

Non-communicable diseases pose an increasing threat to the developing world

Strengthening research capacity to better understand these diseases is essential to ensuring effective and context-specific responses to the growing epidemic

Non-communicable diseases (NCDs) are responsible for 38 million deaths per year worldwide. Low- and middle-income countries (LMIC) are disproportionately affected, bearing nearly three-quarters (28 million) of these deaths.¹ There is also significant overlap and interaction between communicable and NCDs; for example type 2 diabetes increases the risk of incident tuberculosis (TB) by around threefold, while HIV-infected adults on treatment have higher than expected risk of cardiovascular disease and kidney disease.²

In addition to this increased burden, the epidemiology of some NCDs is different in poorer regions from elsewhere; for example, in Africa there is an apparent higher prevalence of treatment-resistant hypertension and aggressive breast cancers in younger women.³ This highlights the need to generate national or regional evidence to address gaps and to refine existing knowledge, both in the causes of NCD and in terms of how best to intervene, particularly in the context of LMIC. Despite increasing visibility of NCDs on the global agenda, research into NCDs in Africa is still in its early stages. Investment in research skills, equipment and infrastructure is essential in order to accelerate an increased understanding of region-specific NCDs and develop appropriate prevention and treatment strategies.

Strengthening research capacity to address challenges

The Capacity Research Unit (CRU) at the Liverpool School of Tropical Medicine is a research group specialising in the development and application of tools and approaches to facilitate, monitor and evaluate more effective research capacity strengthening in LMIC.

CRU's published five-step approach⁴ to research capacity strengthening has been applied in a variety of settings and conceptualises research capacity strengthening as occurring at three levels—individuals (e.g. training in techniques, managing data), institutions (e.g. strengthening research management systems within a university), and national/international (e.g. establishing new networks and collaborations, uptake of research outputs). The approach involves developing an evidence-based description of the optimal capacity

required to achieve the agreed capacity strengthening goal, working with partners to identify existing strengths and gaps against this benchmark and using the results to facilitate the development of a prioritised action plan to address key gaps and challenges.⁵

Partnerships to support NCD research

CRU's five-step approach was implemented in the NCD context in sub-Saharan Africa, in collaboration with GlaxoSmithKline (GSK). Under their Africa NCD Open Lab project,⁶ GSK were seeking to build a picture of the research capacity of institutions in sub-Saharan Africa with existing or potential expertise to undertake research into NCDs. With an aim of identifying gaps that might potentially be addressed through collaboration and sharing of expertise, GSK engaged CRU to undertake research into better understanding the capacity for NCD research across the continent.

The CRU study team reviewed published and grey literature, consulted with laboratory specialists and adapted their existing review tools to generate a list of indicators that described what an 'optimal' research system should look like for an institution to effectively conduct research into NCDs. This was used to design a web-based survey to canvas over 70 institutions and data collection tools for site visits. The survey results were considered by GSK and used to identify two contrasting institutions to be visited to gain a more in-depth



Lorelei Silvester is Programmes Manager in the Capacity Research Unit, Department of International Public Health, at the Liverpool School of Tropical Medicine.

understanding of the current capacity for NCD research. At these two institutions, a university in Uganda and a research institution in Tanzania, key stakeholders were interviewed by the CRU team to obtain an institutional picture of interests, systems, priorities, and capacity in relation to NCD research.

Opportunities for international support

The in-depth analysis of the two institutions visited identified key gaps relating to capacity to undertake high quality NCD research. Many of these were common across both institutions and also corroborated by the results of the survey. These gaps were also notably similar to those that have been identified during the course of CRU's previous research on institutional research capacity in sub-Saharan Africa.

The findings of both the survey and the in-depth site visits, combined with CRU's previous experience, point to key areas where there is potential for international funders or the private sector to collaborate with national research institutions to strengthen capacity for NCD research. This could be through long-term partnerships – collaborating with LMIC research institutions to identify and address their priority capacity gaps with a combination of financial and technical support – or providing targeted technical assistance in areas identified by the research institution. Potential areas for support include NCD-specific technical assistance, as well as wider institutional support to strengthen research management and systems. These are outlined below:

Expertise for NCD research

- Despite increased interest in NCDs in Africa in recent years, there are significant gaps in the amount of NCD research that has been conducted in Africa and hence there exists an opportunity to map and prioritise the key gaps, including through public-private partnerships.
- The institutions visited reported that there are far fewer leading researchers in NCDs than in infectious diseases. Institutions were keen for these to be

developed by supporting post-graduate and post-doctorate level research in key areas. While funding would be essential for these, international skills and expertise in supervising or collaborating on research are also required.

- International collaborations are important in strengthening NCD expertise at national and institutional level. Supporting or creating opportunities that facilitate such collaborations, (e.g. participation in international networks and conferences), would be beneficial to institutions that are building their NCD research capacity.
- Institutions reported very little NCD-specialist expertise in the cross-cutting disciplines that support NCD research—for example in bio-statistics, bioinformatics, health economics, translation, biomedical technology, bioengineering, genomics and ethics. There was interest in the potential of developing tailor made courses to adapt infectious disease expertise to support NCD research.

Research facilities

- Few laboratories have international accreditation, although there is interest in working towards these standards. Many laboratories require additional support to improve their systems and processes for accreditation. Providing technical support to develop laboratory systems to the standard of ISO15189 is considered the most constructive way to direct support towards laboratories in the first instance.
- Staff and equipment in laboratories are primarily focused on and led by the needs of infectious disease research. NCD research staff felt they would benefit from laboratory staff having some 're-orientation' towards the specifics of NCDs. This could take the form of short training courses to familiarise laboratory staff with the differing requirements of NCD research. In the longer term, some institutions are looking towards dedicated NCD laboratories, which would require facilities, staffing and equipment dedicated to NCD research, which highlights the benefits of building national research networks, to facilitate sharing of resources and expertise.
- There is a lack of immunology procedures undertaken within laboratories across surveyed institutions, particularly for immunodiffusion, luminex assays and immunochemistry. This echoes a recent finding of a lack expertise in immunology in Africa⁷ and highlights a need for developing curricula, delivering taught and practical courses and investing in people and technology to support this area.
- Many institutions lack some key equipment needed to support NCD research, such as sequencers, fluorescent microscopes and flow cytometers. However, provision of equipment must take into account capacity for operating and maintaining it, as well as the availability and accessibility of necessary reagents or supplies.

Institutional strategies

- At the strategic and management level, institutions



or departments need sound strategic and operational planning systems, including processes to support their ongoing monitoring and implementation. This ensures they have the necessary structure and procedures to identify organisational challenges and monitor the implementation of activities to resolve these. While not necessarily NCD specific, technical support in strategic planning and management can help institutions sustainably strengthen their research systems more broadly.

- Although many institutions reported a growing interest in NCD research, very few have an action plan specifically for how they will focus on and strengthen this area. Support to develop and implement such a plan will help organisations identify how they might adapt their networks, partners, donor relations and expertise towards NCDs.
- National and international partnerships are critical in assisting institutions to develop and acquire new research projects and strengthen their reputation for high quality research. Supporting or creating opportunities for institutions to attend conferences or visit partner institutions would be strategically beneficial.

Institutional support services for research (not NCD specific)

- A Research Support or Grants and Contracts Office can provide valuable support pre- and post-award, removing a significant administrative burden from researchers and enhancing the quality of grant applications and project management. Thirty percent of the institutions in the survey did not have such an office, indicating a significant gap in this area. Funding and skills to sustainably introduce such an office has the potential to strengthen research support and management.
- A Finance Office providing expertise in research grants and providing adequate and appropriate financial support to researchers both pre- and post-award appears to be a notable gap across a number of institutions, indicating a need for training and skills in this area.
- While career paths for research staff are in place in many institutions, those for support staff are generally less clear. The development of job descriptions and promotion processes (for both research or support staff) is a common gap that could be addressed at a low financial costs to the institution, with the commitment of the appropriate time and expertise.

External promotion of research/research uptake

- Although some training in academic writing and grant proposal writing is provided at most institutions in this analysis, this is repeatedly identified as an



area of need across all research levels and needs to be revisited regularly.

- The opportunity to present at international conferences is considered key in disseminating findings and developing researchers' skills and networks. However, funding for this is limited so opportunities for financing conference attendance are popular.
- Most institutions have a website, but largely they could be used better to describe projects and research interests and disseminate research findings. However, it is commonly found that website development and content is not a priority, so specific focus on this could help institutions attract collaborators and funders.

Despite increased interest in and support for NCD research, there are still numerous gaps that institutions wish to address to take their NCD research forwards. Development partners have the opportunity to support country-specific NCD research in Africa through the provision of appropriate skills and expertise and by fostering national and regional networks. Where this is done as part of a long term partnership, led and owned by LMIC institutions, this can also strengthen research systems for sustainable long term development.

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