Reviewer's report

Title: Evaluation of the Widal tube agglutination test for the diagnosis of typhoid fever among children admitted to a rural hospital in Tanzania

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Reviewer: Patrick Seed

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In their manuscript entitled, “Evaluation of the Widal tube agglutination test for the diagnosis of typhoid fever among children admitted to a rural hospital in Tanzania”, Ley and colleagues determine the test performance of the Widal test for the diagnosis of typhoid fever among children 2 mo to 14 yrs in Tanzania. Overall, this is a well-written, concise manuscript that, like other related studies, again emphasizes the rather poor performance of the Widal test and the likelihood that the test results overtreatment. However the following points should be considered:

Major:

1) On what basis was a titer >1:80 chosen as “optimal”? The PPV was higher when a 1:160 cutoff was applied without significantly compromising the other test performance parameters.

2) The introduction and discussion pass over a number of other studies where the performance of the Widal test has been examined in Africa and on other continents (Choo et al (1993), Parry et al (1999; only briefly cited in the discussion), Olsen et al (2004)). In Parry et al, the test sensitivity is reported as 92%. In Wilke et al in 2002 (a study from Turkey) a PPV of 76 and NPV 71 are reported. The discussion would be improved by describing differences between the studies and the authors’ comments as to why the test performance may have been different between the reported studies and their own. Many differences may arise from the choice of control group, and although the authors do a good job of showing differences in calculated test performance (PPV/NPV) depending on the choice of control group, a more explicit discussion of the control groups used in other studies should be performed.

3) Given the very low prevalence of typhoid fever in the Tanzanian population, reporting and discussion the positive and negative likelihood ratios may prove useful, especially if there are additional clinical parameters that may increase the pre-test probability of disease to which the likelihood ratios may be applied.

4) With the very broad distribution of age in the study, it would be useful to present a table that shows the ages of the children falling into Groups A-D. Can the authors apply their test parameters across this whole age range or are certain age ranges underrepresented within some of these groups?

Minor points:
1) Line 48: Are there more current epidemiological data than 2000?
2) Lines 55-57: the Widal test is based on serum-mediated agglutination
3) Lines 182-184: “increased” suggests a statistical difference. From a statistical standpoint, the numbers are the same.
4) Lines 184-186: See comment above (3).
5) Lines 83: Did all children have only a single blood culture? Were the groupings uniformly determined only on a single initial culture?
6) Figure 1: The lines in the flowchart are not properly end joined in several places.

**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.