Reviewer's report

Title: Using logic model methods in systematic review synthesis: describing complex pathways in referral management interventions.

Version: 2
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Reviewer: Ellen Schultz

Reviewer's report:

General comments:
This paper lays out a compelling argument for using logic models to synthesize interventions literature, demonstrating such an approach in a review of interventions related to specialist referrals. The method is well-presented and illustrates value in articulating how interventions are expected to achieve their impacts. The method of building a logic model from the evidence itself, rather than a priori from stakeholder input, is fairly novel in health services research. The inclusion of a wide range of evidence, including qualitative studies, is also important, as the predominance of the RCT as the gold standard in medical evidence is often not well-suited to the complex, context-dependent interventions typical of health services research. This paper makes an important contribution in demonstrating methods to strengthen evidence reviews through use of empirically-based logic models and to make use of a wide range of evidence types, all through a structured, rigorous process.

Major compulsory revisions:

1. Please briefly describe who was involved in the “final feedback phase” of the review. Specify in methods who provided feedback, at what stage in the review, and through what means (e.g., interviews, questionnaire). Some of these details can be gleaned from later text, but should be clearly stated in the methods. Some of this is currently reported in the results section (pg 12), but would be better moved to methods.

2. Pg. 9, second paragraph states “In addition to listing the interventions and identifying the evidence underpinning each one, the model provides an indication of where the evidence is stronger or weaker.” I see the indication of strength of evidence in Figure 2, but I fail to see how the figure presents evidence underlying each intervention. How is this evidence identified within the figure? Either modify the figure to make it more readily apparent (which could include adding a more descriptive figure legend to guide readers through the figure), or modify how figure is described in the text.

3. On a related note: Figure 2 uses an asterisk (*) to denote when no positive impacts were observed, but further explanation in a figure legend is needed. Presumably this is what was meant by the logic model showing evidence? However, readers should not have to assume. Further clarification of evidence is needed. For example, can readers assume that every piece of evidence that
does not have an asterisk showed a positive effect? Also, lack of positive effect is not the same as showing a negative effect. It may well be that no negative effects were reported, but if so, this should be noted, so that the meaning of the asterisk is clear. Also, please clarify in figure legend or in text whether the figure lists all outcomes (short-term, long-term or impacts) examined, or only those that showed some relationship (whether positive or negative). Knowing that no relationship was found between an intervention and a key outcome is just as important a piece of evidence as knowing that a positive association was found, or a negative one.

4. On a related note, I disagree with the following statement from pg. 10: “As can be seen from the strength of evidence indicators in the model, the stronger evidence chiefly related to the outcomes rather than the impacts, with positive effects reported for elements such as satisfaction and content of referral, rather than referral rate or appropriateness of referral.” What I see from Figure 2 is that the strength of evidence about the relationship between interventions and outcomes was greater than the strength of evidence about relationships between interventions and impacts. However, the direction of the effect, and indeed whether one was demonstrated, is not clear from the figure. I would suggest separating these two factors (strength of evidence and presence and direction of relationships) within the figure. For example, you could use one symbol for a positive relationship, one for no relationship, and one for a negative relationship. If this is not possible within one parsimonious figure, then you must at least make very clear within text and a figure legend that all evidence shown is a positive relationship unless otherwise noted. Do not combine negative evidence (ie, evidence of a negative relationship) with evidence of no relationship.

5. In the discussion section, can you put your method of rating strength of evidence into context with other widely used systems, such as that used by Cochrane or GRADE? Full review of other methods is not necessary, but it would be nice to know what elements of your method were unique or adapted, especially in ways that you believe improved on the value for this application, or improved feasibility, for example, making use of a wider range of study designs, of qualitative evidence, etc.

Minor Essential Revisions:

6. p. 3, 1st paragraph of background section: text refers to evaluation of “these interventions” before actually mentioning any interventions. Presumably the authors mean referral management interventions. Furthermore, no definition is offered about what the authors mean by “referral management” or “referral management interventions.” Please provide some description of what is meant by this term early in the manuscript, keeping in mind that different terms might be used in different health care systems. A key question in my mind as I read through this section: who does referral management – systems administrators? Clinicians (GP/PCP only, or both GP and specialist)? Policymakers? While some further explanation is found later in the paper, I felt a very brief description was needed in the introduction. On a related note, pg. 8 first line mentions interventions that aim to impact on “referral demand” but again, no explanation is offered. By this do you mean the GP’s decision of whether or not to refer a
patient to a specialist? Or are you instead interested in coordination, communication or other processes that take place during the referral pathway? Please clarify as this term is not necessarily widely used in other health systems.

7. Please either list the PROSPERO registration number in the text on pg 5 within methods, as was done in the abstract, or include a direct link to the review within PROSPERO.

8. Table 1 is referenced in first paragraph of the results (pg. 8), but I don’t see any Table 1 in the manuscript file. It’s not clear whether this is intended to be the same as the table of included studies from the supplemental material.

9. Figure 1 appears to omit a box on the left-hand side. An arrow points down to a box labeled “included articles n=12), but nothing appears above the arrow. Where did these 12 articles come from?

10. Figure 2: it was nearly impossible to distinguish the typeface used to indicate conflicting evidence from that used to distinguish no evidence. Please work with the journal editorial staff to find font formats that will be easily distinguishable in the final version of the figure. For example, you might consider using italics or SMALL CAPS fonts instead of shades of grey.

6. Pg. 10, top paragraph has two typos. “…a theory a change” and “begin to unpick these outcomes.” I think you mean unpack outcomes?

7. p. 13, first paragraph: it may not be clear to readers outside the UK (or perhaps within it) what is meant by “commissioning.” Also, in paragraph 2 of this page, its not clear to outside readers what a “locum” GP is.

Discretionary Revisions:

11. In supporting your argument about the utility of logic models for guiding systematic reviews, you might be interested to review a recent publication: The Permanente Journal 2013; 17(4) 52-61. The discussion of this article argues for extending the PICOTS framework for scoping systematic reviews to PLICCOTS – adding consideration of logic models and context as important in structuring and guiding reviews of evidence.

12. Pg. 13. It would be nice to add an example or two of how you feel the logic model makes clear assumptions underlying how interventions are expected to lead to impacts.

13. It would be nice if the final version of this could provide an citation, even if in-press (e.g, only journal name and authors) for the accompanying article that presents the results of the systematic review. Many readers may be interested in that content as well as the methods presented in this manuscript (myself among them).

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:

I declare that I have no competing interests.