Reviewer's report

Title: Designing a stepped wedge trial: three main designs, carry-over effects and randomisation approaches

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Reviewer: Mona Kanaan

Reviewer's report:

This manuscript is one of a series of articles under review looking at issues related to the stepped wedge trial (SWT) design. It identifies three main designs; however, its main focus is on closed and open cohorts designs. It also discusses potential carry-over effects and randomisation approaches. This manuscript extends the recent attempt of Hemming et al (2015) to establish a framework for SWT designs.

Major Compulsory Revisions

The paper focuses mainly on the published SWTs post the systematic review of Mdege et al (2011). However, given that the manuscript attempts to add to the general framework of reporting of SWTs, it would be of interest to include those as well in the results.

On Page 3 under Background the authors mention that most “SWT described in the literature do not follow this particular design”, this most probably depends on the time frame the authors investigate. They cite one of the other articles in this series of under review articles but it would be beneficial if further details are also given here. Also, it would be valuable to provide the distribution of the type of SWT designs of all the studies included in the previous two systematic reviews and the systematic review that is currently under review.

Figure 1 does not seem to add further value to the text and it’s also hard to follow why the different labels are where they are. For example, the duration of the step, (c), does it refer to the whole period after the introduction of the intervention? Would this notation also apply to the continuous recruitment with short exposure design? Also, it’s not clear why (a) is placed in that particular cell.

On Page 5 under “Continuous recruitment with short exposure”, the authors mention thirteen trials that use this design. It would be interesting to quantify the total number of trials that were included in the review; the review article needs to be cited here as well. As mentioned above, it would be interesting to report how many trials in total across the three systematic reviews that have used this design and how many have used the other two designs, possibly, using the typology detailed on Page 8. Also, how many SWTs will not fit the proposed typology?

Minor Revisions
The numbering of the figures does not match the results section.
Page 8, last sentence replace “measurement” with “measurements”.
Page 10, define BHOMA on first appearance.

**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