Author's response to reviews

Title: Basing Care Reforms in Kenya on Evidence: The Kenya Costing Model

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Author's response to reviews: see over
The authors would like to express their greatest gratitude towards the reviewers. The review reports are very intensive and demonstrate a great intellectual involvement in this study and paper. We are convinced that the paper improved tremendously through their contribution.

Reviewer 1

- Cost of the model: Some data is confidential, so that we cannot provide a detailed breakdown of the cost of the development. But we can easily give the total. At the same time it is not yet calculated how much regular up-dating will cost. But there is an agreement between GIZ and the Government of Kenya that this will be done and paid for by GIZ. Therefore, I would write:

“The Kenyan Health Sector Costing Model is designed to base health care reform decisions on evidence. For this target, the German Development Cooperation (GDC) invested some 500,000 € (full cost) to develop the model. It is agreed on that GDC will also provide sufficient funds to update the database regularly so that Kenyan stakeholders are able to utilize these facts for evidence-based decision-making.”

- Sensitivity analysis: The calculation of standard cost depends on the expected occupancy and the application of certain standards. We did scenarios with different standards and occupancy rates. However, this is not presented in table 4 in order to keep it understandable for the readers. We have to see that this model is very comprehensive and allows for many variations. However, we can only present a part of it here. Figure 4 gives a sensitivity analysis of the coverage of the population: how do costs change when we have more or less coverage of the population. In the current situation in Kenya, this is the most important sensitivity which we have to address.

- Text-box: We are not sure whether this fits to the regulations of BMC. But we could add the following, if the editors agree:

_Costing health care services in developing countries: most important steps

1. Objectives and intentions of study
2. Political approval, ownership of key-stakeholders
3. Determine scope of study: which level of institutions, which trustee, which year(s)
4. Determine costing methodology: actual or standard cost, direct or indirect cost, payments or cost, cost apportionment
5. Determine costing units: attendance, admissions, patient days for certain diagnosis
6. Determine standards (where applicable)
7. Develop the tool (questionnaire)
8. **Sampling**: stratification (rural – urban, population of settlement, trustee, quality level) and sample size

9. **Field work**: training of study teams; monitoring of quality; logistics

10. **Data entry**: double entry and full checks

11. **Analysis**: intensive analysis of data guided by study questions

12. **Dissemination of results**

13. **Up-dating and constant improvement**

*Please note that the steps 1-2 and 11-13 are frequently neglected in many studies.*

- **Cost comparison**: We added a comparison in the results section, but not in the summary. The number of words of the summary is already at its maximum.

  “Compared with other studies from Sub-Saharan African countries (see State-of-the-Art) these costs are rather high, but Kenya has also higher gross national product per capita and higher salaries than neighbouring countries.”

- **Rest of health care expenditure**: in the main body of the text we have the explanation:

  “Some 6% of the total cost is due to the overall administration provided directly by the Ministry and its decentralised organs.”

We added this sentence also to the summary.

- **37% and 22 %**: these are the two main cost items (salaries, drugs/med. supplies). There are other minor variable costs (transport, communication, rent, meetings, …). Table 2 gives a summary and distinguishes between fixed and “other variable costs”. It is always discussable how many details we should place in the summary. Please feel free to ask for more details, but we did not want to exceed the word limitation too much.

- **“Health care reforms must be based on economic facts instead of irrational assumptions about the costs of services.”**: omitted, as requested.

- **Knowledge of demographics**: There is no official literature on the improvement of the HMIS in Kenya. However, the statement is underlined by a new source:


- **Levels of health care**: This follows the official levels of Kenya. Level 1 comprises all programmes (not facility-based) such as Aids-Control, health education, nutrition, sanitation, etc. Although there is the HENNET-network of these institutions, we know only little about their location, budget, cost or impact. Do you really think I should explain this here although I will not refer back to it?
• Sample size of institutions: we are used to be careful. We could also write:

“This study has by length the highest sample size of any costing study conducted in developing countries as it is the only systematic costing of all levels and trustee of care in these countries”.

However, we wanted to be careful as this bold statement calls for resistance. If you want, we can – of course – change it.

• We are covering an entire nation and 154 institutions. Therefore, we have less than 10 patients per institution. We assume that this is the minimum.

• Inflation: We are only in/deflating costs so that we can base our calculations on an inflation rate. On average the inflation in Kenya was between 1.9% (2004) and 10% (2006) but we used the standard of 5% as average and as a figure which is frequently utilized in calculations of that kind.

• When we submitted the paper it was indeed GtZ, now we changed throughout to GIZ.

• Low salary cost of private institutions: This is rare, but we added the sentence:

“which are highly specialised on sophisticated equipment and well-off clients.”

• Increase productivity: These institutions are almost empty, but they have the overheads of full beds! Therefore, increasing the number of patients will decrease the cost per patient. We explained it differently and added Figure 4:

Based on the Kenyan Health Sector Costing Model and the strict distinction between variable and fixed costs we can calculate the unit costs at an occupancy rate of 85% (standard) (Table 4). The consequences are dramatic for private facilities. As Figure 4 shows, the cost per patient falls strongly with an increasing workload, i.e., after increasing the occupancy rate of private district hospitals to 85% the cost per admission are halved. This indicates a major problem of under-utilization of private-for-profit hospitals.
“theoretical need”: We agree that this is tricky. In order to discuss this in more details (e.g. difference between needs, wants and demand of health care services) we would have to write quite a lot about it. This would be a paper of its own. In addition, we can only rely on statistics which we have. We would suggest either to leave it as it is or take out the entire section “response rate”.

“proven”: we rephrased it to:

However, investments in health care are usually regarded to be highly effective in a macro-economic perspective [65, 66].

Exchange rate: we put it in the methods section.

Title: changed as requested

Reviewer 2

Sampling: We stratified according to level (2-6), trustee (government, faith-based/NGO, private-for-profit), capacity (beds) and location (urban/rural). Many fields remained empty (e.g. no faith-based provincial hospitals), but from those other fields we took one institution into the sample. We changed the explanation as follows:

The methods employed to obtain provider based costing data comprised facility surveys, face to face interviews and the review and analysis of secondary data sources. Based on the Kenya Health Care Facilities List of the Ministry of Health with 4002 facilities we stratified the health care institutions according to health care level (2: Dispensary; 3: Health Centre; 4: District Hospital; 5: Provincial Hospital; 6: Tertiary Hospital), trustee (Government, Faith Based/Nongovernmental Organisations, Private-for-Profit), capacity (e.g. number of beds) and location (urban vs. rural and different provinces). Some fields were empty, e.g. there is no tertiary hospital in many provinces, but 207 strata remained. If more than one institution was in a stratum, we took a random sample so that in total 207 health care facilities were included in the original sample.
Other criteria (e.g. distance to next centre; physical accessibility in presence of rivers, mountains etc.) could not be considered – even our study (although much bigger than anything else) had budget limitations.

- **Recall-bias:** We are talking about facts of cost and financial accounting as well as statistics. It is not so much a question of remembering “How was it last year” but of giving us the figures presented in their reports, annual accounts, statistics etc. We collected mainly financial data, not impressions or memories. Therefore, there is a very limited risk of a recall-bias. However, we added:

  _All statements of interviewees were reconfirmed with institutional documentation in order to limit the recall-bias._

- **Questionnaire testing:** The questionnaire was also tested in government, faith-based/NGO and private-for-profit organisations. However, as faith-based/NGO and private-for-profit organisations concentrate on dispensaries/health centres and district hospitals, it was not really difficult. We added the term “and all trustees”.

- **Drop-out:** We will provide the questionnaire to the reviewer in order to check the quality of it. However, knowing the standards of financial documentation in Kenyan health care institutions we have to state that this drop-out rate is lower than what we had expected. It might sound unbelievable to the reviewers: but there are some private institutions which do not have any audited accounts! In faith-based organisations a big part of the costs is not recorded in the institution but overseas. And even government institutions have limited quality of their accounts.

- **For-profit organisations:** We did a costing study in the for-profit hospitals of Kenya in 2005 which helped a lot to establish trust. During the last years we developed strong relationship to the CONSORTIUM (i.e. the umbrella organisation of Kenyan private hospitals). Therefore, we added:

  _Based on two other studies of GIZ in Kenya (private-for-profit hospitals, faith-based hospitals) [60] and the excellent long-term relationship of the leadership of GIZ health sector programme in Kenya with the key-stakeholders of the Ministries, the faith-based health care providers and the private-for-profit providers (e.g. CONSORTIUM) our research teams did not experience any resistance._

- **“Lack of many table of economical research”:** We fully acknowledge that the reviewer will not be able to re-calculate our findings. However, the amount of data required for this analysis makes it impossible to add all to this publication. Co-author Tim Ensor is responsible for the data base. We are offering the editors to send them a copy so that they can see the soundness of our data documentation and analysis. However, it will not be possible that the reviewers or readers recalculate all results themselves. But this is quite normal with almost all papers based on a complex data set. Important is that the survey, data entry and analysis are based on professional methodology. We hope that we could present this in this paper.
• “That seem be they combine between primary from survey and secondary data “: Yes, very much correct. But this is normal in costing studies. We use all kind of documentation which is obligatory according to law, e.g. budgets and budget comparison reports (governmental institutions), income & expenditure accounts and balance sheets (non-governmental), institutional statistics (obligatory for HMIS from all institutions) etc. All accounts must be audited, either by the Treasury of Kenya or by private auditors. Some data is not in these statistics (such as number of staff) but can be reconfirmed by internal statistics (e.g. pay-roll). Therefore, we wrote:

> All statements of interviewees were reconfirmed with institutional documentation in order to limit the recall-bias. These documents were either obligatory by law (e.g. budgets, budget comparison reports, income & expenditure accounts, balance sheets, HMIS statistics) or standards of good business practice, such as the pay-roll. Wherever possible, we relied on audited accounts (e.g. by the Treasury of Kenya).

• Demand-side-cost: You are very right: we did not include details about the demand-side cost in this analysis. This might be another interesting paper requiring several pages. For this article we used the demand-side “to adjust the overall costs by level and function to take account of costs not recorded in facilities.” (see section “Costing”). In order to make it clearer, we added an illustration:

> For instance, many patients from government hospitals had to buy drugs from private pharmacies because the government facility was out of stock. We added these costs to the cost of the government hospital in order to determine the real resource consumption of treating a patient and not only the expenditure of this institution.

• „less support by data in this study“: It seems that we did not express ourselves well. The cost per service unit is – in the presence of fixed costs – the lower the higher the occupancy is. One reason for low occupancy and high cost per service unit is that people cannot afford private institutions. Therefore, if the Government of Kenya pays for the fee, the demand will go up, and also the cost per service unit will go down. We expressed it differently now:

> Our study demonstrates that the cost per service unit (e.g. outpatient visit, hospital admission) of private-for-profit facilities are rather high in comparison to the institutions of other trustees. Our data also proves that the low utilization (e.g. number of outpatients, bed occupancy rate) of these private-for-profit institutions is a main reason for these high unit costs. Assuming a normal price elasticity we can conclude, that the high unit costs in these institutions could be reduced if the Government of Kenya decided to pay for essential health care services irrespective of the owner of the health care institution.

• “The private sector institutions are significantly more heterogeneous than the public sector with costs for services varying widely. It can only be hypothesised that this is mirrored in the variability of quality, but further studies need to be undertaken to validate this claim.” We fully agree that this is a hypothesis and a call for further research. However, it stands in the conclusions where it is quite normal that we interpret our results and point at policy implications beyond the hard facts presented in the results section. Please, dear reviewer,
advise us what to do. We could just take out these two sentences without sacrificing much. But we still think that it is appropriate for the conclusion section.

- Limitations: The reviewer writes that we do not state the limitations of our study. Please note the following paragraph:

> However, the authors are aware of a number of shortcomings that limit the validity and representativeness of the data presented in this paper. Firstly, the model tried to cover also the cost of level 1 (community services). However, the wide diversity of community services, such as Aids-Control-Programmes, health education, nutrition programmes, gardening, road safety etc., made it very difficult to come up with reliable results. Secondly, we costed a large number of facilities in comparison to other studies. However, variability of costs, especially in the private sector may have warranted a larger sample in order to draw national policy conclusions from the study. Thirdly, facilities and patients were subjected to the costing exercise over a period of two months, which may under certain circumstances not be representative of the national average of costs, given that disease and consultation patterns are contingent on seasonal or other external variations. Finally, Nairobi based facilities were under-represented in the sample. Consequently, the results will correctly represent the situation in the rest of the country, but might under-estimate the total costs for the entire country as - at comparable levels of care – healthcare costs generated in Nairobi tend to be higher than healthcare costs generated in rural facilities.

We called it “shortcoming”, not limitations. But otherwise we are convinced that we have addressed out limitations. If you see any other major limitations we would appreciate very much your support and are very much willing to add them here.

- Summary: We took out the following paragraph because it was not essential for the paper:

> Concluding from this, health care reforms are required to focus on regulating and strengthening private-for-profit providers.

- Macro economic impact: as stated for reviewer 1, we expressed ourselves more carefull now:

> However, investments in health care are usually regarded to be highly effective in a macro-economic perspective [66, 67].

- GDP etc.: As an economist the first author would love to talk more about how to measure and compare GDPs, reflect more on disparities, measuring poverty etc. However, this paper is already quite long. We have to focus on the costing study. Therefore, we add here:

> Compared with other studies from Sub-Saharan African countries (see State-of-the-Art) these costs are rather high, but Kenya has also higher gross national product per capita and higher salaries than neighbouring countries. For instance, in 2006 (mid-term of the study) the gross national product of Kenya was 527 US$ p.c. (not PPP-adjusted), whereas Tanzania (358 US$), Uganda (276) and Somalia (136 US$) had much lower GNPs p.c. Merely Sudan had a higher income per capita (643 US$), but this figure does not reflect Sudan’s reality. It is skewed due to
military aid and oil income. Generally, Kenya is the richest country in Eastern Africa, even if the average does not reflect regional and social disparities in this country (see Background).

- The same applies for the three diseases. This is interesting – without question. But it is definitely another paper. We want to present data on average costs of health care services to gear the health sector reform process. We have much more data. But we have to focus in this paper.

- Staffing: we fully agree. Therefore we added:

  *Staffing: The decreasing marginal unit cost with increasing utilization is based on the assumption that health care institutions could either meet the demand within their given labour capacity or acquire sufficient additional staff. However, hiring professional staff in rural health care institutions and in particular doctors for remote hospitals is quite difficult in Kenya. Professionals tend to work in cities (in particular Nairobi) and in high-level health care facilities. Our study results indicate that rural health care facilities are – on average – less staff intensive than urban facilities, and private-for-profit institutions attract more professional staff per service unit than government or faith-based/NGO institutions. The regulating bodies of Kenya must invest thought and effort to convince more professionals to work in rural places.*

- Statistical review: This analysis uses the arithmetic mean and standard deviations. No inferential statistics are applied. We do not mind at all if a statistician scrutinizes our paper. But we do not see a need for it. Much more, it is important that an economist and a medical professional look at it. From the deeply grounded recommendations of the reviewers we perceive that reviewer 1 is an economist, whereas reviewer 2 can cover the entire field of public health and medicine.