Author’s response to reviews

Title: Maternity service organisational interventions that aim to reduce caesarean section: A systematic review and meta-analyses

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Author’s response to reviews:

Dear Ms Coore,

Thank you for the opportunity to resubmit our revised manuscript entitled “Maternity service organisational interventions that aim to reduce caesarean section: A systematic review and meta-analyses (PRCH-D-18-00984)”.

On behalf of my fellow authors, I would like to thank Reviewer 3 for their valuable and constructive comments in relation to the statistical aspects of our manuscript. In the following table, we have provided our response to each comment and recommendation point by point. The changes are tracked in the revised manuscript. We believe the manuscript has been strengthened as a result of these revisions.

Additionally, we have noted the editorial policies and can confirm that our manuscript adheres to all requirements.

We hope that our manuscript is now acceptable for publication and we look forward to your response.

Yours sincerely,
Reviewer 3’s comments and Author's responses

Reviewer 3 - 1. Thanks for submitting this manuscript. I believe it is important to synthesize evidence regarding the Maternity service organizational interventions that aim to reduce caesarean section.

Author's response - Thank you

Reviewer 3 - 2. The review included cluster RCTs. Kindly include any methods that were pre specified for dealing with the unit of analysis issues, though none of the cluster RCTs was included in quantitative synthesis. It might be essential for further update of this review.

Authors' response - We appreciate this comment and have amended the statistical methods to include the pre-specified methods for including cluster RCTs within meta-analyses (Page 11, Paragraph 3).

“It was initially planned to combine results from cluster RCTs with individually-randomised RCTs if there was minimal clinical and methodological heterogeneity between the studies, and the interaction between the intervention effect and choice of randomisation units were deemed unlikely [18]. However, only RCTs with a parallel design were ultimately eligible for inclusion within the quantitative synthesis. Had any cluster RCTs been eligible for a least one meta-analysis, the standard error of the cluster RCT would have been adjusted using the reported intracluster correlation coefficient. Heterogeneity in the unit of randomisation would also have been acknowledged, and a sensitivity analysis to investigate the effects of the randomisation unit would have been performed.”

Reviewer 3 - 3. Please explain the pre-specified choice of random model for all comparisons. Meta-analysts understand that "random effects model assumes between-study variability and provides a more conservative estimate of effect, typically resulting in wider confidence intervals". This is a textbook definition but it does not explain why it was chosen as a default. Please remember to mention that under the random-effects model the goal is not to estimate one true effect, but to estimate the mean of a distribution of effects.

Authors' response - Thank you, we have updated the manuscript to provide a more detailed explanation for the utilisation of a random-effects model (Page 10, paragraph 2).

“Effects were pooled using a random-effects model (Mantel-Haenszel method). In contrast to a fixed-effects model that assumes all included studies share one true effect, a random-effects model assumes each study estimates a different underlying true effect, and produces a summary effect that is an estimate of the mean of a distribution of true effects [22]. After obtaining the full
set of included studies, and noting the substantial clinical and methodological heterogeneity between studies (i.e. differences in intervention regimens, country of origin), a random-effects model was selected in preference to a fixed-effects model, as it was deemed unreasonable to assume that all included studies shared a common true effect.”

Reviewer 3 - 4. It is not clear where did this statement come from "Insufficient numbers of included studies in each of the meta-analyses (< 10 studies) meant that subgroup analyses to examine potential sources of heterogeneity were not possible”. This can only be true for investigating publication bias. Further, potential sources of substantial heterogeneity could be investigated by other methods. I am not sure I have seen an effort to explain the substantial heterogeneity in the 5 studies included in the meta-analysis for labor augmentation.

Authors' response - Thank you for bringing our attention to this oversight. This section has now been edited to describe the pre-specified subgroup analyses (Page 11, Paragraph 2). Other than the planned Robson classification subgroup analyses, no additional subgroup analyses to explore potential sources of heterogeneity were specified a priori.

“Subgroup analyses to examine potential sources of heterogeneity were pre-specified that utilised the Robson classification system [25] to differentiate between interventions by type of maternal group [18]. This planned assessment was not possible however, as included studies utilised maternal participant groups that were either not described in sufficient detail or encompassed a diverse mix of maternal groups (not separated in analysis). Similarly, an assessment of publication bias/small study effects could not be performed due to the limited number of included studies (< 10 studies).”

Additionally, the limitations section of the discussion has been updated to reflect the altered text surrounding sub-group analyses (Page 26, Bottom of Paragraph 2).

“Planned subgroup analyses, using the Robson classification system, were also not possible due to the included studies being comprised of maternal participant groups that were either not described in sufficient detail, or encompassed a diverse mix of maternal groups (not separated in analysis). This prevented the determination of intervention effects for any of the ten Robson classification maternal groups.”