Author's response to reviews

Title: Is the level of primary health care resourcing associated with diabetes-related ambulatory care sensitive hospitalisations? A review of the literature.

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Author's response to reviews: see over
Dear Ms Calumpita

Thank you for sending our manuscript to review. We are delighted that the Reviewers were impressed and interested in the systematic literature review.

We thank the Reviewers for their time and valuable comments. All of their comments have been addressed and highlighted in yellow in the revised manuscript. With regards to your two main considerations, 1) the title accurately reflecting the article content and 2) potential for bias in study results that do not control for health status, we have done the following:

*Title*: Type 2 diabetes-related ACSC have been replaced with chronic disease related ACSCs

*Bias due to not controlling for health status*: This was an excellent point. We have now also looked at the relationship between PHC resourcing and ACSC hospitalisation using only the results of studies that control for health status. This has added another level of clarity to interpreting the results collectively and adds further support for the original conclusions.

Each Reviewer’s comments are addressed in Attachment 1 and article formatting changes are outlined in Attachment 2. We hope that the changes adequately address the Reviewers comments and are to the standard of the Journal. Please do not hesitate to contact me if...
there are any concerns. We look forward to the article being published in BMC Health Service Research Journal.

Kind regards

Odette Gibson
RESPONSE TO REVIEWERS COMMENTS

Reviewer 1:
Thank you for the suggestion to change the title to better reflect the contents of the article. The title now meets the requirements of Reviewer 1 and 2. This has also been changed in the abstract. The title also includes systematic review to meet the journal requirements. The new title is:

A systematic review of evidence on the association between hospitalisation for chronic disease related ambulatory care sensitive conditions and primary health care resourcing.

Reviewer 2
Comment 1: Thank you for highlighting this point. The title has been changed to include chronic disease ambulatory care sensitive conditions rather than just diabetes-related hospitalisations. The new title better reflects the content of the article and meets the suggestions of both reviewers. The new proposed title is:

A systematic review of evidence on the association between hospitalisation for chronic disease related ambulatory care sensitive conditions and primary health care resourcing.

Comment 2: We agree with the need to acknowledge direct non-financial barriers to accessing health care. The following sentences have been included and referenced accordingly on page 5 paragraph 1:

It is recognised that even by removing the direct financial cost of care other barriers to accessing care may exist. Other barriers to accessing chronic disease management include lack of time to return to appointments, lack of health education and unavailable suitable transport.\[11\]
Comment 3: We thank Reviewer 2 for enquiring about the quality of the analysis in each study. With regards to study quality we chose to focus on adjustment for confounding and to only include peer-reviewed articles in our search criteria.

Comment 4: Thank you for suggesting that we report results of those studies that only control for health status. Doing this has strengthened our interpretation of the collective results of the studies. The following sentences have been added to the discussion on page 16 paragraph 3 and page 17 paragraph 1 respectively:

Study findings were mixed. Seven of the twelve PHC resource variables that had a statistically significant association with ambulatory care sensitive hospitalisations supported the hypothesis that more PHC resources are associated with less hospitalisation for ACSC. However, three of these studies did not adjust for health status.[19,27,28] Excluding the results of studies that did not adjust for health status,[19,27,28] six PHC resource variables remained and of these three supported the hypothesis that more PHC resources are associated with less hospitalisation for ACSC.

By applying the same categorisation (PHC use or access) to the six studies that adjust for health status, the conclusion remains that better access to primary health care resulted in fewer ACSC hospitalisations.

Comment 5: Thank you for inviting us to discuss recommendations on the future conduct of studies in this area. To inform these recommendations, some of the complexities and limitations of using ACS hospitalisations to measure the performance of PHC have been
included in the discussion (as shown below). Our recommendations are now as follows (page 17 last paragraph last sentence):

Thus additional studies are needed that adjust for a wide range of potential confounders and consider more carefully how best to adjust for disease severity.

Added discussion on complexities and limitations of using ACS hospitalisations to measure the performance of PHC (page 14 last paragraph to page 16 second last paragraph):

It is important to consider the complexities and limitations of using ACSC hospitalisations to measure the performance of PHC. By definition, primary health care is the first point of care that is continuous, coordinated and comprehensive whilst being accessible, acceptable and affordable to the population it serves.11 The role of PHC is diverse and not simply about keeping people out of hospital. Therefore hospitalisation for ACSC can only ever be an incomplete and sometimes poor measure of the performance of PHC. The effect of PHC on ACSC was however the focus of this review, as an interesting policy question.

Much work has been done on rigorous selection of hospitalisations that would most likely be prevented with good ambulatory care.29-32 Even so, the extent to which PHC can prevent or intervene in disease progression that may result in no or less hospitalisation (e.g. represented by decreased length of stay or a less severe reason for admission) will likely vary across conditions. The implication of this is that the impact of PHC on one ACSC hospitalisation is not uniform for each or across all ACSC hospitalisations. For example, a diagnosis of type 2 diabetes that occurs prior to related impaired kidney function (macroalbuminuria) will provide an opportunity for a comprehensive PHC service to prevent or slow progression to
kidney disease. Whereas the same opportunity for PHC to intervene is lost if a diagnosis of diabetes is made, with already established renal impairment. This also highlights the importance of adjusting for individual disease stage\textsuperscript{[33]} in statistical models.

Limitations of using ACSC hospitalisations to measure the performance of PHC also include those related to the measure of hospitalisation. Variation in hospital admission policies within and between hospitals and decisions made by hospital staff on the need to admit patients are likely to affect rates of hospitalisation for ACSCs\textsuperscript{[29]}. It should also be noted that the quality and access to PHC may influence some hospital admission policies and staff decisions on patient admission.

In addition, not all possible determinants of hospitalisation for chronic disease related ACSC, some of which were highlighted in the introduction, are accounted for in statistical models. This can distort the estimated impact of PHC on hospitalisation.

With due consideration of these complexities and limitations, ambulatory care sensitive hospitalisations are a useful measure of the performance of PHC at a population level, and of clear interest to policy makers. Hospital administrative data is objective, available and relatively inexpensive to gather. Gradual improvements in the scope and rigour of PHC data collection, that allows for more variables to be included in the models, should improve the accuracy and interpretability of the results of such studies.
JOURNAL Formatting REQUIREMENTS

The following formatting requirements have been met:

- ‘Systematic review’ is included in the article title,
- The process and reporting of the review does conform to PRISMA guidelines,
- The title page at the front of the manuscript file includes authors names, institutions, countries, email addresses of all authors and the full postal address of the submitting author,
- Figures are uploaded separately and not included in the manuscript file. The figure title and number are not included with the figure. The figure legend and title are part of the manuscript file and given after the reference list,
- Tables are included in the manuscript file in a table section following the references.