Reviewers report

Title: Operating efficiency of public hospitals in Zambia: implications for the success of global health initiatives

Version: 1 Date: 13 December 2006

Reviewer: Erik Blas

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General Comments on: "Operating efficiency of public hospitals in Zambia: Implications for the success of global health initiatives"

General Comment

An excellent contribution to the discussion on hospitals in health sector reforms in countries like Zambia. It provides a useful alternative perspective to the discussion by viewing hospitals as production units. However, there are some fundamental conceptual short-comings, including: What are hospitals actually producing - the author acknowledges this dilemma, but does not explain why the analysis is still relevant. Related to this issue, I am not sure how much hospitals contribute to the achievement of the MDGs and other global health initiative targets - on the contrary, I am convinced that most contributions towards these targets are delivered elsewhere, including within the health services at the lower level, i.e., health centres. This is a matter of allocative efficiency - which, again the author does not address. Saying this is not to diminish the work presented in the manuscript - but to call for a more thorough contextualization.

In the same vein, I am quite surprised not to see any reference to the health reform programme in Zambia of the 1990s. These reforms were driven by an aim to improve both allocative and technical efficiency. Especially the first turned out to be both controversial and political dynamite. The attempts to address the hospital question raised, not surprisingly, political storms, shaking the government and possibly eventually brought the reforms to a halt. In this respect, there are some few articles on the Zambian health sector reform, which might be considered for referencing in the introductory sections as well as in the discussion, please see reference list below (1-5).

The author should also decide who are the key audiences of the article. The way it is written it seems appealing mainly to economists -which I am not sure is the intention. The article is very formula-driven and concepts and variables are rarely explained in a way immediately understandable for public health policy makers and hospital managers. In my experience, these are often turned-off when their 'business' is described in commercial or industrial terms.

Normally, results and discussion sections in scientific articles are distinct. In the results section the finding are presented and analysed - allowing the reader to form his/her own view of the situation. In the discussion, the author's interpretation of the findings is presented and related to the international pool of knowledge on the subject. I believe that the paper would benefit from adhering to this practice.

Further, there are a number of inconsistencies and small errors in the manuscript, which needs to be corrected - I have pointed to some in my specific comments - I will suggest that the author has a colleague to read and go through with.

Finally, I have not reviewed the formulae and detailed economic calculations - it might be advisable to have a fellow economist to review.

Specific Comments

Background

It appears in the manuscript as if malaria eradication failed due governments shifting to a primary health care strategy for health. I don't think this is a correct interpretation. Malaria eradication turned out to be not
feasible and today a very few, if any, think that malaria can be eradicated - the aim is to control.

The Zambian hospital industry institutional context

This section starts with statements, which in the absence of references can only express the personal views of the author. It appears more like sensational journalism than a background to scientific work. One cannot put up statements, such as: "centralized, heavily regulated, resource constrained industry", "there is no agreed model for hospital behaviour", and "Hospitals are simply out there to exhaust theirbudgetary allocations" without reference and justification. When a few lines later it is said that "Hospital managers have considerable discretion to pursue other objectives", it can be interpreted as suggesting that these managers are either corrupt or incompetent or both. In my experience, most of them are competent and trying to do their best - but that the context in which they operate is extremely complex with many different types of demands, concerns, restrictions, and short-falls. I don't know if hospital boards still exist in Zambia as created by the health sector reform. But the boards need to be mentioned as one direct local accountability measure. Further, it is not made clear that not all the hospitals are the same. Some are supposed to be referral or specialist hospitals, while others are first level district hospitals. Further, some of the hospitals are run by missions - getting large part of their resources from the government - but having other accountability lines as well. In this respect it is interesting to see that the mission hospitals in general score high on the 'scale efficiency' - but low on the 'congestion scores' -might be worthwhile discussing.

Analytical framework

I find a need to take another look to reorganize and possible re-explain this whole section, if the intent is to reach policy-makers and managers. For example, why not put the definition of the variables before the presentation of the equations - this would make it much more easy to follow. Some of the terms appear out of the blue and I am certainly getting lost with sentences like "Intuitively this approach measures the relative distance between within an input and output space" and "Thus, an input distance function considers a minimal proportional contraction of the input vector, given an output vector". There is further no reference to where these methods originate.

Later in this section, the author refers to "hospitals were not built to provide visits and bed days...." and enters into a discussion that almost invalidates the approach. I suggest in the introduction to acknowledge that the work is one piece of the puzzle to establish the full picture of the hospitals within the health sector and that hospitals are to be judged using several criteria, including efficiency, effectiveness and politics.

There is a need to explain the key terms 'scale efficiency' and 'inefficiency due to congestion' in plain English. This should not be difficult.

Methods

The author mentions that the high standard deviation in table 2 is due to variations in size of the hospitals. The size of the hospital often also relates to different functions, e.g., referral level. It may not be relevant to compare between a first, second and third level referral hospital, and a children's specialist hospital with a district hospital - as one would expect these to have different production characteristics and production functions, including inputs/outputs.

Result and discussion

The reference to tables as well as cross referencing is a bit sloppy and needs to be reviewed. E.g., table 3 seems to be part of the methods section - but it is suggested placed in the results section. There is reference, I believe to data of table 4 (just under table 3) and with no reference to the table where the data can be found. Does the presentation of arithmetic and geometric means as well as median in tables 3 and 5 add any thing to the analysis - I am not sure, it might just add to confusion.

The section where the author discusses Mazabuka as reference hospital for Petauke, etc.. is not very clear. What does that mean? Is it suggested that all hospitals should develop into referral hospitals, i.e. be self-contained? The author may just be speculating here, in particular because there is no definition what 'reference hospital' means, i.e., there is no such parameter defined in Tables 1 and 2.

Under "Decomposition of technical efficiency ....", there is a discussion of allocative and technical efficiency. I suggest to take this discussion under the analytical frame work rather than under the results in order to get it out of the way and focus on what the paper is about, namely management of a 'production
process' - technical efficiency, i.e., how well available resources are utilized.

There is reference to 'summary and individual DMU...' in table 6. The individual data are actually in table 6. In the following paragraph the author makes reference to average efficiency score and optimal bed size - however, I don’t see where these are coming from - number of beds do not appear in tables 1 and 2. Further, the author is using percentages (which do not add up) while the tables are in numbers.

In the last paragraph of this section, referring to Zimba and Thompson with input slacks of 96% and 23%, the latter should have been 32% according to the table.

Conclusion

Normally, one would not have references in a conclusion, which should be the conclusion on research [results and discussion] and strong enough to stand alone.

Final Comment

Above, I have spent quite some space on commenting - this is because I find the topic important and the approach interesting - but the paper does need some more work, which I would encourage the author to do.

Reference List


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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

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Discretionary Revisions (which the author can choose to ignore)

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What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No

Declaration of competing interests:

I declare that I have no competing interests