Reviewer's report

Title: Population Density and Maternal Health Coverage

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Reviewer: Sheetal Silal

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General Comments

This is a well-written interesting paper that addresses population density as an issue of importance in health service delivery. The authors have undertaken a sizable task in attempting to secure good national data and perform an analysis on an inter-country scale.

The following areas however, need more clarification to justify the methods and results reported in this paper.

- Major Compulsory Revisions

1. Methods – Paragraph 6 – Line 2/3 – It is insufficient to say that using population data that precedes the medical data by 9 years is justified only because it shows that the population data was collected first. 9 years is a very long time and population movement in rapidly developing countries such as China could result in significant changes in density in that period. Rather acknowledge the data as being the only available source and state the limitations of its use.

2. Methods – Paragraph 7 – More detail (a sentence or two) is required here to justify the use of the unadjusted data.

3. Methods – Paragraph 10 & Results – An indication needs to be given on the sensitivity of the score distribution and the regression coefficients to the weights used in the scoring mechanism. E.g values in decile 3 are given twice as much weight as values in decile 2 etc

4. Table 2 – There is no indication of whether the variables are symmetrically distributed and hence whether the mean and standard deviation are appropriate descriptors. If the variables are not, then quote appropriate descriptors like the median in the table.

5. Results & Conclusion - There is very little or close to no discussion of the model results. There is no section in the paper allotted to discussion. This section needs to be included in the paper. Perhaps the reason for this missing section is that the hypothesis tested in this paper is easily concluded on in the regression results. I would recommend that as a discretionary revision, the authors were to explore the impact of density for different levels of country development and to assess the interaction effects of density and the independent variables.
6. While the limitations at different stages of the paper have been highlighted, a section for limitations should be included so that these may be clearly stated.

- Minor Essential Revisions

7. Methods – Paragraph 2 – In describing the three different coverage variables, (ii) and (iii) should be “the percentage use of ……” to avoid confusion.

8. Methods - Equation 3 – Popdc should be changed to into the format used in Equation 2 and in text

9. Results - Paragraph 2, Line 7 - The word “density” is missing after population.

10. Table 2 is labeled inappropriately

11. Results – Paragraph 3, Line 5 – The word “increase”¬¬¬ is omitted after 100% and the dependent variable quoted is incorrect. 12.9% is the coefficient in the in-facility delivery regression not the skilled birth attendant as quoted in Line 6.

12. Table 3 – The stars in the table need to be explained/foot-noted at the bottom of the table particularly as they do not seem to denote significance at varying levels as is normally the case in tables like this. Further an indication needs to be given in the table that the cells are to be read as coefficient above and p-value below.

- Discretionary Revisions

13. Table 2 – In addition to the mean and standard deviation, add the range (min, max) or the 95% confidence interval to obtain a more direct measure of the spread of the variables.

14. Table 3 – 95% confidence intervals can be included along with the coefficient and p values

15. Title – The authors might explore expanding the title to include something along the lines of “Exploring the relationship between……”

16. Abstract – A sentence or two should be added to the results section if the word count allows it.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests.