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11

Research Training in Transfusion Medicine and Hematology

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Learning Objectives

- Distinguish transfusion medicine and hematology research needs in low- or middle-income countries, such as South Africa, vs high-income countries.
- Apply a new approach to teaching research methods and engaging trainees in research.
- Assess the impact of the training program on several metrics.
- Generalize the training approach to other settings and countries.

Introduction

TRANSFUSION MEDICINE AND HEMATOLOGY ARE KEY TOPICS FOR medical research that can have a substantial impact on patient care and the health-care system as a whole in sub-Saharan Africa. To enhance the quality of research and, ultimately, patient care, the region, which includes South Africa and surrounding countries, must overcome a range of obstacles, some of which have their origin in challenges that are unique to the region and/or to low- and middle-income countries (LMICs).

Many institutions in sub-Saharan Africa contend with limited financial and infrastructure resources. This makes it difficult to establish and maintain the cutting-edge research facilities required to advance knowledge in transfusion medicine and hematology. There is a clear need for specialized training programs and qualified instructors to teach transfusion medicine and hematology. At present, there is no formal specialty training program in transfusion medicine in South Africa, and this undermines the long-term sustainability of expert blood transfusion services. Consequently, the ability to conduct high-quality research is hampered by a lack of qualified professionals in these fields. Combining the lack of mentors with huge clinical workloads and demands on trainees and the few available trainers and mentors, there is a considerable negative impact on the ability to provide high-quality training and develop research capabilities. Furthermore, researchers in sub-Saharan Africa frequently lack access to current and relevant literature, often because of the costs to access journals that are not available by open access. The advent of online teaching and training and virtual meetings and mentorship can address these challenges only in part, as the human, relational element of development of experts and specialists still requires significant in-person and bedside teaching and training in an area relevant to that within which the trainee will eventually work.

Regional and international research collaboration is essential for the advancement of knowledge in any field. However, researchers in smaller institutions in sub-Saharan Africa frequently struggle to establish networks and partnerships with institutions and specialists from other regions, especially where there are no established research groups. Lack of resources and access to expensive novel med-

ications also often excludes local centers from many clinical trials, as access to these agents is often a prerequisite for patient inclusion. This can make it difficult to initiate and maintain collaborative projects and build networks on which future collaborations can be built and expanded.

Finally, funding for research in transfusion medicine and hematology is frequently inadequate In sub-Saharan Africa, making it difficult to initiate and maintain collaborative initiatives. This lack of funding also restricts the ability to attend conferences or participate in other collaborative activities and projects. Funding of any innovations or research projects often must be sought from foundations, philanthropists, and the pharmaceutical industry, and this is difficult to sustain and comes with its own embedded challenges.

The lack of research in transfusion medicine and hematology can lead to suboptimal diagnostic and treatment strategies, which can negatively impact patient outcomes. Inefficient and inappropriate use of scarce resources, including blood components and products, is common where a lack of expert guidance, training, research, and mentorship in these areas is the norm. A lack of research in transfusion medicine and hematology can contribute to a higher disease burden, as the unique needs and challenges of the sub-Saharan African population may not be fully understood or addressed. In addition, the dual burden of communicable and noncommunicable disease in the region contributes to an increased need for specialists who can deal with the nuances of transfusion medicine and hematologic problems related to these diseases. For example, human immunodeficiency virus (HIV) infection contributes to a number of hematologic conditions, and tuberculosis (TB) often mimics lymphoma with a concomitant delay in diagnosis of the latter. Hemoglobinopathies and other noninfectious diseases prevalent in the region also provide reasons to support a focus on locally relevant research.

Much has been published on the requirements for high-quality, sustainable research programs in LMICs.[1,2] These include:

- A clear strategic vision.
- Strong management systems to provide appropriate governance and administrative support.
- Experienced, knowledgeable mentors.
- Enthusiastic early-career investigators.
- Research-related career pathing.
- Sustainable intra- and extramural local and international funding.
- Protected time for research and research-related skills development.

A sustainable research program requires aspects of all seven of these building blocks (Fig 11-1), but they also represent a catch-22 situation, as it is often difficult to develop one without the others being in place. It is nearly impossible to obtain extramural funding without demonstrating high-quality research output and strong governance and administration capability, but it is extremely difficult to develop such governance and administration capacity and research output without extramural funding.[3]

Figure 11-1. Components required for sustainable research programs.

A multifaceted approach is required to address these challenges, including increasing investment in education and research infrastructure, promoting regional and international collaboration, and procuring adequate funding for research. By enhancing its research capacity, specifically including skills development, advanced training, and mentorship in transfusion medicine and hematology, sub-Saharan Africa will be able to go a long way towards improving patient care and bolstering its overall health-care system.

This chapter describes one approach to research capacity development that may be of interest to other specialists in Africa and other LMICs. It involves a three-way collaboration between the University of California San Francisco (UCSF) and its affiliated Vitalant Research Institute, the South African National Blood Service (SANBS), and the Division of Clinical Haematology in the Faculty of Medicine at the University of Cape Town (UCT). The review starts with a situational assessment; describes the approach to the training intervention; lists metrics, achievements, and challenges; and ends with some perspectives for the future.