting that there are sufficient surgeon-trainers at UCT.

Surgical division heads identified several program-specific advantages such as: knowledge of surgical conditions not commonly found in South Africa and cultural diversity among the surgical trainees. Additionally, our study reported that non-South African SSA trainees brought opportunities for regional clinical and research collaborations leading to African networks. For example, SSA trainees who graduated from the Karl Storz Head-and-Neck fellowship at UCT have established the African Head and Neck Society (AfHNS) and published the AfHNS Clinical Practice Guidelines for Head & Neck Cancers in Developing Countries and Limited Resource Settings.²²

Attending postgraduate training programs in South Africa may pose several challenges for SSA doctors including financial hardship. Unlike local trainees, SSA doctors do not receive a salary from the South African government, and one-fifth are self-funded. In another UCT study, financial hardship was cited by the majority of non-South African trainees.¹⁴ Funding sources from HIC governments, global surgery interest groups, and non-profit organizations could be potential ways to overcome such financial challenges. Non-South African SSA trainees also reported feeling that they were not prioritized in rotation scheduling and choices of operative cases. Furthermore, these trainees reported experiencing xenophobia from their South African colleagues and felt they lacked academic support and learning opportunities compared to their South African counterparts.¹⁴

Additionally, our study found that non-SA SSA female surgical trainees were under-represented at UCT. Females are in the minority in surgical training all over the world, but especially in

Table 2

Advantages and disadvantages of sub-saharan african trainees on the surgical training program at the university of cape town ($n = 7$).

Advantages	n (%)
Increased workforce	5 (71%)
Future clinical collaborators	4 (57%)
Future research collaborators	3 (43%)
Improves the quality of South African surgical trainees	3 (43%)
Diversity amongst resident body	1 (14%)
Internationalization and building links with African countries	1 (14%)
Establishing reputation as an international training institution	1 (14%)
Disadvantages	
Increased teaching load	2 (29%)
Fewer cases for South African trainees	2 (29%)
Increased personal and financial strain on sub-Saharan African trainees	1 (14%)
Decreased quality of South African surgical trainees	0 (0%)

Africa.^{24–26} In 2014, COSECSA identified that only 9% of their surgical residents were female.²⁷ Active female trainee recruitment is warranted and barriers to gender equality should be explored and addressed in future studies.

This study was limited by its small sample size, its poor trainee response rate, and single-center study site, which could introduce selection bias. The response rate, although low, is comparable to other studies on retention rates following surgical training programs, where response rates range between 26.1% and 45%.^{14,19} The response rate from earlier graduates was lower than more recent ones and this could be attributed to outdated email and contact addresses. Since many of the SSA trainees have not recently published or did not have social media accounts, we could not find more recent contact information. This study was limited by its quantitative methodology and, therefore, did not elicit additional comments or reasons why SSA trainees chose to remain on the sub-continent. This should be assessed by future mixed-methods or qualitative studies. Despite this, previous trainees who responded were retained on the African sub-continent, which will increase the African surgical workforce and cadre of local surgeon-trainers. Our study suggests that there is room for expansion of these programs, with the prospect of additional funding. However, further studies would be required to assess the long-term impact of training SSA surgeons in South Africa and to understand any barriers that trainees might experience when they return to their countries of origin.

Conclusion

Partnerships between LMICs can be an important solution to the shortage of surgeons in SSA. SSA surgeons who train in South Africa are highly likely to remain on the African sub-continent and work in the public and academic health sectors. South African universities can provide SSA doctors with ideal surgical training opportunities because of disease burdens and available resources similar to those in their country of origin. In addition, they offer sufficient surgeon-trainers and the opportunity to perform a wide variety of operations that range in complexity. SSA doctors also add value to South Africa training programs as they help create African networks of surgeon specialists that will disseminate clinical knowledge and research opportunities throughout the continent. If additional funding sources could be secured, this pathway could contribute even more to training surgeons in and for SSA.

Declaration of competing interest

Authors declared they have no conflicts of interest. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amjsurg.2020.06.070>.

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