Reviewer's report

Title: Current tuberculin reactivity in schoolchildren in the Central African Republic

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Reviewer: Keren Middelkoop

Reviewer's report:

This paper reports on the prevalence of TB infection and the annual risk of TB infection in two health districts in the Central African Republic, including in the capital city. Since there has not been any TST data published from this country since the 1980’s, this is a timely study. However, I find the reporting of results generally confusing, and this paper requires substantial work before publication.

Major comments

Abstract:
1) Results: Authors should present the prevalence of TST positivity/TB infection for each of the cut-offs assessed.

Introduction:
1) In the first sentence the authors state that children are the source of spread of TB in a community: given the pauci-bacillary nature of childhood TB disease, this is not accurate. It is generally accepted that adults are mainly responsible for transmission; children are a vulnerable population for infection and disease, and are a good sentinel for TB transmission rates in a community.

2) 2009 DOTS coverage and new TB rates are provided. The authors should use the most up to date data available – 2013 data can be obtained from the WHO report. Unless the study was performed in 2009, in which case the authors should state this in the methods.

Methods:
1) The sample size calculation information does not say what prevalence the authors were anticipating in the calculation.

2) How was BCG vaccination status determined? History from parents/immunisation cards? This is important for understanding potential information biases in this variable.

3) Could the authors please provide the formula used for ARI in the format $ARI=\ldots$.

As it currently stands it is not intuitive for the reader to understand.

Results:
1) Paragraph 1: The numbers given for participants in Bangui (1469) and
Ombella M’Poko (1242) do not total the 2710 participants reported. This is true in both the text and Table 1.

2) Paragraph 3: I find the flow/order of the results presented confusing: the authors talk about TST positivity in children with BCG scar, then all vaccinated (I think) and then non-vaccinated. I more logical flow, eg non vaccinated, all vaccinated and then vaccinated with or without BCG scar, would be easier to read.

3) Authors should provide 95% CI around TB infection prevalence estimates.

4) Table 1: This is a very confusing table – the percentages suggest that the denominator for “not vaccinated” is the total N, but for the “vaccinated with and with BCG scar” the denominator is all those vaccinated (n). Is this correct? And if so, then across what groups was the p-value calculated? Its unclear what groups are being compared statistically.

5) Table 2: Across all 3 cut-off points, the “N” in not vaccinated, vaccinated without BCG scar and BCG scar do not sum to the total provided in the Total column. As with table 1, its not clear which groups are being compared to provide the OR for the BCG effect – this needs to be clarified.

6) Table 3: Similarly, its not clear which groups are being compared to provide the OR for the BCG effect – the legend says “No versus Yes”, but the groups are not labelled as such in the table: is this the effect of BCG scar or having received BCG?

Discussion:

1) The authors note that their reported TB infection rate is lower than that of the previous study in this country, but they have not attempted to explain why this is.
   a. What cut-off was used in the 1988 study?
   b. What is the confidence interval around this estimate and the 1988 estimate?
   c. Given the Central African Republic status as a high burdened HIV country, what do the authors estimate may be the HIV prevalence in the study sample? Given the anergy to TST noted in HIV positive patients, may this have contributed to the lower than anticipated TB prevalence rate among the study sample?
   d. Do the authors think the lower than anticipated TB infection prevalence/ARTI reflect the declining TB rates reported for the country by the WHO?

The conclusion is vague and could be strengthened.

Minor comments

Abstract:

1) Introduction (line3): insert a space between school and children

Introduction:

1) The description of countries bordering the Central African Republic is not necessary (and the information is available on Figure 1). It would be more helpful...
to have a description of the health regions in which the study was performed, in
the methods.
2) The last sentence of the first paragraph of the Data Analysis section is very
confusing (“The reaction induration size…..”) . Please could the authors re-word
this sentence.
Methods:
1) A description of the two health districts should be provided – is HR1 a rural
district, for example? What are the TB rates in these areas compared to the rest
of the country?
Results:
1) Paragraph 3: I would split the first sentence, as BCG coverage and TST
induration size are two different concepts
Discussion:
1) First sentence: the authors should state which cut-off they are using for this
final prevalence. I would also explain up front why this cut-off was used for the
final prevalence.
2) The authors do pick up on the lack of HIV testing as a limitation to this study,
but more information could be provided: what has the PMTCT coverage been like
over the birth years of this cohort in these areas; as mentioned above, some
estimate of how many of the participants are likely to be infected would be
helpful.
Conclusion:
1) Insert a space between school and children

Level of interest: An article whose findings are important to those with closely
related research interests
Quality of written English: Acceptable
Statistical review: Yes, and I have assessed the statistics in my report.
Declaration of competing interests:
I declare that I have no competing interests