Reviewer's report

Title: Effectiveness of First-Line Antiretroviral Therapy and Correlates of Longitudinal Changes in CD4 and Viral Load Among HIV-infected Children in Ghana

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Reviewer: Kim CE Sigaloff

Reviewer's report:

General comments on the manuscript “Effectiveness of First-Line Antiretroviral Therapy and Correlates of Longitudinal Changes in CD4 and Viral Load Among HIV-infected Children in Ghana”:

Overall this is a well-written and clear report of a pediatric cohort in Ghana. Although the sample size is limited, the authors try to explore associations between clinical/demographic data and immunological and virological response to ART.

Major Compulsory Revisions

- Methods: please explain why mixed models were used for statistical analysis
- Results: the “effectiveness of first-line regimen” is reported, without prior explanation of the definition of effectiveness. Please do so in Methods.
- Results: were any participants lost to follow-up? Was this an intention-to-treat or on-treatment analysis? Please clarify.
- Results, section on HIV drug resistance: what was the median time on ART for the 15 children with virological failure?
- Discussion: Besides the 83.3% percent of children with “effective” ART (again, definition?), 71% of had VL < 400 cps/ml. Was this data given in results?
- Discussion: the rate of virological suppression < 400 cps/ml is given at 24 months, while the rate of virological failure is given at 24 weeks. Is this a typing error? If not, what explains this discrepancy?
- General: In order to interpret results it’s important to know what determined when viral load measurements were done for children on ART. Were viral load tests done on clinical indication or for study purpose only? Were they performed routinely after x months of follow-up or were they performed in targeted manner, based on clinical or immunological data?
- Discussion: the authors have tried to related clinical/demographic proxies, such as gender or caregiver, to virological outcomes. These proxies cannot replace laboratory testing, most importantly viral load testing for children on ART, underscoring the need for cheaper and simpler viral load tests which are currently being developed. The new tests are usually DBS-based which is
especially relevant in (young) children. Please also discuss how VL tests should be implemented, i.e. in routine or targeted fashion, based on your own results (see previous comment).

Minor Essential Revisions
- Abstract, results section: again, the “effectiveness of first-line regimen” is given as a percentage, without prior explanation of the definition of effectiveness.
- Abstract, results section: M84V should be M184V
- Background: resources-limited should be resource-limited
- Background: abbreviation for lamivudine is given as LMV, while 3TC is more commonly used.
- Results, table 1: perhaps divide characteristics in total-VL suppressed – VL failure.
- Discussion: “the role of gender in HIV treatment outcome needs further investigation”. How would this potentially be investigated and what is the clinical relevance?

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.