Reviewer’s report

**Title:** Poverty and health trajectories in early childhood: Exploring the influence of timing and duration of poverty on child health outcomes

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**Reviewer:** Anita Kozyrskyj

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Manuscript review: Poverty and health trajectories in early childhood: Exploring the influence of timing and duration of poverty on child health outcomes

**Major compulsory revisions:**

This is an analysis of a population representative survey of families with young children in Quebec, Canada to explore the association between static and dynamic measures of household socioeconomic (SES) status, and asthma and infections at preschool age. The authors provided a comprehensive literature review on SES trajectories and health, including their own earlier publications (some of which I have cited). They used several statistical methods (eg latent class) to enumerate the dynamics of changing household SES: current poverty and recent poverty at specific ages, and transient poverty and cumulative poverty from birth. The manuscript is succinctly written, and the methods are relatively well-described.

The major criticism I have of this paper is the outcome measure: parent report of asthma attacks between 5 and 41 months of age (~4 years old). It is not possible to confirm a diagnosis of asthma before the age of 6. The natural history of wheeze phenotypes in childhood is well described, for example by Martinez FD. Transient wheeze and persistent asthma are the 2 phenotypes before age 6 and unlike persistent asthma, transient wheeze “goes away.”

I recognize the outcome measure is limited by how the question was asked on the Quebec Longitudinal Study of Child Development survey. If physicians cannot definitely make an asthma diagnosis in infants but suggest this diagnosis as a possibility to parents, this is what parents will report, especially if they are not given other response options on the survey. My suggestion is to re-label the outcome as preschool wheeze and cite some of the literature (eg. Martinez FD) on wheeze phenotypes. Also, one can test the association with child asthma at a later age, if that data is available.

My second comment is a strong recommendation rather than a major concern. Childhood infections should be analyzed separately instead of collectively, as a single measure of “any acute infection” because they are individual physiologic entities and are treated as such by health care providers. For the same reason, I recommend that growth delay be reported as a separate measure. I am not a fan of composite indices because they do not provide useful clinical information for
the treatment or prevention of specific diseases.

Finally, here are some recommendations for your data interpretation and discussion. It appears that to support a hypothesis that chronic poverty has a greater effect on health than current or recent poverty, one would have expected to see associations with health status measures at 41 months vs 17 or 5 months (baseline). You found an association for “asthma” attacks at 17 and 29 months but not at 41 months. In fact, an inverse association was found for chronic poverty at 41 months, as it was for some of the other measures. This contrary finding was never discussed in terms of biological plausibility or statistical analysis artefact. It should be.

Minor essential revisions:

1. I publish and read papers on early life determinants of asthma from birth cohort studies, and myself, have published a paper on SES trajectories (using SAS proc traj) and asthma in schoolchildren. Generally, I found that your paper was heavily weighted on the description of your statistical methods to derive your income measures, at the expense of interpreting your results. Even so, not all of your methods descriptions would be accessible to a clinician or even a heath services researcher audience. Some terms such as “adjusted poverty variables” were not defined at all.

2. It was not clear from the Muthen and Muthen citation whether the categories of not poor, transient poor and chronic poverty were derived statistically or a priori. What was the time period for transient poverty? Since a critical time period for poverty is during infancy when the immune and neurologic systems develop, it would have been more conceptually appropriate to define transient periods as increasing or decreasing poverty relative to infancy.

3. I did not find your presentation of data in the tables the easiest to follow. For example in Table 5, was it necessary to use the descriptors intercept and slope, when it could have been sufficient to list the age groups?

4. The discussion was not effective in highlighting the results. I recommend the Mimi Zeiger method of stating in the first paragraph, the main findings that test the primary objective of the paper, ie, the association between SES and child health. Trends over time can be reported in subsequent paragraphs.

Level of interest: An article whose findings are important to those with closely related research interests

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.