Reviewer's report

Title: Secular trends in pediatric antiretroviral treatment programs in rural and urban Zambia: a retrospective cohort study

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Reviewer: Helena Rabie

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General:
This is an important reflection on the programmatic aspects of pediatric ART in Africa. It also adds to evidence that outcome in rural clinics with access to ART may be as good as urban clinics particularly where enrollment depend on health systems. The authors highlight some interesting points and unexpected findings with regards enrolment and outcomes in different settings.

Major Compulsory Revisions

1) Statistical Methods
a. Re WAZ scores. Children up to 15 where enrolled, however WHO only provides Z-scores till age of 10 and recommends BMI after 10. How did the authors address this? Other than excluding them from analysis for WAZ. These children are a significant number of the total especially in the urban clinic.
b. Re CD4 response: Using the CD4 percent in children > 5 is not appropriate in addition achieving this level of improvement at 6 months given the severity of disease and the age of the children may not be the best measure. It may be more useful to reflect improvement as a % a change in CD4 in children < 5 and change in absolute count in those older than 5. Using CD4 Z scores may also be an alternative way to address this.

2) State the when PCR access for infants where established for the sites.

3) Please indicate number of infants initiated on ART that was stopped at 18 months if the data is available.

4) Indicate if possible if deaths occurred between enrolment and initiation of therapy for eligible and ineligible children if the data is available.

Minor Essential Revisions

1) Indicate if possible if deaths occurred between enrolment and initiation of therapy for eligible and ineligible children.

2) Can the authors provide further possible explanations for the low enrolment of infants into urban clinics? Given rapid progression with early clinical disease the “lack” of infants in the program is both interesting and worrying.

3) The reduction in TB self report in urban children is also interesting given that there was not a significant reduction is age (as in rural clinic). I think explaining
this for rural clinics may be easier as age of infected children lowered and children may have been uninfected.

4) Can clinical improvement be reflected change in WAZ?

5) In the introduction reference 9 may be used inappropriate

Discretionary Revisions

1) The challenges to rural clinics are similar to those in urban settings. If space allows it may be valuable to unpack the issues little better when describing the setting ie reflect staff patient ratios, income, community stability and numbers in parental care.

2) Also some information on seroprevalence rates at antenatal clinic and numbers of exposed infants per year at each site will be interesting as this will reflect the success in linkages as well.

3) Can the distance from the clinic for urban children be assessed? Some urban children also need to travel significant distances to clinics.

4) Please state if there are differences between the Zambian or WHO guidelines since most readers will not know the Zambian guidelines. Alternatively state the treatment criteria for infected children.

5) Figure 1 - Add into the legend if cumulative / number at the bars/lines, this will make it easier for the reader.

6) Though virological outcomes for African children are similar to high income countries I think the authors should include a comment about the lack of outcomes available for infants. The current published literature mostly have data for older children. Also there is little information on children that initiated on ART on a presumptive diagnosis of HIV. There may also be some differences in some clinical outcomes for all children ie growth.

**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