

# The Malawi NCD BRITE Consortium



## Building Research Capacity, Implementation, and Translation Expertise for Noncommunicable Diseases

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### ABSTRACT

Africa is experiencing an increasing prevalence of noncommunicable diseases (NCD). However, few reliable data are available on their true burden, main risk factors, and economic impact that are needed to inform implementation of evidence-based interventions in the local context. In Malawi, a number of initiatives have begun addressing the NCD challenge, which have often utilized existing infectious disease infrastructure. It will be crucial to carefully leverage these synergies to maximize their impact. NCD-BRITE (Building Research Capacity, Implementation, and Translation Expertise) is a transdisciplinary consortium that brings together key research institutions, the Ministry of Health, and other stakeholders to build long-term, sustainable, NCD-focused implementation research capacity. Led by University of Malawi—College of Medicine, University of North Carolina, and Dignitas International, NCD-BRITE's specific aims are to conduct detailed assessments of the burden and risk factors of common NCD; assess the research infrastructure needed to inform, implement, and evaluate NCD interventions; create a national implementation research agenda for priority NCD; and develop NCD-focused implementation research capacity through short courses, mentored research awards, and an internship placement program. The capacity-building activities are purposely designed around the University of Malawi—College of Medicine and Ministry of Health to ensure sustainability. The NCD BRITE Consortium was launched in February 2018. In year 1, we have developed NCD-focused implementation research capacity. Needs assessments will follow in years 2 and 3. Finally, in year 4, the generated research capacity, together with findings from the needs assessments, will be used to create a national, actionable, implementation research agenda for NCD prioritized in this consortium, namely cardiovascular disease, diabetes mellitus, and asthma and chronic obstructive pulmonary disease.

Malawi is a low-income country in southeastern Africa with a high burden of infectious diseases such as malaria, tuberculosis, and human immunodeficiency virus (HIV) [1]. Noncommunicable diseases (NCD), particularly cardiovascular diseases, chronic obstructive respiratory diseases (COPD), and cancer, are increasing in prevalence globally [2] and especially in low-income countries throughout Africa [3]. In Malawi, the prevalence of hypertension and diabetes in the adult general population was estimated to be 33% and 6%, respectively. Both conditions were mostly undiagnosed and therefore untreated [4]. Moreover, at least 40% of Malawian adults had abnormal lung function that is largely restrictive, and risk factors for chronic respiratory diseases, including exposure to biomass smoke, are widespread [5]. Despite a gradually increasing number of studies, comprehensive insight into burden, main risk factors, and economic impact of NCD remain limited.

Middle- and high-income countries have recognized the importance of NCD as a development issue. In Africa, despite the growing awareness of the serious burden that they cause, the health system response is slow [6]. In addition to vulnerable health care system infrastructure and limited numbers of health care providers, an important barrier is the lack of a critical mass of NCD researchers to produce much-needed high-quality, locally relevant research evidence. In particular, knowledge about how the prevention and treatment of NCD can be implemented to maximize effectiveness and scale up in the local context is insufficient, and the understanding of challenges in program delivery to patients and communities is incomplete, as a consequence of insufficient late-stage implementation research and implementation research capacity [7].

As the Malawi government addresses weaknesses in current NCD programs and launches new programs to

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expand NCD prevention and treatment activities, the country will benefit from a sound implementation research approach for priority NCD. We have therefore brought together a consortium of local organizations active in the field of NCD care and research to set up a implementation research capacity-building program. This is developing implementation research-skilled researchers locally and couples this new capacity with research infrastructure and disease burden assessments to design a comprehensive, actionable, and Malawi-specific priority NCD implementation research plan, with the ultimate aim to stimulate low-cost, highly effective, and scaled interventions for the prevention, treatment, and control of priority NCD in Malawi. The consortium was named NCD BRITE (Building Research Capacity, Implementation, and Translation Expertise). Here we describe NCD BRITE's aims, strategy, planned activities, and early progress.

## APPROACH

### The NCD BRITE Consortium

This consortium is led by the University of Malawi—College of Medicine (COM) [8], Dignitas International [9], and the University of North Carolina-Project Malawi [10] and brings together key institutions that are currently championing NCD training and research in Malawi. There has been increasing collaboration among these organizations, initially stemming from a common background of long-term HIV programming, training, and research. In the development of the NCD BRITE funding proposal, further stakeholder engagement was undertaken to broaden the NCD BRITE Consortium's national reach, improve NCD implementation research coordination, and engage with international stakeholders that can add unique value to the consortium's work. Although there is a critical shortage of researchers needed to provide local evidence for informed policy concerning NCD, this field is now receiving more attention and some capacity building. Research coordination has started, mainly from pockets of expertise in specific disease areas, such as hypertension, diabetes mellitus, and asthma and COPD [11,12]. NCD BRITE has facilitated the consolidation of this process, bringing together and growing the individual institutions in a focused manner, creating a transdisciplinary network that seeks excellence in NCD implementation research training and capacity building. NCD BRITE is designed around COM, the only public medical school in the country, to ensure local ownership and sustainability, and there is a shared commitment to respond to the needs of the growing NCD Unit in the Ministry of Health (MOH). Other partners in NCD BRITE are the Malawi-Liverpool Wellcome Trust Clinical Research Programme Blantyre, Malawi Epidemiology and Intervention Research Unit, Northern Ontario School of Medicine, Lighthouse Trust Lilongwe, and Partners in Health. Funding for the NCD BRITE Consortium was awarded by the National Heart, Lung, and Blood Institute of the National Institutes of Health (NIH)

through its implementation research Capacity Building Initiative in Low-Income Countries (TREIN) funding opportunity. A steering committee was formed consisting of all investigators plus 1 representative from each partner organization and the funding agency. This steering committee is actively supporting the overall direction and implementation of the NCD BRITE program. A launch meeting was held in February 2018 that included overviews of ongoing national efforts in combating NCD in Malawi, background information about NIH's TREIN initiative, and the NCD BRITE project aims. During the first NCD BRITE Steering Committee meeting, a selection of disease focus areas was made, based on disease burden in Malawi, potential impact through proven and feasible interventions, and already existing NCD-focused activities that can be leveraged. It was decided that priority areas in NCD BRITE will be cardiovascular diseases, particularly hypertension, diabetes mellitus, and asthma and COPD.

### Aims of NCD BRITE

NCD BRITE has the following aims: 1) to strengthen NCD implementation research skills of current COM faculty, graduate students, post-graduate clinical trainees, frontline health workers, other selected MOH staff, and implementation partners' leaders; 2) to conduct a national needs assessment to capture the current status of vital implementation research infrastructure areas; 3) to conduct a national prioritized NCD disease burden assessment utilizing existing data from NCD BRITE's ongoing work supplemented by surveys and publication reviews; and 4) to update, strengthen, and disseminate the NCD-focused content areas of Malawi's national health research agenda, utilizing our local assessments of NCD burden and implementation research infrastructure, so that it contains a comprehensive, actionable, and Malawi-specific NCD implementation research plan. This will stimulate the development of low-cost, highly effective, and scaled interventions for the prevention, treatment and control of NCD in Malawi.

### Implementation research skills development activities

Malawi has modest research capacity to evaluate the impact of NCD prevention and treatment programs. The Malawian health sector has limited research personnel and research activities are conducted by a small number of academic and research institutions, often linked to foreign universities, and nongovernmental organizations [13]. Yet, research is a high priority for the COM. The COM's Research Support Center was established in 2006 to support COM research endeavors. In 2011, the COM initiated a research track that allows faculty to devote the majority of their time to research and in 2015 COM developed its first ever research strategy that identifies NCD as an emerging research area. Over the last 15 years, the NIH Fogarty International Center—sponsored training programs among others have

facilitated the development of a small group of exceptional Malawian investigators. This core group has substantial experience in epidemiology, clinical trial implementation, and general public health programming and has assumed leadership positions in research and program development throughout the country [14]. Yet, as the strength of evidence for effective interventions has grown internationally, the research environment has evolved to require multidisciplinary, multifaceted approaches to studying program implementation to maximize efficiency, effectiveness, and sustainable uptake of proven-effective interventions. Furthermore, we have identified several weaknesses among Malawian investigators in the nascent COM research programs, including moderate scientific manuscript productivity, limited indigenous grant writing initiative and success, lack of career mentorship, and difficulties in grants management. For Malawi to realize maximal impact of its NCD programs and prevention strategies, it requires more professionals with expertise in implementation research. NCD BRITE's program strengthens NCD-focused implementation research capacity of COM academics, frontline health care workers, Malawi's Public Health Institute, the Ministry of Health staff, and NCD BRITE partner organizations. Gender parity will be sought to further the research careers of female Malawian investigators. NCD BRITE provides formal introductory training in NCD-focused implementation research, assists in identifying research priorities, involves trainees in relevant research projects, provides opportunities for internships, and gives mentorship for research development.

NCD BRITE leverages its consortium partners' existing HIV-oriented implementation research short courses that focus on local research priority areas, clinical research design, epidemiology/biostatistics, implementation science methods, scientific writing and preparation of manuscripts, and grant writing and grant management. We do this by developing an additional qualitative methodology implementation research-focused short course module (qualitative methodology for clinicians and nonsocial scientists), by supporting 35 additional NCD-focused trainees to take part in the existing short courses and by incorporating NCD domain experts who have refined the existing curriculum to include NCD content. The first NCD BRITE participants have completed short courses and further capacity building will take place over the next 3 years.

We have developed a program for mentored research by supporting 2 to 5 awards in program years 2, 3, and 4 focused on implementing NCD implementation research. This program allows promising local investigators to generate preliminary data for future grants. Goals of the program are to learn and practice the planning and development of pilot studies for a larger project, hypothesis generation, study design, grant writing, and evaluation of data in a controlled mentored environment. Pilot grant proposals are written in a concise format including specific aims, and research plan and studies will typically be

completed within 1 year. We produced a mentored research award guidance document that entails eligibility criteria, application procedures, and proposed award duration, and a call for applications was advertised. Proposals were peer-reviewed, approved for funding by NCD BRITE senior staff, and the first awards were granted.

A 4- to 6-month stipend-supported implementation research Internship Placement Program has been developed to allow an intensive practical experience for NCD implementation research trainees to gain implementation research skills across a range of projects. Often, as a component of training, analysis skills are limited to a specific thesis or dissertation. As a research career progresses, a broader range of skills becomes necessary. Given the critical need for implementation research skills in Malawi, we have developed 6 internship placements in operational settings in Malawi where implementation research is ongoing and on-site supervisors are available and fellows are expected to conduct at least 1 analysis leading to a manuscript. A standardized template was developed for internship opportunities and multiple distinct internship descriptions were produced outlining the opportunities of internship engagement within each consortium organization. After a selection procedure, the first interns were placed early in the second year of the NCD BRITE program.

We will leverage the on-going Pan African Thoracic Society—Methods in Epidemiologic, Clinical and Operations Research training program, which was codeveloped and supported by Malawi-Liverpool Wellcome Trust Clinical Research Programme Blantyre, a partner in NCD BRITE. This program focuses on developing research capacity for respiratory conditions in Africa. NCD BRITE will support a limited number of trainees from Malawi to attend the Pan African Thoracic Society—Methods in Epidemiologic, Clinical and Operations Research annual program held in different locations within Africa.

Our skills development program is centered on the COM, the leading clinical and public health higher institution of Malawi, which maximizes long-term sustainability of the implementation research skills development program. Conducting skills development activities within Malawi helps us train a larger pool of future research leaders who will conduct implementation research, thereby minimizing travel costs, protecting trainee's employment and family time, maximizing retention, and ensuring local relevance. Moreover, this program was developed according to the principles of adult education and includes case-based small group workshops, reflection activities, and follow-up evaluation to ensure applicability within a given implementation research. It facilitates the development of individuals with tailored NCD implementation research expertise and also develops a suitable research environment to support a long-term career goal of future generation faculty and researchers. Trainees and fellows will be motivated to take part in the NCD BRITE needs assessment phases. Translating research into action to improve health

**TABLE 1.** Challenges for stakeholder engagement and structural barriers for NCD implementation research in Malawi

Challenges for Stakeholder Engagement	Structural Barriers
<p>Geographical separation.</p> <p>Despite large burden of NCD in Malawi, the number of stakeholders doing extensive work in this field is limited.</p> <p>Lack of professional society meetings in-country.</p> <p>NCD stakeholders are committed but overburdened with competing priorities.</p> <p>Funding available for service delivery is limited within government and through NGO, so political will is not matched with support for clinical care.</p>	<p>There is insufficient funding available for NCD implementation, making true opportunities for research (&lt;2% of programmatic spending in resource mapping is flagged for NCD).</p> <p>Most patients are rural-based and seek care at health centers or primary care level, but most services are available at tertiary level.</p> <p>A national monitoring and evaluation system for NCD is in development, thus reporting through public system is not yet comprehensive.</p> <p>Lack of specialists and specialist clinics.</p> <p>Lack of advanced diagnostic facilities, such as lung-function measuring units.</p>
Overcoming Challenges for Stakeholder Engagement	Overcoming Structural Barriers With Facilitators
<p>Small group of close colleagues who already know and work together in other forums offers timely opportunities for collaboration.</p> <p>Active MOH participation and engagement helps bringing together stakeholders across disciplines.</p> <p>Appropriate funding opportunities stimulate formation of active consortia.</p> <p>Annual meetings, research dissemination conferences.</p> <p>Joint internships.</p> <p>CREATOR project.</p>	<p>Identifying implementing partners doing service delivery work facilitates opportunities for research.</p> <p>Close connection to MOH processes and strategy allows leveraging of future opportunities.</p> <p>Identify which solutions worked to solve problems encountered for structural barriers.</p> <p>Engagement of professionals via group activities to build trust and develop better communication and reporting protocols.</p> <p>Investments to acquire good prevalence data.</p> <p>Education at various levels.</p> <p>Provision of diagnostic equipment.</p>
<p>CREATOR, Clinical Research Excellence and Training Open Resource; MOH, Ministry of Health; NCD, noncommunicable disease; NGO, nongovernmental organization.</p>	

outcomes not only involves developing local experts but also investing in the health care team. In settings with limited human resources it is the health care team, their skills, and cohesion that can act as a multiplying force for implementation research implementation, particularly as it relates to putting evidence into practice. NCD BRITE therefore engages frontline health workers in its capacity-building activities and develops knowledge and skills of frontline health workers at partner sites who can then serve as local champions—first for NCD-focused implementation research and ultimately for evidence use in policy and practice that will follow. By including district-level health workers within the structure of the training programs, we cultivate a set of skills that can be called on for future implementation research projects.

### Needs assessment phase I: research infrastructure

NCD BRITE will conduct a detailed NCD implementation research infrastructure needs assessment that will concentrate on the government of Malawi and other health funding partner commitments to NCD

implementation research funding, existence and quality of locally relevant NCD implementation research programs, presence of skills and expertise to conduct implementation research, research ethics and governance structures, laboratory capacity to support sample analyses, database and programming capacity, infrastructure related to information communication technology to support implementation research, and the availability of NCD implementation research mentors. Further stakeholder analysis and engagement will be undertaken throughout this needs assessment phase and include identifying additional national NCD implementation research stakeholders, an exploration of the various stakeholders' areas of influence, organizational barriers and facilitators, and consortium communication mechanisms and approaches (Table 1). We will utilize several tools including short written surveys, facility visits, and audits; nominal focus group discussions with responsible institutions; and telephone interviews. We will triangulate results from these various methods in summary content areas that will be refined further by consortium partners. Existing infrastructure facilities

and resources will be organized based on thematic areas identified from the needs assessment. Short- and long-term strategies to conduct robust, multidisciplinary, and sustainable implementation research capacity will be developed. We may also explore partnerships with private industry to support Malawi's NCD equipment needs. Within this assessment, a strength, weakness, opportunities, and threats analysis framework will be developed and key opportunities and weaknesses to support implementation research will be identified and critically analyzed to inform future planned NCD research within this framework. Gaps identified during this assessment exercise will be discussed with stakeholders, and deficiencies in infrastructure needed to conduct implementation research will be prioritized. During this assessment, potential opportunities to conduct implementation research and sites that could serve as implementation research hubs for priority NCDs will be identified.

### Needs assessment phase II: disease burden of priority NCD

We will extract and synthesize data from partner organizations currently engaging in NCD burden research in Malawi to come up with pooled estimates for chronic NCD that are prioritized within NCD BRITE and their risk factors. Support has been granted for access to vital data sources from the Malawi Non-Communicable Disease and Injuries Poverty Commission and the Knowledge Translation Platform Malawi of which several NCD BRITE Consortium partners are stakeholders. We will also undertake detailed literature searches to describe the burden of selected conditions in the region and will contact relevant authors for systematic data acquisition. This information will be collated, shared with NCD BRITE Consortium partners, and critically appraised. Special attention will be given to risk factors that are amenable to locally appropriate interventions. This comprehensive disease burden assessment will be presented to national stakeholders for further refinement and harmonized with the implementation research infrastructure needs assessment work to design locally relevant, evidence-based interventions.

The findings of the research infrastructure and disease burden needs assessments will be presented at NCD technical working groups of the MOH and the National Non-Communicable Disease and Injuries Poverty Commission; the Knowledge Translation Platform Malawi, which is a joint initiative of MOH and Dignitas International that engages national-level policymakers, researchers, implementers, and civil society members in a coordinated approach to the use of health-sector research in Malawi through evidence synthesis and policy dialogues [15]; international meetings of the NIH-funded TREIN; and Hypertension Outcomes for T4 Research within Lower

Middle-Income Countries Consortium; the NCD Alliance; and World Health Organization's Global Non-communicable Disease Network. We will publish findings of the needs assessments in open-access, peer-reviewed journals.

### A comprehensive, actionable, Malawi-specific implementation research plan for priority NCD

Following the NCD implementation research infrastructure needs assessment and disease burden and risk factors assessment, we will leverage and further Malawi's National Health Research Agenda [16] to include context-specific, priority NCD implementation research plans and interventions focusing on lifestyle and behavior, disease progression and control, and on medical management. The available information from the 2 needs assessment phases will be utilized in national research priority workshops that will involve researchers, health care workers, and policy-makers to create a national NCD research agenda, adding specific priority NCD content to the National Health Research Agenda. The central position of the Ministry of Health within NCD BRITE will drive the utilization of the needs assessments for informing the NCD research agenda and will work toward further sustainability of overall NCD policy and planning.

### SUMMARY

Despite the growing burden of NCD, Malawi has a shortage of locally relevant research evidence and lacks a critical mass of NCD scientists, especially with knowledge of how to effectively implement proven-effective health interventions. The Malawi NCD BRITE Consortium aims to address these gaps. It consists of key institutions involved in NCD research and care and is purposefully designed to build capacity within the COM, the only public medical school in the country, and the Malawi MOH to ensure sustainability. NCD BRITE was launched in February 2018 and will build NCD implementation research capacity within COM's faculty, graduate students, post-graduate clinical trainees, frontline health workers selected from MOH, and implementation partners' leaders. This skills development will leverage ongoing, mainly HIV-oriented implementation research short-course training programs and this will be supplemented by mentored research awards and an internship program housed at partners' implementation sites. NCD BRITE will use the generated capacity to do in-depth research infrastructure and diseases burden needs assessments. Finally, the skills development activities together with the findings of the needs assessments will be utilized to create a comprehensive, actionable, and Malawi-specific NCD implementation research plan. Cardiovascular diseases (particularly hypertension), diabetes mellitus, and COPD and asthma were selected as priority NCD. NCD BRITE will disseminate program



experiences and research findings through national and international dissemination avenues.

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