Author’s response to reviews

**Title:** The burden of disease profile of residents of Nairobi's slums: Results from a Demographic Surveillance System

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**Version:** 2  **Date:** 16 December 2007

**Author’s response to reviews:** see over
Response to reviewers’ comments

PHM editors’ comments:

The editors believe that as authors you have tried to put too much in one paper. Thus the editors would like to ask you to consider resubmitting in two parts, and would strongly advise you to concentrate on the mortality estimates and burden extrapolations in this paper and think about submitting another paper on the TEHIP essential package application to this population. Both reviewers have flagged a number of methodological areas that need to be better explained. Splitting the paper in two would help to do justice to these comments.

*The paper has been split into two. The current resubmission focuses on the quantifying the mortality burden. All aspects of the intervention addressable burden have been removed. The authors will consider submitting the second paper at a later date.*

Page 7: YLL were calculated by multiplying ? deaths ?. by the GBD standard life expectancy ?. (the PHM editors presume)

*Yes. This has been clarified in the methods section – see page 7 last paragraph*

Page 7: YLD factors need to be explained better (as Rosana Norman also comments). The PHM editors presume these are ratios of YLD to YLL from GBD AFRO-E region. That means the YLD estimates are rough extrapolations from rather shaky GBD YLD estimates for the region to begin with. Therefore, the editors would suggest not to put any YLD calculations in the tables and also not to try and interpret the YLD estimates in a number of spots……..

*YLD calculations have been removed from the manuscript, which now only covers YLL estimates*

Page 10: How do you estimate 174 YLL per 1,000 person years in adults if estimates for 15-64 are 202 and for 65+ 443 (Figure 3)?

*“Adults” in this case was used to refer to the population aged five years and older. To avoid such confusion, the latter term has been used throughout the manuscript*

For comparisons with GBD, the editors suggest that you pick up Rosana Norman’s comment that undetermined causes of death are better redistributed rather than left in a separate category.

*Done!*

The PHM editors also agree with Rosana Norman that it is preferable that you use traditional mortality indicators such as mortality rates or 5q0 when making comparisons with the Tanzanian site or the rest of Kenya.
Response to Rosana Norman’s comments

General:
This is an interesting manuscript documenting the burden of disease profile of residents of Nairobi’s slums. The authors use a verbal autopsy approach to fill the gap left by lack of vital registration data in their local setting. Although global burden of disease estimates are available for the African region, the authors focus on quantifying the disease burden facing the urban poor providing important and relevant information for local health planning showing that most of their health needs could be addressed by proven cost-effective interventions. This study makes a useful contribution towards filling the enormous gap in cause of death data in the sub-Saharan African region. The methods are appropriate and well described and the authors made reasonable assumptions to overcome the shortcomings of available cause of death data to arrive at estimates of the burden of disease using data from the Nairobi Urban Health and Demographic Surveillance System (NUHDSS). It is difficult to assess fully whether the data are sound and well controlled from the manuscript. More detail is required on quality control regarding the DSS rounds and it would be helpful to present more information about the death rates observed. Please see Minor Essential Revisions. The manuscript adheres to the relevant standards for reporting and data deposition and the material is presented clearly and appropriately although some suggested improvements can be made. The discussion and conclusions are well balanced and adequately supported by the data.

Comments greatly appreciated!

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

Done! See page 12 first paragraph

Page 15: The editors are not sure there is evidence of a causal relationship between cold climate and risk of pneumonia.

Reference to cold weather has been omitted from the sentence. (Studies on stroke incidence seem to suggest that relationship)

Page 15: Discussion on the size of burden attributed to malnutrition is pertinent. It may help the authors to think of malnutrition largely as a risk factor rather than a categorical disease in the mutually exclusive GBD list…..

Done! See page 14
Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1) In both the Abstract (pg 2 last sentence of the Background section) and in the last paragraph of the Background section on pg 5 the authors refer to the Burden of Disease approach. The authors should consider changing this to a Burden of Disease approach as there is a growing range of approaches that may be considered Burden of Disease…….

Done

2) In this manuscript, mortality burden and YLLs per 1000 person years are referred to as mortality risks and the terms are used interchangeably. The authors should use only the term mortality burden instead of mortality risk…..

The term mortality risk has been replaced with mortality burden in all sections of the manuscript

3) Abstract
The first sentence of the Results section does not read well, please modify.
The sentence has been modified; it now reads “The overall mortality burden per capita was 205 YLL/1000 person years.”
In the second sentence, this should be overall burden instead of mortality burden in DALYs per 1000 person years.

The paper now focuses on the mortality burden alone as suggested by the editors

In the third sentence of the Results section the authors should replace 'four times the risk of dying' with 'four times the mortality burden (or premature mortality rate if YLLs/1000 person years)'.

Done

There are 2 conclusions in the Abstract

The conclusion has been reformulated to reflect the current content of the manuscript

4) Methods
Pg 6 The NUHDSS: More detail on quality control regarding the DSS rounds should be provided. It is difficult to obtain a sense of the extent of missing verbal autopsy data, and how many visits were made to each home when residents were not present.

A more detailed description of the verbal autopsy procedures and the quality control aspects has been added. See page 6 last paragraph

5) Pg 7 Cause of death ascertainment
Causes of death were classified according to ICD-10 but it is not clearly mentioned if these ICD 10 cause of death classifications were mapped to the global burden of disease cause list.

A description of the coding procedures and how the NUHDSS code list relates to the Global BoD one has been added – see page 7 first paragraph

Following the GBD hierarchy, a disease category should not appear in a ranking list of diseases for eg central nervous system disorders (which is not a GBD disease category), injuries (unintentional and intentional categories combined so a broad group) are ranked with conditions or single causes of death such as malaria in Table 3. The same applies to other perinatal causes in Table 2.

This has been rectified. The ranking is now based on single causes of death

6) The process of coding underlying causes of death involves some extent of misattribution or miscoding even by medically qualified staff. The authors should please discuss possible incorrect or systematic bias in diagnosis if, for example, the cause of certain deaths in children could not commonly be ascertained and were therefore coded as undetermined.

The issues surrounding misclassification and miscoding have been discussed in detail – see page 16 last paragraph

The problem of misclassification could be addressed by redistribution of general ill defined categories, and a correction algorithm for re-classifying undetermined causes of death could be developed. Although a small proportion of mortality burden (7%) was undetermined, the authors could consider some redistribution of the undetermined causes of death (by age and sex). This would impact on the rates calculated.

The undetermined deaths (unknown causes, missing, and true undetermined) have been proportionately redistributed to other cause-of-death categories and the YLL recalculated accordingly.

7) pg 7 Burden of disease estimation:
The authors should also indicate how stillbirths were incorporated into estimates of burden of disease and which modifications of the DALY formulation were used so that YLLs could be assigned to stillbirths.

Done – see page 7, last paragraph

8) More detailed information is required on the YLD calculation. YLLs were multiplied by the corresponding YLD factors for the Afro E region……..
As suggested by the editors, YLD calculations have been removed from the analysis. The manuscript now only covers YLL estimation.

9) Pg7 All deaths were distributed to sex, age groups- should this be All deaths were classified to sex, age groups?

The sentence now reads “All deaths were classified to sex, age groups (<1, 1-4, five year age groups thereafter) and cause-of-death categories”

10) Pg8 The intervention addressable burden
Please consider presenting more detailed information on the HIV/AIDS and Sexually Transmitted Infection (STI) care intervention.

As suggested by the editors, the sections on intervention addressable burden estimation have been removed from the analysis. The manuscript now only covers mortality burden estimation.

11) Results
A basic description of the mortality would be useful as it would add value to the paper for comparison with other settings and it would also enable better assessment of the robustness of the data and results. The mortality rates should be presented in age groups to assess the validity of the data and whether, for example, child deaths are missing.

Mortality rate estimates have been added – see page 8, results section, and first paragraph

12) Pg 9 Burden of disease estimates
It is not clear how the largest contribution from the 15-64 years age group reflects the wide range of ages in this group.

This sentence has been modified to reflect the fact that the age group contributes the most person years – see page 8 last paragraph

13) On pg 11 Estimates of the intervention addressable burden
Disease conditions that account for 81% of DALYs in the study population can be addressed by available proven cost-effective interventions……

See response to comment 10 above

14) Pg 11 AIDS and Tuberculosis were combined in the analysis because about 35% of deaths were due to a probable combination of HIV/AIDS and TB and hence were coded as unspecified TB. In Table 3 "AIDS and TB" combined accounted for 35% of burden 5+. In Figure 5, how the AIDS and TB burden was then teased out into the proportion addressable by HIV/STI Control (17%) and TB DOTs (9%) interventions. What was done to avoid double counting?
See response to comments 10 and 13 above

15) Pg 12 Discussion
In adults verbal autopsy can be used to make reasonable estimates of the number of AIDS deaths, but the authors could discuss whether this technique has been well validated in children. Pneumonia and diarrhoeal diseases are listed as the leading causes of disease burden in under-fives. Given the high prevalence of HIV in the area, the authors should discuss possible misclassification of AIDS deaths in children to indicator conditions such as pneumonia and diarrhoeal diseases…….

This has been addressed on page 13, second paragraph

16) On page 13 it would be easier to compare mortality rates in Tanzania with those in the study population rather than premature mortality (YLL rates).

The comparison with the YLL aims to show the mortality disadvantage of children in the study population. Nonetheless mortality rates for the coastal DSS sites have also been included for comparison, see page 12, first paragraph

Again on page 16, age-standardized road traffic and interpersonal violence injury mortality rates would be useful to enable comparisons with other African countries using the GBD categories of external type of injury rather than mode/mechanism of injury such as blunt trauma or gunshot wounds.

YLL have been recalculated for interpersonal violence injuries and road traffic accidents – see table 3

17) Pg 13 Mortality contributes about 71% of total disease burden which is lower than the contribution of mortality in sub-Saharan Africa. Were comparisons made with the GBD 2002 estimates (reference 23) or 1990 estimates? From Table 1 it seems that authors should replace reference 14 with 23.

Table 1 now reflects the comparison based on YLL calculations alone – the SSA figures are from the revised BOD estimates of 2002 which is reference 23

18) Pg 17. Inability to assign causes of death in 7% of deaths would not only lead to an underestimation of YLD and DALYs, but YLLs and rates for specified causes would also be underestimated.

This has been clarified – see page 16 last paragraph

19) Figures and Tables

Figures are not correctly numbered (all Figures are labelled Figure 1).
This arose during the submission process since each figure was submitted as a separate file. It has now been addressed

Table 1 Title is too long and confusing - can be improved

The title has been shortened

In all Tables, authors should consider removing the decimal place from YLL, YLD and DALY estimates (but leave 1 decimal place for %).

Done!

Figure 1: The population pyramid for the study population needs a scale for the percentage of person time.

A scale has been added

Figure 3 legend should be:
Age-specific premature mortality rate expressed as YLL per 1000 person years, Nairobi DSS, 2003-2004.

Revised

Discretionary Revisions (which the author can choose to ignore)
1) The authors could consider hyphenating sub Saharan (sub-Saharan) Africa throughout the manuscript.

2) pg 4. In Kenya this proportion (rather than percentage) is about 71%.

3) In Methods the authors refer to WHO-AFRO E estimates which are thereafter referred to as sub-Saharan African estimates. When comparing to sub-Saharan African estimates on pg 10 of the Results the authors could perhaps mention that these refer to WHO AFRO-E 2002 estimates to avoid confusion with sub-Saharan African estimates from GBD 1990 in subsequent discussion.

4) Discussion
In addition, the authors could consider adding a recommendation in the discussion section to improve availability of reliable data and improve vital registration systems.

Done

Response to Osman Sankoh’s comments

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COMMENTS
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This is an original paper that seeks to quantify the burden of disease (BoD) faced by two communities of Nairobi’s informal settlements.

Overall comments:

The paper is well presented. It addresses an important issue of public health relevance which is assessing disease burden within a specific community using demographic surveillance system (DSS) data. Due of lack of empirical data, disease burdens are often accessed at global, regional or national levels. These scales are less informative to support interventions at the local level, more so in such marginalized populations. The attempt by the authors to quantify the BoD of this marginalized population deserved to be applauded. However, I would like to point out some of the following points.

Comments much appreciated!

In the method section paper the authors should give a short description of the access to health care of these communities. This is important for the reader to fully understand the disease burden. A short paragraph in the first subsection of the method section would be informative.

A sentence on access to health services has been added – see page 6 first paragraph

The authors did not mention whether the verbal autopsy (VA) tool used was different for different age groups. This precision is necessary as WHO recommends a different set of questions for childhood deaths.

This has been clarified – see page 6 last paragraph

Figure 2: It will be informative to provide the proportion of person years contributed by each age group.

The person years contributed by each age group have been added to figure 2

Page 13: The authors should have compared directly the per capita DALY for the study population and the Tanzanian site for under-fives and then looked at the under five mortality rate for Nairobi and the district containing the Tanzania DSS site to confirm if similar differentials exist.

The mortality rates for the Tanzanian site have been included in the discussion for comparison purposes – see page 12 first paragraph

Page 16: The contribution of CNS conditions to the morbidity burden should not be dismissed given the level of poverty, unfulfilled aspirations, insecurity, etc; the urban poor may be uniquely predisposed to higher prevalence of CNS conditions.

We agree that there may be a high burden of neuropsychiatric disorders in the study population. However based on suggestions from the editors regarding the utility of YLD
factors in the analysis, YLD calculation has been excluded from the analysis and hence this category’s relative importance has diminished.

I expected the author to discuss the limitations of the software (TEHIP) used as well as the limitation of the verbal autopsy tool.

*The limitations of the verbal autopsy tool have been discussed (see pages 16 and 17).*

*Since aspects of the intervention addressable burden have also been removed from the manuscript, the discussion on the TEHIP tool has been deferred.*

Please check the numbering of the figures. All the figures are numbered “1” yet in the text it goes from 1 to 5.

*This has been addressed.*


*Thanks, the reference list has been updated accordingly.*