Reviewer’s report

Title: Alternation as a Form of Allocation for Quality Improvement Studies in Primary Health Care Settings: the on-off study design

Version: 2 Date: 5 March 2015

Reviewer: Andrew Vickers

Reviewer’s report:

Trials review on alternation

Major comment

There are two general problems with this paper. First, there is no reason why the proposed design needs to be seen as an alternative to randomization; it can be just a different type of randomized trial. For instance, the following sentence is misplaced: “However, random allocation is not acceptable in some cases, and alternative designs can be implemented, such as the on-off design described here”. The authors have to be much more specific about what specific aspects of typical randomized trials are problematic and how their new design addresses those specific aspects.

Second, it is not clear to me why the alternation design has to involve: a) investigator specified order rather than randomized (e.g. why do the control group first and then treatment? Why not decide at random?); b) only a single crossover (e.g. why not do first month control, second treatment, third treatment, fourth control etc. etc.)? This would be in fact a crossover cluster randomized design. Here is a recent example http://www.ncbi.nlm.nih.gov/pubmed/25602496. And here is a recent description of the methodology http://www.ncbi.nlm.nih.gov/pubmed/25278228 . The authors provide valuable data that there isn’t much evidence of bias in these sorts of designs. What is unclear to this reviewer is what advantages alternation has over crossover, cluster randomized designs?

Third, there is no reference to the uncertainty principle. Clinicians can exclude patients from studies if they are reasonably sure that the experimental intervention would benefit them.

Minor comments

1) It is generally a nonsense to do baseline testing between groups in a randomized trial, but in this particular case, it makes sense, because the authors are testing whether the lack of allocation concealment inevitable in their chosen design leads to bias. This should be much more clearly stated in the paper, i.e. that this sort of hypothesis should not normally be tested, but there is a very specific reason to do so here.

2) In table 1 and 2, please provide differences between groups with 95% C.I.
(part of the question is whether we can exclude the possibility of important bias). Also, report p values to only a single significant figure unless close to 0.05.

**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:**

none