Reviewer’s report

Title: Decline in reported AIDS cases in Brazil after implementation of the Test and Treat Initiative

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Reviewer: Eline Korenromp

Reviewer's report:

GENERAL COMMENTS:
The study presents interesting new data, about AIDS diagnoses in Brazil including a marked drop in the last year of analysis, 2015. It is timely to evaluate the contribution of the expansion of antiretroviral treatment (the T&T initiative) to this recent drop - and the results of such analysis can usefully inform other countries starting or considering a similar expansion of treatment into T&T.

However, the analysis as presented is not as strong as it could be, it misses analysis of correlates that could justify the interpretation as an effect of treatment - such as, corresponding annual new HIV diagnoses, new enrolments of PLWH on ART, the average CD4 count of PLWH enrolling in ART.

Also, I question if the observed trends are at all correctly summarized as 'decline over 2007-2015 with the most marked decline over 2014-2015'. I rather interpret the trend as something like: fairly stable levels over 2007-2014 (please assess that by statistical testing), followed by a sudden drop in 2015. Which interpretation is correct here, remains to be assessed by statistical testing of the trend, and the year(s) of interruption in the ongoing longer-term trend.

INTRODUCTION:
7th line: Mortality decrease from 5.9 to 5.6: Is this statistically significant? If not, then it seems too small a difference to interpret firmly as 'decline'…

METHODS:
Study population (page 6): Did the CD4 stay at 350/mm3 throughout 2015, or … Preferably, summarize Brazil's evolving ART eligibility criteria throughout 2002-2015 either here, or in Introduction page 4 last sentence 'PLVHA being treated with ART increased from 44% in 2012…' - rather than in bits and pieces scattered across text sections.

RESULTS:
Section Changes in the AIDS detection… (page 8): 'In women, a decreasing trend was observed starting in 2011, with the largest decline between 2014 and 2015': I rather see fairly stable levels over 2008-2014, followed by an abrupt drop in 2015'. Please reconsider, and add statistical testing of the time trend (not just the overall 2007-2015, but some test of the year of curve bending, e.g. segmented
regressive model of an interrupted time series.

For theory and an example of time trend testing, see:


& Same for the corresponding sentence about the trend in males, later in the same paragraph.

Page 9, 'For heterosexuals, the proportion of reported AIDS cases was stable': For clarity, please rephrase (this sentence, and the next) as:

* The proportion of reported AIDS cases that was among heterosexuals was stable…
* &… the proportion of AIDS cases who were IDUs decreased…
* & … A decrease was observed in the proportion of reported AIDS cases reported as through other modes of transmission, who covered less than 1% in both sexes'.

Page 9-10: 'In other words… each year': Remove this sentence, it is redundant - and in fact possibly misleading, as this odds ratio reflects the contribution of the group to reported AIDS cases, not an absolute trend in the risk of getting infected within the underlying population (of heterosexuals, in this sentence).

'These odds ratios represented annual decreases by 10% and 11%': Same, please remove.

Add results table(s) and/or graph(s) of one or more of the following indicators (and perhaps others?), annually over 2007-2015, which would help support the interpretation of the time trends:

* HIV tests conducted
* new HIV diagnoses
* new enrolments of PLWH on ART, and/or PLWH alive on ART,
* the average CD4 count of PLWH enrolling in ART.

DISCUSSION

Page 12, In conclusion…: Again, please rephrase as something like 'fairly stable levels over 2007-2014, with a sudden drop in 2015' - depending on the result of statistical testing of the trend and year of 'interruption' of the curve.

Given that the drop in AIDS diagnosis is apparent for only one year so far, this observation and its interpretation remain to be confirmed and strengthened with similar analysis with additional years of data (2016 and 2017). Please state this as a logical next step for ongoing program evaluation.

Behavioural changes were observed … with increasing trends in homosexual…:

The results did not show behavioural changes. I think you meant this to refer to Figure 2c&d here? If that's the case, then please clarify and rephrase as: … 'Shifts were observed in the distribution of AIDS diagnoses by reported mode of transmission'.

TABLE 1:
Clarify title, by inserting after 'study population': of cumulative known HIV cases (alive and/or dead?)

ACKNOWLEDGEMENTS:
Did only women participate in the study? This looks odd - was this thank-you statement inherited from a different earlier study?

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

No

Are the conclusions drawn adequately supported by the data shown?
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