Reviewer's report

**Title:** The effects of spatial population dataset choice on population at risk of disease estimates

**Version:** 1  **Date:** 12 January 2011

**Reviewer:** Stephen Lim

**Reviewer's report:**

This paper describes an assessment of numbers that are paid little attention in the field of health measurement; that is, population estimates at small area levels. The authors demonstrate the importance of accurate population numbers by describing variation in the estimated population at risk of malaria that results from using different population datasets. This is an important topic that is line with the objectives of the PHM journal. In general the paper is well written and the methods are sound and I have only limited comments.

1. It is important to state in the abstract what spatial resolution the variation in population numbers is being assessed at. I understood from the methods section that this is at the 5x5km level rather than the 1x1km resolution that some of the population datasets are available at (Table 1). Given that the finer the resolution the more potential there is for variation, it should be clearly stated that the assessment is done at the same resolution for all four datasets and what that resolution is.

2. In the assessment of population variation, the paper takes estimates of P. falciparum endemicity from 2007 and overlay this on population numbers from the four different sources. For Landscan, these numbers are available directly, but for the other three datasets, numbers are projected to 2007 using intercensal growth rates. Are the Landscan numbers for 2007 (and the GPW3 numbers up to 2005) derived using the same intercensal growth rate method? How different would the comparison be if one were to take a year for which population data is available for all four variants (e.g. 2000) and applied the P. falciparum endemicity numbers?

3. In the comparison of national-level assessments of PAR using the detail census data, the census data were available for different years (Mali – 2009, Namibia – 2001, Tanzania – 2002). It was not clear to me how the authors resolved the temporal differences in this data compared to the population and PAR data that was for 2007?

4. It would be informative to show the direction of the difference in Figure 4; i.e. +2.5% vs -2.5%. This would allow readers to assess whether CIA is systematically lower in terms of population numbers compared to UNPD.

5. Table S2 with an additional line for the global numbers could replace Figure 5.
6. I found Figure 6 to be very hard to read – the size is very small given that multiple graphs/maps have been combined into one. I think a more intuitive way to present these numbers would be as a selected series scatterplots of the PARs>X% using the different datasources, e.g. GRUMP vs Landscan. Points could be color coded for the different regions (Africa, CSE Asia, Americas).

7. Summary statistics are needed on the variation in PAR>X% at the country level between the four population datasets, e.g. a table presenting concordance correlation coefficients of the PAR>X% for Landscan vs Grump, GPW3 vs Landscan etc. This could also be done at a final geographical resolution, e.g. province.

8. One of the implications that is mentioned is the need to “gather datasets into a central resource”. This speaks to the need for increasing public availability of detailed census data. The authors make reference to IPUMS but it would worthwhile making reference to current debates about increasing public accessibility to health data, e.g. such as those covered in PLoS Medicine, the Lancet.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

I declare that I have no competing interests