Author’s response to reviews

Title: Effect of enhancing audit and feedback on uptake of childhood pneumonia treatment policy in hospitals that are part of a clinical network: a cluster randomized trial

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Author’s response to reviews:

ASSOCIATE EDITOR’S COMMENTS:
As you can see, the reviewers were positive about your manuscript. However, both noted that the manuscript needs light editing throughout to address unclear terminology and confusing sentence structures. Please address all of the reviewers' comments. Also, please ensure the intervention effects reported are not overstated given the nuances embedded in Figure 2.

Response: We are happy about the positive reviews we have received for this manuscript. We have read through the manuscript and made extensive editing throughout to ensure that sentence
structures are right. We have paid keen attention to subject and verb order within sentences as suggested by reviewers. All authors including those who speak English as a first language have reviewed the sentence structures and feel that the grammar used in the paper is satisfactory. We have also removed all instances in which we used the term rate which was identified by the reviewers as an inappropriate term for the metric which we reported.

We have reviewed the manuscript carefully to ensure that we have not overstated the intervention effect. Specifically, we have made the following changes to ensure that we do not overstate the effects.

In the abstract we have explicitly stated that the significant interaction we have reported was part of an exploratory analysis. This details now appear in the abstract as follows:

“However, in exploratory analyses there was evidence of an interaction between type of feedback and duration (in months) since commencement of intervention, suggesting a difference in adoption of pneumonia policy over time in the enhanced compared to standard feedback arm (OR = 1.25, 95% CI 1.14 to 1.36, p < 0.001).”

We have also stated in the discussion that the intervention had a modest effect on policy adoption as highlighted in this text from the discussion:

“The trial, conducted in a resource constrained healthcare setting, showed that the overall adoption of the new policy after initial training, guideline dissemination and in the context of the network activities and feedback approaches we have described was moderate at approximately 40 %. Failure to use recorded signs to direct treatment (misclassification) rather than inappropriate treatment once correctly classified accounted for most cases of incorrect performance. Initial training and dissemination of guidelines appeared to result in modest (and variable) adoption of the new policy.”

REVIEWER REPORTS:

Reviewer #1: Abstract

1. The term "rate" is used frequently to describe associations that do not appear to be in fact rates.

Response: We agree with the reviewer that the term rate has a clear epidemiologic definition. We had previously used the term rate to refer to fast breathing which we previously referred to as raised respiratory rate. We also used the term treatment failure rate to mean occurrence of treatment failure. Finally, for our secondary outcome we referred to the change from oral to injectable antibiotic over the nine-month intervention period as rate of change from oral to injectable antibiotic. We have now replaced all these instances of use of the term rate with more appropriate terms throughout the manuscript.
Introduction

1. The introduction could use 1-2 sentences explaining what audit and feedback is, and what evidence already surrounds audit and feedback as an implementation strategy, beyond mention of the systematic review calling for more research in this area.

As noted by the reviewer we provided limited information around audit and feedback in our introduction and instead confined audit and feedback information to the section describing the intervention. We have now provided some background of audit and feedback as an implementation strategy in the introduction. The text included in response to this comment reads:

“Audit of hospital care is widely used as a strategy for improving quality of care. Clinical audit involves measuring health worker or clinical team performance in providing care. The effect of audit is enhanced when it is coupled with feedback where agents (e.g. peers or supervisors) provide information regarding individual health worker or clinical teams’ performance. The mechanism through which audit and feedback improves performance in hospitals is by identifying and reducing the discrepancy between current and desired performance. Apart from its routine use in improving hospital care designing complex interventions around audit and feedback provides an opportunity for promoting desired clinical performance following changes in health policies.”

2. Might do with some light editing throughout for clarity. For example, "The WHO responding to this new evidence made the first major revisions to the childhood pneumonia guidelines for many years in 2013." Should likely be "The WHO responded to this new evidence in 2013 by making the first major revisions to childhood pneumonia guidelines in many years."

Response: We note and agree with the reviewer that restating this sentence as suggested will improve its clarity. We have made this suggested change in paragraph 2 of the introduction. We have also edited the introduction extensively to improve its clarity.

Methods

1. Line 56: it would be helpful to clarify what you mean by "had a diagnosis of pneumonia" given your thorough overview of different pneumonia definitions in the introduction (i.e. provider clinical diagnosis, irregardless of signs/symptoms).

Response: The reviewer had correctly identified the criteria for inclusion in the study which was a provider clinical diagnosis of pneumonia regardless of the signs or symptoms documented in patient case record. We have reviewed our statement of the inclusion criteria considering this comment and it now reads as follows: “Individual case records were identified for post-discharge medical record review in each participating hospital if the admissions were aged between 2 and 59 months and had a provider clinical diagnosis of pneumonia regardless of signs or symptoms.”
2. You might consider adding the “specific pneumonia feedback sheet” and the “comprehensive performance report” templates into the Appendix, so readers can understand what the mechanisms of action for the enhanced intervention might be. Or, at least provide an example of that the “action plans” provided might have entailed.

In response to this comment we have now included in the appendix a sample of the pneumonia specific feedback sheet showing the performance two target indicators in one of the intervention hospitals against the target performance contained in the action plan for pneumonia.

3. Page 11, line 9: Should briefly mention what new guidelines say in terms of when it is appropriate to switch to IV antibiotics for children admitted with non-severe pneumonia

We have highlighted the three recommendations for switching to IV antibiotics contained in the new guidelines. In brief guidelines recommend a switch to IV treatment at any time when a child progresses from pneumonia to severe pneumonia during the course of treatment; at 48 hours in cases where pneumonia does show improvement in at least one sign (respiratory rate, severity of indrawing, fever or ability to drink) or severe pneumonia gets worse; and at day 5 if at least three of the following criteria are present: fever; respiratory rate above 60 per minute; cyanosis; persistent chest indrawing or worsening chest x-ray.

4. Data analysis: Why not conduct analyses separately for correct classification and correct treatment? This seems important for understanding how the intervention influences these very different clinical behaviors.

Response: We appreciate the reviewer’s suggestion on conducting separate analysis for correct classification and correct treatment. We however feel that unlike correct classification, an analysis of correct treatment cannot stand alone. We define correct treatment as oral amoxicillin, which only applies to children with a correct pneumonia classification. It is possible to report the proportion of children who were correctly classified. This needs to be done without introducing any ambiguity as to what the primary outcome is (i.e. correct treatment following correct classification). We have done the analysis of the proportion correctly classified as suggested by the reviewer and revised figure 2 to show percentages correctly classified and percentages correctly treated.

Results

1. Page 15, line 21: It would be helpful to explain what you mean when you talk about the proportion of children that were referrals, or presented with wheeze. These might seem arbitrary to people without clinical knowledge of pneumonia.

Response: We welcome the reviewer’s suggestion on how to enhance the readability of this sentence by a nonclinical audience. We have now explicitly stated that “14.9% of children were referred from other health facilities to the admitting hospital”. We have separated the issue of
referral from that of wheezing by rewriting the statement on wheezing as a standalone sentence. We now provide details on why wheezing is relevant at the point of admission with pneumonia.

2. Primary outcome: There are several denominators used (1087, 1212, 1030, 1068). Please explain why different denominators are used for assessing % of correct cases classified and % of cases correctly classified and treated, or specify it is of complete cases.

The reason why the denominators for proportions correctly classified and treated were lower than % correctly classified is because 57 children in intervention arm and 144 in control arms did not have records of the prescribed treatment. Consequently, we could not determine whether they were correctly treated. We have rearranged the information in this section to show the stage at which the denominator changes and why it changes.

3. Primary outcome: Although the reader could back calculate from the numbers you provide, please include the % of correctly classified cases that are thereafter correctly treated (i.e. denominators of 615 and 742).

We have provided the percentages that have been suggested in this comment.

4. Page 16, line 19: Looking at overall trends, performance primarily declined in the standard feedback arm during the last 3 months of the study. I would not imply that performance "steadily declined" in the standard feedback arm throughout the paper, because Figure 2 indicates that there might have been something else going on during month 7 in the control group. Was the dramatic decrease observed at this time attributable to certain facilities specifically? If so, you could consider a line chart by facility (with color coding by arm) to make this point.

We have removed the term “steady decline” throughout the paper. We have also included the suggested line graph as a figure in the appendix (Supplementary Figure S1).

5. Secondary outcome, Line 59: In the methods section, it is implied that this variable (switching from oral to injectable abx) might be a proxy for provider confidence in the new guidelines, while in the discussion it states that this variable is proxy for treatment failure/outcomes.

We have removed the text in the method section that implied that switching treatments might be a proxy for provider confidence in the new guidelines. Instead in this section we now include the guidelines recommendation for treatment switch as recommended by the reviewer in comment no.3 in the methods section.

Discussion
1. Line 55: This is a great explanation for why the trends in control arms might have been observed. Do you know if either of the two staff rotations occurred during month 7? If so, did they occur across both intervention and control arms? This might be worth mentioning.

The rotations did occur in hospitals across both trial arms during month 7. We have now mentioned this.

2. Page 19, line 41-47: You discuss differences in trends between classification and treatment as distinct outcome variables (not a combined variable), which was not presented in the results.

We acknowledge that previously we did not present percentages of children correctly treated yet we discussed the same. The results in Figure 2 now contain both percentages as suggested by the reviewer.

3. What are the overall implications of your study: would you suggest that enhanced audit and feedback be implemented in conjunction with the roll out of new guidelines? In your final sentence you say you recommend "evidence based strategies", does this now include enhanced audit and feedback, in your opinion?

The implication of this study is that audit and enhanced feedback offers a possibility of improving guideline adoption, and although this study does not provide conclusive evidence there is need to continue evaluation the intervention components to see which elements produce optimal effects. The suggestion in the paper that policy makers utilise evidence based strategies includes enhanced audit and feedback. We have now explicitly stated the same in this section of the manuscript.

Table 2

1. It is unclear what "Paediatric admission record used during admission" means. Can you clarify what this variable is or rephrase?

We have rephrased this and indicated that structured records were introduced in hospitals for use during admission to record features of illness, investigations and management.

Table 3

1. Combined outcome of correct classification and treatment. Do you have the ORs for each outcome separately? This would likely be interesting to see if the intervention has an effect on one component of the outcome (diagnosis vs. treatment vs. both), as compared to the other. This may be important for teasing apart the effectiveness of the intervention, as stated above.

We have responded to this comment this comment above.
1. Same as above, it could be impactful to include percent of patients correctly classified and treated separately, perhaps within a stacked column bar chart. We have included a stacked column bar chart as suggested.

Reviewer #2: Thank you for the opportunity to review the manuscript titled 'Effect of enhancing audit and feedback on uptake of childhood pneumonia treatment policy in Kenyan hospitals that are part of a clinical network: a cluster randomized trial'. This article reports the results of a cluster randomized trial of an enhanced audit and feedback intervention on the implementation of childhood pneumonia diagnosis and treatment in referral hospitals in Kenya. The design compared standard A&F with an enhanced strategy that increased the frequency of feedback, included a more robust and focused set of monitoring indicators, included graphical feedback, included action planning, and also had more frequent contact with pediatric supervisors in the intervention facilities). The trial was well designed and executed, and addresses the need to evaluate alternative approaches to deliver A&F strategies (rather than generating evidence on A&F strategies on their own). Though the study did not find improvements in correct classification and treatment of pediatric pneumonia symptoms in intervention vs. control facilities, there was a significant trend towards improvement, and the article is novel in that it is one of the few reports of A&F strategies from low and middle-income countries. The findings of this research will be of interest to researchers and implementers focused on A&F strategies generally, and practitioners working to improve pediatric clinical care.

The study as described is well conducted, and the article is well conceived, comprehensive and well written. I have a very small number of minor comments on the article, detailed below.

Minor revisions:

1. Introduction:

-Beyond emphasizing pneumonia diagnosis and treatment protocols, the introduction would be strengthened with further information on the A&F literature.

We are grateful for the reviewer’s suggestion on how to strengthen the introduction section. We have now added the following paragraph in the introduction in response to this comment.

“Audit of hospital care is widely used as a strategy for improving quality of care. Clinical audit involves measuring health worker or clinical team performance in providing care. The effect of audit is enhanced when it is coupled with feedback where agents (e.g. peers or supervisors) provide information regarding individual health worker or clinical teams’ performance. The mechanism through which audit and feedback improves performance in hospitals is by identifying and reducing the discrepancy between current and desired performance. Apart from its routine use in improving hospital care designing complex interventions around audit and
feedback provides an opportunity for promoting desired clinical performance following changes in health policies.”

2. Methods:

-The article would be strengthened with a more robust description of the A&F strategy evaluated in the study. Consider the checklist published by Colquhoun and colleagues (https://qualitysafety-bmj-com.offcampus.lib.washington.edu/content/qhc/26/1/54.full.pdf).

We would like to thank the reviewer for bringing this insightful paper by Colquhoun et al to our attention. We have now read this article on modifiable audit and feedback design elements suggested by the reviewer. We feel that we have included these main elements in the description of our intervention. We will highlight each of the checklist element in response to the comment.

   a) Who – Feedback was given to clinical care teams and this comprised the person in whom the practice change of classifying and treating pneumonia admissions was desired.

   b) What – our feedback was about processes of case namely classifying and treating pneumonia. The standard feedback also included patient outcomes. The feedback was about group as opposed to individual performance and provided information on aggregate patient cases. The feedback identified classification and treatment of pneumonia as behaviours for change. Graphical elements were included in the feedback.

   c) When- Feedback was provided on a monthly basis in enhanced feedback group and every two months in the standard feedback group.

   d) Why – the use of audit and feedback to promote guideline uptake was informed by theory including feedback intervention theory developed by Hysong et al.

   e) How – We administered feedback using face-to-face sessions, email, telephone, and dispatch of printed material

   f) How much – We delivered nine rounds of feedback in enhanced feedback group and four rounds in the standard feedback group

3. Overall:

-The manuscript has a number of minor grammatical errors, and a thorough editing is needed.

We have edited the manuscript extensively especially in the introduction which was identified as lacking clarity by reviewer 1. We have read through the entire manuscript and corrected grammatical errors as far as we could.