Reviewer's report

Title: Approaches and impact of research capacity building models in sub-Saharan Africa: a systematic review

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Reviewer: helen Smith

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A potentially interesting paper; it is of benefit to others considering research capacity strengthening activities to learn about which models and approaches are successful, under what conditions, and how best to evaluate impact. However I am not sure in its current format the paper fully achieves this. It needs a conceptual framework that outlines the different factors that influence the impact of research capacity strengthening programmes; this would help to inform the analysis and make it more meaningful.

Major Compulsory Revisions

1. The review is missing a conceptual framework to organise the arguments around research capacity strengthening in SSA, and to help structure the analysis. What definition of research capacity strengthening (CS) is being used in the paper? And how does this compare to broader scientific capacity strengthening? I think sometimes the two terms are confused in the paper. The background/conceptual framework also needs to acknowledge different levels of capacity strengthening; currently the paper assumes CS involves individual skills and training only. Costs of implementing CS programmes, and the timing of programmes are also important considerations for impact. There are plenty of published models and frameworks for evaluating impact of CS programmes, and the authors need to situate their review in the context of these.

2. The methods of the review need further explanation. It is usual to demonstrate the rigor of a systematic review by including description of inclusion criteria, study selection process, assessment of study quality, and analysis and synthesis methods – all of these are missing or not elaborated sufficiently in the methods section. An example search strategy used to search one database would be helpful to illustrate how terms were combined; there is no mention of which databases were searched. The inclusion criteria should be described, along with who was responsible for applying them, how this was done, and what decisions were made and why.

3. What type of study designs were included for each objective of the review? This usually determines the analysis and synthesis methods used. For example, for the objective on ‘challenges’ what types of study were included and what method of synthesis was used and why? The reference to independent data extraction and ‘consistency’ of data is not clear – what is meant by consistency?

4. It is usual in a review to describe the characteristics of included studies at the
beginning of the results – for example a summary of where these programmes were implemented, when, by whom, and what was their main purpose would be helpful before launching into the review findings by objective.

5. For objective 1 relating to the approaches and models, it would be helpful for others considering such approaches if the authors could provide critical evaluation of the sources of funding of these programmes and their costs, what level of capacity they targeted, whether the approaches were informed by any theory of change or logic model, and the nature of the partnership or collaboration in which the training is carried out.

6. For the synthesis of methods used to evaluate CS activities, this currently contains very little analysis of the methods used...it would be informative to synthesise in addition - what evaluation design was used, what was the purpose of the evaluation, and was the design adequate, what monitoring and evaluation tools were employed to assess impact, was the evaluation only at endline or were more sophisticated monitoring tools used? These aspects of impact evaluation are currently widely debated in the literature.

7. The section on challenges to research CS activities is very brief, seems to skim over quite complex issues related to the feasibility of research capacity strengthening activities and doesn’t appear to distinguish between challenges faced by those providing CS activities, or the recipients; perspectives on the value of these activities as well as the potential challenges to implementing and sustaining them are likely to vary depending on the standpoint of different actors. The source of the recommendations and innovations is not clear – is this author opinion or based on information in the papers reviewed? Please consider the feasibility of some of the suggestions, i.e. ‘provide essential resources such as internet’ – this is not an easy or straightforward solution, who would fund this? How would providing additional human resources alleviate the challenge of insufficient time for research? In busy clinical environments it is difficult to release staff for research activity. Developing institutional infrastructure and leadership for research is a huge resource intensive long term activity – and whose responsibility is it?

8. In the discussion reference is made to debate about ways of evaluating the impact of research capacity strengthening activities and whether this should be measured in number of papers published or changes to policy or practice – the important point here is that the measure used depends on the purpose of the CS activity (and the purpose of the evaluation). Refer to previous comment about the differences between research capacity strengthening (ability to undertake and disseminate research) and scientific capacity strengthening (ability to support and make use of research and scientific outputs in policy decisions).

Minor Essential Revisions

1. The term ‘capacity building’ used in the title and throughout the paper implies that programmes are starting from scratch, ‘building’ a new structure or platform for research capacity. However, more recent conceptualisation of research capacity emphasises the importance of ‘strengthening’ or ‘developing’ capacity, acknowledging that a level of capacity exists already in health programmes;
therefore ‘capacity strengthening’ is a more commonly used and acceptable term. I would encourage the authors to consider this.

2. In the abstract the authors refer to ‘systematic review’ and ‘careful review’ without actually elaborating the actual methods of the review. The only method described here is literature searching.

3. In the background, pg 4, the authors provide the example of TB research to illustrate disproportionate research output from African researchers – is this typical? What is the level of African research output for other diseases or public health topics?

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests