Reviewer's report

Title: Human resources needs for universal access to antiretroviral therapy in South Africa: A time-motion study

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Reviewer: Kaspar Wyss

Reviewer's report:

The article analyzes the additional number of doctors and nurses needed to expand population coverage with antiretroviral therapy (ART) in South Africa. The paper nicely presents the results of a time-motion study and applies them to staffing needs and is of high relevance given that human resource-related challenges are the key issue to improve health system performance. Thus, the topic covered by the manuscript covers a highly relevant and interesting topic.

Major compulsory revisions

• The study uses current time use patterns defined as patient contact, indirect patient contact, and other, and extrapolates them to increased coverage with ART at different thresholds. Through this approach, no analysis is being done on potential productivity gains through better time allocation (the manuscript looks only on efficiency gains through economies of scale using one single literature reference indicating possible gains between 72 and 73%). However, there are two potential major productivity gains possible: First, the productive time of workers may substantially be increased as for example in one study site staff worked only 4.9 hours per day. At average, the work time was 6.3 hours. If it is assumed that health workers do work over 7 or 8 hours per day (using the standard of South Africa), there are substantial potential productivity gains. Second, around 10% of staff time is used for “other activities” (see comment below). This time potentially can be better used. The manuscript does only account through an indirect approach assuming that there will economies of scale. Given that the data is available on time allocation and potential productivity gains, this should be taken into account in the different scenarios estimating numbers of health workers for increased coverage.

• The study recorded activities along 3 predefined categories (patient contact; indirect patient contact, and other). There are two substantial flaws in this categorization: (i) indirect patient contacts defined by the authors as discussion with other health workers may be warranted for assuring adequate care but also simply may consist in social networking or “chatting” (e.g. in clinic C the counsellor uses 44% of their time for indirect patient contact”). Indeed, the time used; (2) other activities include tasks which are relevant and needed to assure adequate care for patients such as continuous education, administration, meetings but also activities which are unproductive such as waiting for patients, being absent from work etc. There is a need for a stronger rationale and more in-depth explanation given by the authors on the categorizations and the
potentially productivity gains (see comment above)

- Increased coverage will also imply that the number of other staff categories, especially laboratory technicians, but also of managers overseeing the performance of the additional staff has to be recruited in addition to the doctors, nurses and counsellors. The manuscript does not at all discuss this aspect and this has to be taken-up.

- Along the national guidelines, the model for increased coverage assumes that there is ART initiation-visit and estimates staffing needs for this initiation visit. Around 30% of the additional doctors and nurses are needed for this initiation visit. Or this is a one-time investment. In other words should the respective staff been fired once this one time investment for full coverage completed? The model used should take into account this (e.g. for discounting over years) or simply state that around 30% of estimated additional workers are only needed in year 1 and any longer in year 2.

Minor compulsory revisions:

- Budgetary implications of increased coverage are only discussed in relation human resource costs. Or a relevant share of additional costs for scaling-up coverage will related to investments in infrastructure (e.g. are all the necessary facilities for providing services availability) and running costs (ARVs, consumables, etc.) Especially the additional running costs need to be further discussed and taken into account so to adequately analyse the implications of the increased coverage on the health budget of South Africa.

- The indicates that the additional required doctors (around 300). Nothing is said about the availability of the 2'200 additional nurses. If additional nurses or counsellors need to be trained, then this is an additional cost and should be taken into account in the cost calculations

- The tables indicate the additional human resource needs in person – months. It should be considered to display them also in terms of full-time equivalents.

- As indicated above, in clinic C the counsellor use 44% of their time for indirect patient contact. This outlier should be discussed.

Minor non compulsory revision

- In the introduction section is stated that in 2007/08 there was a shortage of 79'791 health workers in South Africa. On what this assumption is based on how this has been calculated. Some additional comments would be welcomed here so to underline the data

- The manuscript assumes 20 work days per month. Typically 22 work days are being used. In consequence there is a need to give a rational for the 20 work days (as opposed to 22 days) as this has an impact on staff numbers needed.

- In the discussion section the possible bias in work patterns through the presence of an observer is discussed. One way to control for this is to analyse time allocation over the 14 days observation period. If patterns are similar then this is an indicator that the presence of the observer did not substantially influence work patterns. Has this analysis been done and if not it is strongly
recommended to so and to refer to this in the manuscript

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare to have no competing interests