

## PEER REVIEW HISTORY

BMJ Paediatrics Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Where are the Paediatricians? An International Survey to Understand the Global Paediatric Workforce
<b>AUTHORS</b>	HARPER, BETH; Nganga, Waceke; Armstrong, Robert; Forsyth, Kevin; Ham, Hazen; Keenan, William; Russ, Christiana

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Reviewer name: Peter Flom Institution and Country: Peter Flom Consulting, USA Competing interests: None
<b>REVIEW RETURNED</b>	27-Oct-2018

<b>GENERAL COMMENTS</b>	<p>I confine my remarks to statistical aspects of this paper.</p> <p>In the abstract, the authors list pediatrician per 100,000 as integers. Surely there can be fractional doctors per 100,000. Listing a median of 1 and an IQR of 0-1 is not very useful, both should be fractions. As written, it implies that in 25% of low income countries, there are no pediatricians at all.</p> <p>p. 7: Effect sizes should be given for the differences between countries with no contact or no response and those with a response. P values alone are not useful here. The question is not whether the difference was significant but how large it was.</p> <p>p. 7 I'd strongly suggest that, rather than a bunch of tests of single variables, the authors should model pediatricians per 100,000 using regression and including all the independent variables at once. Perhaps quantile regression would be best, but some form of regression would allow the authors to look at the effect of each IV controlling for the others.</p> <p>I would also avoid categorizing continuous variables such as income; instead use it as a continuous variable.</p> <p>p 8 As above, density should not be rounded to integers.</p> <p>p. 8 and forward, when a p value is given, please also give the test statistic.</p> <p>Fig 2 - stacked bar charts are not a good method of presentation. What graphic should be used depends on what exactly the authors are trying to show.</p>
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<b>REVIEWER</b>	Reviewer name: Cynthia R Howard Institution and Country: University of Minnesota, Associate Professor of Pediatrics. USA Competing interests: None
<b>REVIEW RETURNED</b>	15-Nov-2018

<p><b>GENERAL COMMENTS</b></p>	<p>This manuscript outlines a survey with the aims of describing the global pediatric work force in relationship to country income; primary care; and transition of children to adult care. These measurements are significant in determining workforce shortage, goals for training the non-pediatrician workforce who provide health care for children; and health care access for adolescents, who now account for a higher percentage of the world's population than previously recorded. The authors deserve credit for recognizing these gaps in our knowledge and undertaking a huge effort to close the gaps.</p> <p>In reviewing the paper, I made the following observations and recommendations:</p> <p>Abstract: please be more specific in describing the objective (s) of the survey - were the primary objectives to determine the number of pediatricians per number of patients and the distribution of the pediatricians by geographic area and a secondary objective to describe the training programs for pediatricians in the country. The objective of determining the work that the pediatricians are doing does not appear to be a major objective when looking at the questions.</p> <p>Introduction: Strong summary of the gaps in knowledge to be addressed and why this is important. A couple of minor edits: Line 7, capitalize Sustainable Development Goals and SDGs and in the following paragraph, capitalize Millennium Development Goals</p> <p>Objectives: Clear summary - seems to be ideal to add this summary to the abstract under objectives there as well.</p> <p>Methods: Clearly stated. I do not have the statistical expertise to comment on the statistical analysis.</p> <p>Results: Thank you for the detailed tables and the color coded map - all interesting, helpful to actually have numbers to confirm what we suspected not only in terms of extremely low number of pediatricians relative to the need in terms of population and burden of disease, but also the "trickle" of new pediatricians into areas of high need.</p> <p>I was left wondering about the results you obtained regarding what the pediatricians are doing especially in countries where they are clearly not doing primary care - what were the results of private versus public sector work; sub-specialty expertise questions? And also, what did you find regarding the geographic differences as related to the questions pertaining to training? Might these results be added?</p> <p>Conclusions: Excellent summary and identification of next steps. Thank you for doing this work and sharing with us.</p>
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**VERSION 1 – AUTHOR RESPONSE**

Reviewer: 1

Comments to the Author

I confine my remarks to statistical aspects of this paper.

1. In the abstract, the authors list pediatrician per 100,000 as integers. Surely there can be fractional doctors per 100,000. Listing a median of 1 and an IQR of 0-1 is not very useful, both should be fractions. As written, it implies that in 25% of low income countries, there are no pediatricians at all.

Response: Thank you for this point! We have revised the calculations to be more specific, and include the values up to one decimal place for those <1. Specifically, these changes can be seen in the abstract, throughout the Results section, as well as reflected in Table 2 and Table 3, where the integer values were previously used. In re-running these analyses we noted small changes to the medians and IQRs as noted, that did not change the results. We also noted in reviewing these analyses that the previous final line for Table 2 and Table 3, physician density per 100,000 was based on all countries available in the WHO database rather than reflective of only those respondents for whom there is data in the rest of the table. Therefore, these lines have been revised to be accurate to one decimal, and to more precisely match the dataset used in the remainder of the tables. These changes did not change the statistical results, or overall trends.

2. p. 7: Effect sizes should be given for the differences between countries with no contact or no response and those with a response. P values alone are not useful here. The question is not whether the difference was significant but how large it was.

Response: We have added additional information about these differences in the text (Results, paragraph 2). Further details on the direction and magnitude of the differences can also be seen in Table 1.

3. p. 7 I'd strongly suggest that, rather than a bunch of tests of single variables, the authors should model pediatricians per 100,000 using regression and including all the independent variables at once. Perhaps quantile regression would be best, but some form of regression would allow the authors to look at the effect of each IV controlling for the others.

Response: It would be fascinating to understand the effect of each of variable on the others! However, because the paper is descriptive in nature, we are concerned that it would be an overstatement of our findings to present a regression analysis. With regards to the outcome of pediatrician density per 100,000, our only predictor variables are GDP and region. Our hope was to demonstrate the high correlation of the two in the top section of Table 3. In addition, since some of the regions contain a small number of countries, the regression analysis may be further complicated.

4. I would also avoid categorizing continuous variables such as income; instead use it as a continuous variable.

Response: We agree that this would be most detailed. However, because we are using publicly available published standards (in this case, the income categories as defined by the World Bank), analysis based on each individual country's GDP is beyond the scope of this work. Previously published work from the World Health Organization regarding the physician workforce is similarly grouped by World Bank GDP classifications; therefore we think that modeling our analysis in the same way may be the most informative for comparison purposes of paediatrics as a field to other physician specialties. (e.g. WHO. Health workforce Requirements for Universal health coverage and the sustainable development goals. . Human Resources for Health Observer Series 2016;17.)

5. p 8 As above, density should not be rounded to integers.

Response: Thank you, we have revised this in the results and tables, as above in (1).

6. p. 8 and forward, when a p value is given, please also give the test statistic.

Response: We have revised the results and tables to denote the statistic used for each of these tests.

We have included these in the abstract, text (results section), and have clarified the tests used for each analysis in the tables. If they do not feel additive to the work in all places, we would be happy to redact them from the text and keep them in the abstract and tables.

7. Fig 2 - stacked bar charts are not a good method of presentation. What graphic should be used depends on what exactly the authors are trying to show.

Response: Our goal in showing this figure was merely to demonstrate the tremendous variability in the provision of primary care among countries. Our ability to demonstrate this with a scatter plot is limited by two-dimensions, and since we were hoping to show the variability by country within regions, pie charts would be cumbersome. If a graphical representation is not felt to be additive to the work, we can remove this figure.

Reviewer: 2

#### Comments to the Author

This manuscript outlines a survey with the aims of describing the global pediatric work force in relationship to country income; primary care; and transition of children to adult care. These measurements are significant in determining workforce shortage, goals for training the non-pediatrician workforce who provide health care for children; and health care access for adolescents, who now account for a higher percentage of the world's population than previously recorded. The authors deserve credit for recognizing these gaps in our knowledge and undertaking a huge effort to close the gaps.

Response: Thank you!

In reviewing the paper, I made the following observations and recommendations:

1. Abstract: please be more specific in describing the objective (s) of the survey - were the primary objectives to determine the number of pediatricians per number of patients and the distribution of the pediatricians by geographic area and a secondary objective to describe the training programs for pediatricians in the country. The objective of determining the work that the pediatricians are doing does not appear to be a major objective when looking at the questions.

Response: You are correct, and we have revised the objectives in the abstract to match the former description.

Introduction: Strong summary of the gaps in knowledge to be addressed and why this is important. A couple of minor edits:

2. Line 7, capitalize Sustainable Development Goals and SDGs and in the following paragraph, capitalize Millennium Development Goals.

Both have been capitalized (Introduction, Paragraph 1 Line 7 and Paragraph 2 Line 11).

4. Objectives: Clear summary - seems to be ideal to add this summary to the abstract under objectives there as well.

Response: Thank you! We have revised the Objectives in the abstract to better reflect them as delineated here. (Abstract, Objectives (see above, reviewer 2, comment #1).

5. Methods: Clearly stated. I do not have the statistical expertise to comment on the statistical analysis.

6. Results: Thank you for the detailed tables and the color coded map - all interesting, helpful to actually have numbers to confirm what we suspected not only in terms of extremely low number of pediatricians relative to the need in terms of population and burden of disease, but also the "trickle" of new pediatricians into areas of high need.

Response: Thank you.

7. I was left wondering about the results you obtained regarding what the pediatricians are doing especially in countries where they are clearly not doing primary care - what were the results of private versus public sector work; sub-specialty expertise questions? And also, what did you find regarding the geographic differences as related to the questions pertaining to training? Might these results be added?

Response: Well noted. Reviewing the responses about private vs public sector work and the feedback from our respondents, these questions were felt to be the most subjective or difficult to accurately answer, and therefore least reliable, so were not included in the manuscript. The questions about training were beyond the objectives of this analysis.

8. Conclusions: Excellent summary and identification of next steps. Thank you for doing this work and sharing with us.

Response: Thank you for your thoughtful review, and your helpful and insightful comments!