Reviewer's report

Title: A random effect variance shift model for detecting and accommodating outliers in meta-analysis

Version: 2 Date: 17 January 2011

Reviewer: Katherine Jane Lee

Reviewer's report:

I thank the Author for responding to the comments of my review of this paper. This paper is now very readable. There are just a couple of sentences which could be revised further.

Minor Essential Revisions

1. I still don’t think the $j$ subscript is very clear in the section “Extending the random effects model to the RVSOM”. It might be clearer if this section starts “The RVSOM for the $j$th study (which allows inflated variance for the $j$th study), takes the form…” Also should the RVSOM for the $j$th observation (should this be study?) not be denoted $y_j$?

2. For the general version of this model, again should this not be $y_I$? Also it is not clear what $D$ is (presumably indicating which variables have an inflated variance).

3. The sentence “A RVSOM for observation $j$…” at the end of this section is now out of place (unless you extend this to the extended version).

4. The last sentence in the first paragraph in “Implementation of the RVSOM”, “We do however need to determine what constitutes a large $w_j^2$….” Is hard to follow and could be clarified.

5. RL need defining in equation 5.

6. The first sentence in Identifying and downweighting outliers, “Using significance level alpha…” could be re-written. Firstly I think you mean the LRT statistics for each $y_j$. Also “any set of $r$ that provide larger LRT statistics than the other studies…” is a bit vague. Do you need this? Isn’t it just RVSOM models that reach the LRT threshold?

7. I also found the first sentence in the second paragraph in this section hard to follow “If there is no apparent reason to exclude these trials.....”

8. I am still not convinced by the reference to publication bias in the results section and how this is relevant to RVSOM in the second two examples. I think it would be cleaner to remove the reference to publication bias altogether but if the author wishes to keep it I would suggest further explanation of the link between the two.
9. What do the authors mean by “Although the forest plot does suggest something may be untoward in these data” in the magnesium example?

10. Should yi in the fluoride example be yj?

11. Figure 1, 3 and 5 legends – The size of the circle is presumably inversely proportional to the total variance for that study?

12. Figure 2, 4 and 6 legends – I don’t quite follow the “jth 95th percentile…” part of the legend. Firstly this applied to (d) only and also isn’t this just the 95th percentile?

13. Tables 1 and 2 – It would be useful to include which RVSOM model is the extended RVSOM in the title (i.e. which variances have been inflated).

**Level of interest:** An article of importance in its field

**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.