Author’s response to reviews

Title: Vaccination in England: a review of why business as usual is not enough to maintain coverage.

Authors:

Tim Crocker-Buque (drtimcb@fastmail.com)

Sandra Mounier-Jack (Sandra.Mounier-Jack@lshtm.ac.uk)

Version: 1 Date: 20 Sep 2018

Reviewer’s response to reviews:

Reviewer reports:

Charles Shey Wiysonge (Reviewer 1): I read the manuscript by Tim Crocker-Buque and Sandra Mounier-Jack with great interest, and applaud the authors for this work. The development of the logic model is particularly praiseworthy.

The authors set out to: (1) develop and describe a logic model for the implementation of the vaccination programme in England; (2) undertake a systematic review of interventions designed to increase vaccination coverage; and (3) evaluate how the available evidence base relates to critical components of the logic model.

General comment:

For a review of why business as usual is not enough to maintain (or increase) vaccination coverage in England, objective 2, I would have expected the authors to conduct a systematic review of the effects of interventions tested in any setting (or at a minimum, any high-income country) similar to England and discussed the applicability of the findings to England;

and/or mapped out the interventions currently implemented in GP practices in England to improve vaccination coverage (based on their logic model) and assessed the quality of the evidence supporting the use of such interventions.

There could be interventions that have been tested in randomised trials outside the UK, which are currently implemented in the vaccination programme in England with the aim of improving coverage. Why do the authors think that an intervention should be tested in a randomised or quasi-randomised trial in the UK before it can be implemented in England?

Thanks for this helpful comment – it has clarified what we are hoping to achieve with this paper.
We felt that the evidence form HICs in a general sense is already well defined in several large-scale systematic reviews (summarised now in the introduction, rather than simply integrated into the discussion), focusing both on population groups and interventions, and to repeat this again here would be duplicative. Our expectation was not that an intervention should be tested in a trial in the UK before being implemented in England, but instead, that what has already been attempted in England should be known.

What is obvious to us from within the England system, but may not be from an outside perspective, is that we do not know i) how GP practices organise implementing the programme, and so are trying to identify some of this through the published literature; and ii) what has been attempted and evaluated in the England context, as we don’t know what research in this field has already been conducted, whether it worked, and if there are lessons we could learn.

“There could be interventions that have been tested in randomised trials outside the UK, which are currently implemented in the vaccination programme in England with the aim of improving coverage” - this is exactly true, but there is no mechanism to identify these interventions aside from reviewing the published literature, which is what we have sought to do here.

In England there is an idiosyncratic system of independent contracted primary care organisations with large leeway to design and deliver their own vaccination services a single funder, however, subject to a single state funder within a very rigid national system of commissioning and policy formation. This does not easily match the situation in other countries, so, from our perspective, it is reasonable to consider whether the broad international evidence is applicable to the England context. For example, the lessons from QOF implementation are very England specific.

We have modified the introduction and aims to make this clearer, as well as added some more specificity in the Discussion.

In addition, the GRADE approach is now widely considered as a gold standard for assessing the quality (or certainty) of evidence on effects of interventions. Without the use of a systematic approach such as GRADE (or a similar method), claims of "good quality evidence" of effects (e.g. page 2, line 25) seem unfounded.

Agreed.

For the RCTs the Cochrane Handbook guidance uses the same format and process for identifying and describing bias in studies as is used for Grade evaluations. We do not seek to undertake a
meta-analysis and thus have no need to weight studies on evidence quality. It is beyond the scope of this study to use the evidence to make evidence quality weighted recommendations, particularly as we are not seeking to develop evidence-based guidelines. For example, evaluating consistency of effect and publication bias are beyond the scope of this study. The purpose of evaluating risk of bias is to caveat the results presented in terms of the study limitations and we feel the descriptors from the Cochrane Handbook for assessment of bias are adequate in this context.

For the quasi-experimental studies, both the Cochrane Handbook and Grade methods universally classify non-RCT evidence as being of low quality and do not take into account study design in a situation where it is not possible to randomise or blind participants. This is particularly important in vaccination programmes, as often studies are implemented within complex existing systems, where blinding and randomisation are not possible (or, in some cases, not ethical).

We have previously found the Study Quality Assessment Tools, which provide specific checklists for non-randomized study designs, to provide a more detailed and fairer evaluation of study design and reporting for non-RCT studies. This is of course within the limitations of these studies being non-RCTs in the first place.

All references to study ‘quality’ have been removed, and instead these have been rephrased to refer to the risk of bias we have evaluated within each study using the relevant study-design specific tools.

Specific comments:

1. The manuscript needs some language editing e.g. page 4 line 27 (different NOT difference), page 4 line 32 (thus NOT this), page 8 line 29 (for NOT or), page 11 line 3 ("is to" is used two times), etc.

   These have been amended.

2. In some places the authors indicate the setting for eligible studies for the systematic review as UK (e.g. page 2 line 16, page 6 line 3) and in others as England (e.g. page 5 line 39).

   These have been amended.
3. Page 5 line 48. Note that "Cochrane Database of Systematic Reviews" contains systematic reviews NOT trials.

Yes – we searched the Cochrane Database to identify other SRs on a similar topic, in order to “review… the references for other systematic reviews on similar topics that could have contained studies that fitted our inclusion criteria.” (page 6, lines 20-25). We have found this method to increase the thoroughness of the included studies.

4. To develop the logic model, the authors report searching websites of UK Department of Health, Public Health England, NHS England, NHS Digital, British Medical Association, Royal College of Nursing, and Google; using the search terms "vaccination" and "immunisation" and spelling variants (see page 5, lines 14). On page 7, line 11, the authors report that this search yielded ONLY 83 documents. That is not possible. Such an extensive website search (including Google), using "vaccination" and "immunisation" and spelling variants would yield more records than 83. The authors should indicate how many records they got before screening down to 83 documents.

This detail has been added on page 7 and the search results have been added as a supplementary file.

5. Page 11 line 47, and elsewhere in the manuscript. PCV is not an appropriate abbreviation for pneumococcal vaccines; since the latter includes both pneumococcal conjugate vaccines (PCV) and the pneumococcal polysaccharide vaccine.

This has been amended throughout.

6. Was the systematic review referred to on page 11 line 59 and page 14 lines 10-17 limited to studies conducted in England? What interventions did the 710 participants (page 14 line 15) receive?

This Cochrane Review included studies from all geographies. The two studies whose results were combined were both conducted in England. Clarification has been added in this paragraph.

7. Pages 12-13 (Table 1), for "effect measures", the authors should consistently report the odd ratio with its 95% confidence interval for each study. For studies with more than two arms, they should report the odd ratio with its 95% confidence interval for each intervention-
control pair. This should also be applicable to the quasi-experimental studies (Table 2, pages 16-18).

Odds ratios have been added for all the RCTs. It is not possible to calculate ORs for the quasi-experimental studies due to the study designs and the nature of the statistics reported in the papers (most do not have 2 arms).

8. Page 25, line 25. HPV usually refers to "human papillomavirus" NOT "human papillomavirus vaccine".

This has been amended throughout.

9. Figure 1 (Logic Model).

a. Why is "vaccinations" put under "inputs"? Did the authors intend to write "vaccines (pharma industry)"?

This has been amended.

b. The statement "expertise exists to accurately analyse the data" seems appropriately placed under processes/outputs, but I doubt whether the statement "Data collection systems are available and accurate" is appropriately put under outcomes/impacts. Is there a difference in the message conveyed by the two statements?

This outcome to impact assumption statement has been removed.

c. Does reduction in incidence not lead to a reduction in morbidity? If yes, why are these concepts contained in two different "indicators" under impact?

Incidence and morbidity are related, but are measured in different ways and through different systems. Disease incidence is measured in number of lab-confirmed cases (via PHE), whereas for each case there is a variety of potential morbidity impacts: i) measles case with mild illness, managed at home; ii) measles case with severe illness, managed in secondary care; iii) measles case, resulting in hearing loss; iv) measles case resulting in pneumonia; v) measles case resulting in encephalitis. So, the impact of reducing circulating measles can be measured using different indicators for both incidence and morbidity.
Reviewer 2 (Reviewer 2): PEER REVIEWER COMMENTS: To view the full report from the academic peer reviewer, please see the attached file.

REVIEWER COMMENTS FROM REPORT: The authors have completed a thorough review of the studies on this topic.

REQUESTED REVISIONS:

I found the paper too long. Perhaps it can be split into 2. One about the logic model and one about research studies on the subject.

We feel that the innovation in this paper is the combination of the logic model with a literature review to better identify and understand the evidence base relating to a complex public health intervention in a specific geography.

I couldn't see how the logic model creation aided in interpreting the intervention studies in a way that they wouldn't have been otherwise.

The novelty in this study is that the system implemented in England post the Health and Social Care act is complex, fragmented and not well described. The logic model clarifies this for the first time and will enable researchers, policy makers and service delivery organisations to better identify targets to improve coverage. The associated systematic review shows what has been implemented at primary care level in England and this is mapped to the logic model in the discussion to show what aspects of the system have previously been modified, and where there are potentially modifiable targets, which have not previously been accessed. To our knowledge, there has not been a systematic consideration of the implementation of the vaccination programme in England, nor the specific evidence base to improve coverage in this way before.

The provision of the logic model and identification of what interventions have been evaluated in England has enabled us to show where the gaps in both the evidence and also what has been attempted.

ADDITIONAL REQUESTS/SUGGESTIONS:

The writing could be improved

We have undertaken a further proofing edit.