

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Decomposition of socioeconomic inequalities in child vaccination in Ethiopia: Results from the 2011-2016 demographic and health survey data
AUTHORS	Bobo, Firew Tekle; Hayen, Andrew

VERSION 1 – REVIEW

REVIEWER	Sanjeev Singh University School of Medicine & Paramedical Health Sciences, Guru Gobind Singh Indraprastha University, New Delhi, India
REVIEW RETURNED	07-May-2020

GENERAL COMMENTS	<p>A well written paper – Few comments Page numbers in the comments below are according to the PDF file pages</p> <ul style="list-style-type: none">• Grammar /punctuation check in the whole document: example o Page 4, line 21- “three doses diphtheria” “of” missing, line 23- in place of DPT3 should be DPTo Page 7, line 12 – () is empty. Probably DHS is missing• Page 4, line 23 – define time period of full vaccination. Polio vaccine – was it IPV or OPV – clarify• Page 5, line 20 – expand DHS or use short form in bracket in line 7 as (DHS)• Page 6, line 44: Is the author sure that there is NO study?• Page 7, line 35-36: trivalent, tetravalent or pentavalent which combination (DPT – do not use DPT-3, is only three components, what others were for tetra and penta explain this just after the name of the vaccines in brackets). Line 37 – which polio vaccine oral or injectable good to mention. Line 38 – at what time period?• Page 10, line number 20 – Put exact percentage of the rural respondents same in line 22• Page 10, line 24-26: Good to mention any probable reasons in detail for the increase and the decrease (at least in discussion). Line 34-35: Define full vaccination with time. Line 38: This whole calculation indicates that in 2011, incomplete immunization was 62%, and in 2016 it was 46%. Good to have any probable reasons for changes observed in this paragraph and the paragraph mentioned above.• Page 12, line 9: Define Household wealth index (different categories)?• Page 13, line 10: Define pro-poor since pro-poor means something directly targets poor people but here the case is not like that.• Page 18, line 11-14 “In the present study, maternal education had contributions to vaccine uptake in 2016, but this was not the case in 2011.”. Any probable reasons? Good to mention
-------------------------	---

	<ul style="list-style-type: none"> • Page 19, line 8-15 is actually the part of the above paragraph - probable reason for low coverage in rural setting rural population. Good if merged and rewrite clearly. Line 19-21: define overall coverage
--	--

REVIEWER	Julia Porth University of Michigan, United States of America
REVIEW RETURNED	13-May-2020

GENERAL COMMENTS	<p>The author presents a very interesting and well-constructed analysis of the trends in vaccination inequalities in Ethiopia. A few notes:</p> <p>TITLE -Please correct the title to reflect the fact that you are examining basic vaccination coverage rather than full vaccination coverage.</p> <p>INTRODUCTION -In the first two paragraphs of the introduction the author discusses both full vaccination and basic vaccination. It would be helpful to provide a definitions distinguishing these two terms for readers who do not work in the global vaccination arena. -It would be more impactful if the author could quantify the degree to which global vaccination coverage has improved (line 11) -In general, it would be very helpful to the reader and more impactful if the author could provide more detailed descriptions of and supporting information/statistics in the introduction. For example, in paragraph 2 (starting on line 11) could the author quantify the degree to which global vaccination coverage has improved? Later in the same paragraph could the author discuss the global vaccination disparities in more detail – what are the reasons for the disparities? Differences in SES? Occupation? Religion? Ethnicity? -Please include a rationale for why the analysis was conducted in Ethiopia.</p> <p>METHODS -Please explicitly mention ethical approval for the study (ie DHS data is publicly available and therefore ethical review is not necessary). -Please clarify language of vaccination in the 'Measures' section; as you are not including receipt of PCV and rota in your analysis it is about receipt of all basic vaccines, not 'full' vaccination, which suggests receipt of all available vaccines. -The description of equation (1) is unclear. In the equation the author wrote (2/y) but in the paragraph after the equation the author describes "I [rather than y] is the mean of h". Please standardize the nomenclature. -The author describes how the concentration index is decomposed but does not clearly discuss what statistical methods were used to determine which factors are demonstrate a statistically significant contribution. Please clarify.</p> <p>RESULTS -Please replace "full vaccination" with "basic vaccination" throughout results.</p> <p>DISCUSSION -Please replace "full vaccination" with "basic vaccination" throughout discussion.</p>
-------------------------	---

	<p>-Please discuss the results in paragraph 2 in the context of the literature.</p> <p>-Discuss the limitations of the analysis (more detailed discussion than the bullet points provided on page 3).</p> <p>TABLES AND FIGURES</p> <p>-For all tables/figures: Please substitute “receipt of all basic vaccines” in the place of “full vaccination”</p> <p>-Table 2: In the text the author mentions that a variety of factors were significant contributors to socioeconomic inequalities in vaccination (ex wealth, education, etc.). Could the author please include something in Table 2 that indicates which factors are statistically significant (ie bold or asterisk)?</p>
--	--

VERSION 1 – AUTHOR RESPONSE

Response to reviewers

Reviewer: 1

Reviewer Name

Sanjeev Singh

Institution and Country

University School of Medicine & Paramedical Health Sciences, Guru Gobind Singh Indraprastha University, New Delhi, India

Please state any competing interests or state 'None declared':

None

Please leave your comments for the authors below

A well written paper – Few comments

We thank you for your time and insightful comments that have improved our paper.

- Grammar /punctuation check in the whole document: example

Thank you. We have now addressed grammar/punctuation errors. We believe the revised manuscript reads easier.

- Page 6, line 44: Is the author sure that there is NO study?

We have now corrected this statement. Very few studies examined inequalities in child vaccination. Most examined individual vaccinations such as BCG or measles others were limited by time addressing either 2011 or 2016.

- Page 7, line 35-36: trivalent, tetravalent or pentavalent which combination (DPT – do not use DPT-3, is only three components, what others were for tetra and penta explain this just after the name of the vaccines in brackets). Line 37 – which polio vaccine oral or injectable good to mention. Line 38 – at what time period?

Thank you. We have now modified the definitions of DPT3 as “three doses of diphtheria, tetanus toxoids, and pertussis vaccine.” We have also defined the vaccination schedules using table – this can be found in the methods section.

- Page 10, line number 20 – Put exact percentage of the rural respondents same in line 22

We have now modified this.

- Page 10, line 24-26: Good to mention any probable reasons in detail for the increase and the decrease (at least in discussion). Line 34-35: Define full vaccination with time. Line 38: This whole calculation indicates that in 2011, incomplete immunization was 62%, and in 2016, it was 46%. Good to have any probable reasons for changes observed in this paragraph and the paragraph mentioned above.

We appreciate your suggestion; we have discussed probable reasons for coverage improvements and incomplete vaccinations. We discussed missed opportunities for vaccinations and vaccine hesitancy as key issues that lowered vaccination coverage in the context of the literature.

- Page 13, line 10: Define pro-poor since pro-poor means something directly targets poor people but here the case is not like that.

We agree – we have corrected this statement.

- Page 19, line 8-15 is actually the part of the above paragraph - probable reason for low coverage in rural setting rural population. Good if merged and rewrite clearly. Line 19-21: define overall coverage

Thank you. We have now modified the paragraph.

Reviewer: 2

Reviewer Name

Julia Porth

Institution and Country

University of Michigan, United States of America

Please state any competing interests or state 'None declared':

None declared

Please leave your comments for the authors below

The author presents a very interesting and well-constructed analysis of the trends in vaccination inequalities in Ethiopia. A few notes:

We thank you for your comments and suggestions. We have tried to address all your concerns.

TITLE

- Please correct the title to reflect the fact that you are examining basic vaccination coverage rather than full vaccination coverage.

Thank you. We have now corrected the title as “Socioeconomic inequalities in child vaccination coverage in Ethiopia: A decomposition approach”

INTRODUCTION

- In the first two paragraphs of the introduction the author discusses both full vaccination and basic vaccination. It would be helpful to provide a definitions distinguishing these two terms for readers who do not work in the global vaccination arena.

We have now redefined full vaccinations In Ethiopia as;

A child is said to have received full vaccinations if they receive one dose of the Bacille Calmette-Guérin vaccine, three doses of the pentavalent vaccine (penta includes diphtheria, tetanus, pertussis [DTP], hepatitis B [HBV], and Haemophilus influenzae type b [Hib]), three doses of the oral polio vaccine (OPV), three doses of the pneumococcal conjugate vaccine (PCV), and two doses of the rotavirus vaccine (rota), and one dose of measles-containing vaccine (MCV).

Basic vaccination is defined as receiving a single dose of BCG, three doses of DTP, three doses of OPV, and one dose of measles vaccine by the age of 12 months.

- It would be more impactful if the author could quantify the degree to which global vaccination coverage has improved (line 11). In general, it would be very helpful to the reader and more impactful if the author could provide more detailed descriptions of and supporting information/statistics in the introduction. For example, in paragraph 2 (starting on line 11) could the author quantify the degree to which global vaccination coverage has improved? Later in the same paragraph could the author discuss the global vaccination disparities in more detail – what are the reasons for the disparities? Differences in SES? Occupation? Religion? Ethnicity?

Thank you. We have now presented the global vaccination coverage. We then described existing disparities in vaccination coverage by place of residence, education or socioeconomic status.

- Please include a rationale for why the analysis was conducted in Ethiopia.

We appreciate the suggestions; we have now included rationale of the study in Ethiopia.

METHODS

- Please explicitly mention ethical approval for the study (ie DHS data is publicly available and therefore ethical review is not necessary).

Thank you. We have now explicitly mentioned that ethical review is not necessary, as the data is publicly available.

- Please clarify language of vaccination in the 'Measures' section; as you are not including receipt of PCV and rota in your analysis it is about receipt of all basic vaccines, not 'full' vaccination, which suggests receipt of all available vaccines.

We agree – we have corrected full vaccinations to all basic vaccinations throughout the manuscript.

- The description of equation (1) is unclear. In the equation the author wrote $(2/y)$ but in the paragraph after the equation the author describes "I [rather than y] is the mean of h". Please standardize the nomenclature.

Thank you. We have corrected this now.

- The author describes how the concentration index is decomposed but does not clearly discuss what statistical methods were used to determine which factors are demonstrate a statistically significant contribution. Please clarify.

We agree – the statistical significance of the contributing factors were examined using bootstrap method because analytical standard errors do not exist for the composite components. Bootstrapped standard errors were computed with 1000 replications.

RESULTS

- Please replace "full vaccination" with "basic vaccination" throughout results.

We agree – we have corrected "full vaccinations" to "all basic vaccinations" throughout the manuscript.

DISCUSSION

- Please replace "full vaccination" with "basic vaccination" throughout discussion.

We agree – we have corrected "full vaccinations" to "all basic vaccinations" throughout the manuscript.

- Please discuss the results in paragraph 2 in the context of the literature.

-Discuss the limitations of the analysis (more detailed discussion than the bullet points provided on page 3).

Thank you. We now discuss our findings in the context of literature. The limitations of the analysis were also described in more detail under discussion.

TABLES AND FIGURES

- For all tables/figures: Please substitute "receipt of all basic vaccines" in the place of "full vaccination" We agree – we have corrected "full vaccinations" to "all basic vaccinations" throughout the manuscript.

- Table 2: In the text the author mentions that a variety of factors were significant contributors to socioeconomic inequalities in vaccination (ex wealth, education, etc.). Could the author please include something in Table 2 that indicates which factors are statistically significant (ie bold or asterisk)?

Thank you. We have now indicated the statistical significance of contributing factors using asterisk.

VERSION 2 – REVIEW

REVIEWER	Sanjeev Singh Independent Expert - Immunization
REVIEW RETURNED	11-Aug-2020
GENERAL COMMENTS	Its OK to publish with a proof read.

REVIEWER	Julia Porth University of Michigan School of Public Health, USA
REVIEW RETURNED	27-Jul-2020
GENERAL COMMENTS	The authors have responded to all requested revisions. The paper is clear and reads very well.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 2

Reviewer Name

Julia Porth

Institution and Country

University of Michigan School of Public Health, USA

Please state any competing interests or state 'None declared':

None declared

Please leave your comments for the authors below

The authors have responded to all requested revisions. The paper is clear and reads very well.

Response to reviewers

We would like to thank Reviewer 2 for taking the time to review this manuscript. We found the reviewers' comments to be helpful in revising the manuscript and have carefully considered and responded to each suggestion.

Reviewer: 1

Reviewer Name

Sanjeev Singh

Institution and Country

Independent Expert - Immunization

Please state any competing interests or state 'None declared':

None

Please leave your comments for the authors below

Its OK to publish with a proof read.

We are grateful for taking the time to review this manuscript.