**Reviewer’s report**

**Title:** Facilitating Implementation of Research Evidence (FIRE): an international cluster randomised controlled trial to evaluate two models of facilitation informed by the Promoting Action in Research Implementation in Health Services (PARIHS) framework.

**Version:** 0 **Date:** 15 May 2018

**Reviewer:** Noah Ivers

**Reviewer's report:**

The paper reports on a three-arm, multinational cluster trial in nursing homes of two different approaches to facilitation. This is a major major accomplishments and represents the summary of what was undoubtedly a huge amount of work. I found it interesting to read and congratulate the authors and team on their ambitious and important work.

Below I outline some concerns that, if addressed, would, in my opinion, meaningfully improve the manuscript.

The order of subtitles in the methods section is not the usual approach to reporting cluster trials, which usually follows closer to the Equator checklist (helpfully appended by the authors). The editors can decide if this matters much to them.

Intervention description could be more clear in terms of understanding specifically what the expected active ingredients / components of the interventions were and how they differed. I gather this has been reported elsewhere? Maybe a table or figure might be helpful for readers of this paper? Maybe supplementary materials? Interestingly B seems more intense in terms of both 'type' and 'dose'. if B was better, might be hard to sort this out later. but no matter, it turns out.

Most importantly: Analysis - the description of the linear regression model is not clear enough for my liking. How did it adjust for clustering? Seems there could be four levels here… is there a need to adjust for physician or just home? And what about country? Repeated measures is not usually managed this way either in a trial - or maybe it's just not clear to me what was done.

Plus, in a three-arm trial, some adjustment for multiple comparisons is usual.

I think maybe a statistician should look at this.

Given what happened with England (only one control site) it may be impossible in England to distinguish site from effects. A post-hoc sensitivity analysis dropping England might be warranted here.
Results:

Table 1 - appears to not be adjusted for clustering?

I fear that Table 2 through 7 need to be reworked. The key in a trial is to contrast intervention versus control (controlling for covariates per a priori statistical plan, usually including baseline value for outcome, stratification factors in allocation, etc). The current approach to presenting results makes it difficult to see that this is what was done? I also do not see any ICCs reported. Maybe I missed it.

Alberta context tool section - this feels like a potentially important effect modifier, but i'm not sure it is analysed as such here.

This section mixes methods and results and discussion. I'll leave it to the editors to decide how important it is to reorganize this.

Discussion

Interesting and thoughtful discussion section

PARIHS says that nature of evidence being implemented is key. Here we see that while the best practice processes had room for improvement, the secondary outcomes related to actual adverse events were low (UTIs, dermatitis). Although incontinence is no doubt important overall, maybe professionals in nursing homes who were being asked to make changes simply didn't feel the 'juice was worth the squeeze' in this area? If adverse events are so uncommon already, maybe they understood that all those extra processes would be unlikely to significantly further reduce this? This is conjecture though as I could not identify actual rates of outcomes like dermatitis or UTI (this is stated as low).

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