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Building capacities in research for blood services in Africa

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Abstract**Background**

Capacity building of African based blood services researchers has been identified as key in developing a sustainable programme of generation local evidence to support sound decision making. There are a number of research training programmes that have been instituted targeted at blood services in Africa. The article shares programme experiences of building research capacities for blood services in Africa.

Methodology

The Francophone Africa Transfusion Medicine Research Training network, the NIH REDS-III and NIH Fogarty South Africa programmes and T-REC (Building research capacities in Africa) have been the key research capacity programmes targeting blood services in Africa over the last decade. Data were drawn from research outputs, publications and end of programme reports. The focus was to understand their experiences on the implementation of the capacity building programmes highlighting the success, challenges and the main research outputs from their initiatives.

Results

The Francophone research network achievements included more than 135 trainees and in excess of 30 publications. The NIH REDS study the achievements included more than 12 research publications with South Africa junior investigators as lead authors. The NIH Fogarty program currently includes 56 short course trainees, 5 Masters and 6 PhD candidates. The four year (2011-2015, funding period) T-REC research capacity has as of 2020 managed to produce 4 PhDs, 42 in-service Diploma in Project Design and Management (DPDM), and supported bursaries for 60 Masters/undergraduate research. The main common challenges in the running of the research programmes include shortages of in-country mentoring and identified needs in high quality research grants writing.

Discussion and conclusion

It has been noted that the key achievements for the blood services research capacity building include a mix of short courses, medium-term (epidemiology & biostats) and MS/PhD degree training. Also, having a train the trainers to develop in-country mentors has been instrumental. Overall, the key recommendations for blood services research capacity building include the need for research collaborations with high-income countries which can jump-start research. For a sustainable research programme, eventually there is need for in-country grant-writing capacity building.

Key words: Research- Transfusion-Africa

Résumé

Contexte

Le renforcement des capacités des chercheurs africains travaillant dans les services de transfusion sanguine a été identifié comme un élément clé du développement d'un programme durable de production de données locales et pertinentes pour les prises de décision. Il existe un certain nombre de programmes de formation à la recherche qui ont été institués pour les services de transfusion sanguine en Afrique. Cette revue partage quelques expériences de programmes de renforcement des capacités en recherche pour les services de transfusion sanguine en Afrique.

Méthodologie

Le Groupe de Recherches Transfusionnelles en Afrique francophone (GRETAF), les programmes de recherche du NIH REDS-III et NIH Fogarty en Afrique du Sud et le T-REC (Renforcement des capacités de recherche en Afrique) ont été les principaux programmes de renforcement des capacités en recherche ciblant les services sanguins en Afrique au cours de la dernière décennie. Les données ont été tirées des résultats de la recherche, des publications et des rapports de fin de programme. L'objectif était de comprendre leurs expériences sur la mise en œuvre des programmes de renforcement des capacités en mettant en évidence le succès, les défis et les principaux résultats de recherche de leurs initiatives.

Résultats

Les réalisations du GRETAF comprennent plus de 135 stagiaires et plus de 30 publications. L'étude du programme NIH REDS rapporte plus de 12 publications de recherche avec des chercheurs juniors d'Afrique du Sud comme auteurs principaux. Le programme NIH Fogarty comprend actuellement 56 stagiaires de courte durée, 5 masters et 6 doctorants. La capacitation en recherche d'une durée de quatre ans (2011-2015, période de financement) du T-REC a réussi à produire 4 doctorats, 42 diplômes en service en conception et gestion de projet et des bourses financées pour 60 recherches de maîtrise / premier cycle. Les principaux défis communs dans la gestion des programmes de recherche comprennent le manque de mentorat dans le pays et les besoins identifiés dans la rédaction de demande de subventions de recherche de haute qualité.

Discussion et conclusion

Il a été noté que les principales réalisations en matière de renforcement des capacités en recherche dans les services de transfusion sanguine comprennent une combinaison de cours de courte durée, de formation à moyen terme (épidémiologie et biostatistiques) et de formation MS / PhD. De plus, la formation des formateurs pour développer des mentors dans le pays a été déterminante. Dans l'ensemble, les principales recommandations pour le renforcement des capacités en recherche dans les services de transfusion sanguine incluent le besoin de collaborations de recherche avec les pays à revenu élevé qui peuvent relancer la recherche. Pour un programme de recherche durable, il est finalement nécessaire de renforcer les capacités en rédaction de demande de subventions dans le pays.

Mots clés: Recherche - Transfusion - Afrique

BACKGROUND

Funding for building research capacity is limited and where it has been instituted it has not been sustained sufficiently beyond the programme life cycle. As reported in the literature, some of the common challenges include lack of dedicated research team, staff skilled in research, team commitment, internet access, financial resource, and regulatory barriers.¹ These generic challenges have been equally noted in the African blood services either as researchers within the blood services or researchers working on blood service-related issues and are employed outside the blood service. A Wellcome Trust funded blood transfusion workshop of African blood service directors in 2008 concluded that there is there is lack of indigenous researchers for research for blood services.² As indicated by Fisher and co-workers, to increase safe blood supply, Africa-specific evidence and strengthened capacity for transfusion research are needed.³ A 2017 workshop sponsored by the US National Heart, Lung and Blood Institute (NHLBI) echoed the need for local needs assessments and targeted interventions to improve blood safety and availability.⁴ The purpose of the workshop was to identify research opportunities for implementation science to improve the availability of safe blood and blood components and transfusion practices in low-income and medium-income countries (LMICs). To close these gaps, a number of research capacity building programmes were initiated. This article shares the experiences from various research programmes of building research capacities for blood services in Africa. These research capacity building programmes are ultimately aimed at facilitating generation of local based evidence to guide policies and decision making.

METHODOLOGY

The Francophone Africa Transfusion Medicine Research Network, NIH REDS-III South Africa, NIH Fogarty research training in haematology and transfusion medicine in South Africa and T-REC (Building research capacities in Africa) were identified through this paper's authors involvement in these programmes as investigators. These were agreed as key four research capacity programmes targeting blood services in Africa providing a wider perspective on experiences.

The Francophone Africa Transfusion Research Network was created in May 2007 with the objective of developing common evidence-based blood safety policies that may be adapted to each country's situation. The network activities to date have focused mainly on obtaining epidemiological and laboratory data on blood transfusion and on suggesting blood safety strategies, particularly in the field of TTIs. The Recipient Epidemiology and Donor Evaluation Study-III (REDS-III) research program focused on transfusion medicine research in South Africa. The main goal of this program was to reduce and prevent the transmission of HIV/AIDS and other known and emerging infectious agents through transfusion. The NIH Fogarty South Africa program builds upon the advances made under REDS-III but focuses instead on building additional research capacity in haematology and transfusion medicine in a collaboration between the University of Cape Town and the South African National Blood Service. It also includes some trainees from neighbouring countries in Southern Africa. The purpose of T-REC project was to strengthen the capacity of blood transfusion services in Africa to generate own research to inform Africa-specific transfusion policies and practice. It also aimed to

support transfusion policy makers, service managers and researchers to work together to identify research needs and develop research strategies.

The Principal Investigators and their co-workers were invited to participate and contribute in this synthesis paper. The idea was to share the experiences from these projects. These included mainly to identify the success, challenges, and recommendations for sustainable research programme for blood services in Africa. The outputs from these projects were reviewed and common thematic areas for sustainable blood services were identified.

RESULTS

The Francophone Africa research network had its origins in a transfusion medicine research training course given annually at the Institut Pasteur from 2007 – 2018 and continued in Francophone Africa thereafter.⁵ Subsequently, alumni from the course organized the research network, undertook a number of collaborative research projects and established an affiliation with the Francophone Africa Transfusion Network (RAFT). Achievements included more than 135 trainees and more than 30 publications on a variety of topics related to blood bank capacity, prevention of transfusion transmitted infections and quality assessment (Table 1).⁶

The NHLBI-funded REDS-III South Africa study (2011-2019) was a research collaboration between researchers at the University of California San Francisco, Vitalant Research Institute and the South African National Blood Service (SANBS).⁷ It built a 5-year research database including data on blood collections and infectious disease testing from all SANBS blood donations and completed four other clinical studies relating to HIV and transfusion safety. To date, it has produced more than 12 research publications with South African junior investigators as lead authors and established a biorepository and research database for use by future trainees.

Following upon REDS-III, a partnership between UCSF, SANBS and the University of Cape Town was established under a NIH Fogarty Center HIV research training grant. This ongoing program aims to increase research capacity in HIV-related haematology and transfusion medicine in South Africa and neighbouring countries. It includes short courses in research methods, protocol writing and manuscript writing; medium term training in epidemiology, biostatistics mentorship; and long-term Masters and PhD degree training. To date, it has enrolled 56 short course trainees, 5 Masters and 6 PhD candidates. Long-term goals include the establishment of a research and development Academy at SANBS and academic research capacity in the haematology division at UCT.

The four year (2011-2015, funding period) T-REC research capacity has as of 2020 managed to produce 4 PhDs, 42 in-service Diploma in Project Design and Management (DPDM), and supported bursaries for 60 Masters/undergraduate research. The main common challenges in the running of the

research programmes include post-training capacity to have high quality research grants writing.

Table 1 summaries the key research programmes undertaken by the capacity building teams.

DISCUSSION AND CONCLUSION

It has been noted that the experiences that contribute to achievements for the blood services research capacity building include a mix of short courses, medium-term (epidemiology & biostats) and MS/PhD degree training. Also, a “train the trainers” approach to develop in-country mentors has been instrumental. What has been implemented for blood services research capacity programmes is in line with similar experiences as has been observed in the research programme for Southern African Collaboration for Research Excellence (SACORE). SACORE has supported 12 Masters, 21 PhDs, and six post-doctoral positions since its founding in 2009.⁸ From the investigators experiences, key recommendations for blood services research capacity building include the need for research collaborations with high-income countries to jump-start research. It has been argued that a suitable capacity programme for Africa requires support of high quality international mentors to formulate their ideas and write their grants. However for a sustainable research programme, there is need to develop in-country mentorship and grant-writing capacity.

In order for blood services in Africa to prepare themselves for research programme, it is important to assess the capacity of their research systems and address any gaps. A research capacity assessment tool used by the T-REC study team can be considered for use. This tool has eight thematic areas to use which are research strategies and policies, institutional support services and infrastructure, supporting funding applications, project management and control, research careers and promotions, development of skills and knowledge for research, external promotion of research and national research uptake (details in supporting information). This tool was successfully piloted at the National Blood Service Zimbabwe. The tool framework was also applied in Ghana National Blood Services to further assess its usefulness and transferability.

The Africa Society for Blood Transfusion (AfSBT) has since 2008, provided guidance on research priorities in African blood services.² In a recent review, it has been noted that there are countries and regional disparities in research outputs in SSA-relevant transfusion research. Another key observation was that published research topics were not well matched to the AfSBT research priorities and in particular research topics on supply, distribution, financing and systems were not well covered.³ There is commitment within the AfSBT to have transfusion research hubs within and beyond Africa and the AfSBT Research Consortium has been established for this purpose (<https://afsb.org/research-consortium/>).

As noted earlier on, the US NHLBI also held a workshop to establish research priorities for transfusion medicine in low- and middle-income countries in 2017. The report from the workshop lists a number of research priorities and emphasizes the need for capacity building to produce local needs assessment

and targeted interventions. The workshop was followed by a new NHLBI funding program entitled BLOODSAFE whereby implementation science projects will be carried out in Kenya, Ghana and Malawi (<https://grants.nih.gov/grants/guide/rfa-files/rfa-hl-20-009.html>).

In conclusion, the four-research capacity programmes provide a reference point for continued blood services research capacity building in Africa. Whilst there is ample evidence of much research outputs during the active programme period, there is need for more research capacity beyond the programmes. It may also help to have a post evaluation of the different programmes to identify additional opportunities to strengthen future programmes. More funding is needed to support such research capacity initiatives but they also need to be focused on sustainability of the local transfusion medicine research capacity in Africa.

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Table 1. Summary of African based research programmes and progress status in 2020

Item	Project Name	Project details	Summary of the project and objectives	Project deliverables (success)	Experiences and Challenges	Recommendations	Key references on project documents and outputs
1	T-REC (2011-2015), some outputs achieved beyond the project lifecycle.	Building research capacities in Africa	PhD students; In-service DPDM; Bursaries	4 PhD students; 42 in-service DPDM; 60 Masters/undergraduate	Feasible to build research capacity to international level; Blood services commitments;	Sustainability of the initiative a challenge by failing to absorb the researchers; robust funding mechanism is needed.	PhD thesis; Research projects; Project documents
2	NIH REDS-III South Africa 2011-19	HIV-related Transfusion Medicine research program	Epidemiology and clinical research projects with SA National Blood Service	>=12 research publications with SA junior investigators as lead author	Rich research potential; Deficit of in-country senior mentors	Develop in-country R&D capability within blood service	Jentsch et al. manuscript in submission
3	NIH Fogarty grant South Africa 2017-22	Research training in HIV related	Short courses, medium term biostats etc; MSc and PhD	56 short course trainees; 5 MSc and 6 PhD candidates	Growing pool of research mentors; COVID	Outreach needed to less advantaged institutions	Annual grant report June 2020; >=8 trainee publications to date

Item	Project Name	Project details	Summary of the project and objectives	Project deliverables (success)	Experiences and Challenges	Recommendations	Key references on project documents and outputs
4	Francophone Africa TxMed Research Training (2007-present)	Tx Med & Haematology Building capacity in clinical and epidemiological research in the field of transfusion medicine and nosocomial infections	2-week short courses annually on clinical research methods and protocol writing. Medium-term training in manuscript writing.	>135 PhD, MD, MSc, Nurses, clinicians involved in transfusion trainees	has limited in-person training Growing pool of francophone TxMed researchers. 2020 course postponed due to COVID pandemic	Increase collaboration among francophone TxMed researchers	>30 publications