Author's response to reviews

Title: Event based record linkage in health and aged care services data: a methodological innovation

Authors:

Rosemary Karmel (rosemary.karmel@aihw.gov.au)
Diane Gibson (diane.gibson@aihw.gov.au)

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

Thank you for the comments on our article. As the referee LG recommended acceptance without revision, the following points refer only to comments made by referee TC.

**TC paragraph 1: anonymous record linkage.**

The authors thank the referee TC for drawing their attention to other relevant literature. In response, we have included the term ‘anonymous’ in the abstract to provide a more discernible connection to that literature, and included a brief discussion of three such anonymous record linkage articles (as opposed to anonymised linkage) at the end of paragraph 5 in the Background section, as requested. We have not systematically included the term ‘anonymous’ to refer to our approach as ‘anonymous’ linkage is also used to refer to linkage using anonymised identifiers, which is not the strategy outlined in this paper.

**TC paragraph 2: reference to ethical considerations.**

The referee rightly points out the need for ethical clearance when linking administrative data collections. In a number of our linkage projects, we have become very familiar with the processes involved in obtaining clearances from multiple ethics committees, particularly where multiple jurisdictional requirements or cross-institutional teams are involved. We are committed to maintaining strong ethical and privacy standards in our work, and agree that these requirements should be mentioned as part of the context to this paper. As no linkage is involved in the theoretical investigation of false matches presented in the paper, ethical clearance was not required for this particular paper, and so was not mentioned in the submitted manuscript. (However, perhaps I should mention in this context that ethical clearance has been obtained for the comparative study currently being undertaken and mentioned in the final paragraph of the Conclusion). The importance of such clearance generally, and, more specifically if an application of the results of the paper were to lead to carrying out data linkage, has been clearly set out as requested in the last paragraph in the Background section. In addition, minor changes have been made to make it clearer that the data used in the example in the manuscript refer to information collected for administrative reasons (in paragraphs 3 and 6 in the Background).

**TC paragraph 3: discussion of other sources of error.**

The authors agree with the referee that false positives and false negatives due to data error are also an issue for data linkage. The paper concentrates on providing a tool for deciding whether data linkage could be useful for a particular study by concentrating on the expected false match rate when all data is reported perfectly. Acknowledgement of linkage error due to inconsistent data has been augmented by expanding what was previously the last paragraph in the Background section and adding a short discussion of the issue (with references) in the (now) second and third last paragraphs in that section. A phrase has also been added to the first sentence of the second paragraph in the Methods section to emphasise the assumption of ‘perfect’ data in the theoretical approach.
TC paragraphs 3-5: concern over theoretical focus of paper, and desirability of empirical results. The purpose of our paper is to present researchers who are active in this field with an innovative application of a less common type of linkage to investigate transition events by individuals. A method for deciding whether such an approach could be considered in any chosen transition scenario is put forward. As reviewer LG indicates in the closing sentence of his/her review, the paper provides a useful basis for other groups wishing to test and or use this method in their own work. The performance of the strategy in a particular setting is therefore not the aim of this paper. Different applications of the linkage strategy would be expected to lead to potentially different proportions of false positives and false negatives (depending on data quality) in particular settings and linking particular datasets; we have concentrated on presenting the theoretical approach as a generalisable method of interest that researchers can consider for adoption in investigating transition events in their own work. For this reason, the performance of the strategy in a particular setting has not been included in this paper.

Minor changes have been made to the abstract to reflect the above changes in the manuscript.

We look forward to hearing your response to our amended paper

Yours sincerely

Rosemary Karmel