Author’s response to reviews

Title: Predicting 7-day, 30-day and 60-day all-cause unplanned readmission: A case study of a Sydney hospital

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Version: 2 Date: 19 Nov 2017

Author’s response to reviews:

Dear Editor and Reviewers,

Thank you very much for your final comments and suggestions.

Please find our point-by-point response to the editor and reviewers' comments in the lines below.

Kind regards,

Oscar Perez-Concha on behalf of all the authors.
Editor Comments:

Comment 1: Please see comments from reviewers below and address and outstanding comments.

Response 1: Please find our point-by-point response to the reviewers’ comments in the lines below.

Comment 2: In your next version, please ensure you provide a clean manuscript (no track changes or any highlights/edits).

Response 2: Thank you. We have done so. A clean copy is attached.

Comment 3: Please provide a description of the supplementary material. Please see out author guidelines for more information: https://bmcmedinformdecsismak.biomedcentral.com/submission-guidelines/preparing-your-manuscript#preparing+additional+files

Response 3: We have now included a description of the supplementary material. You find it on the last page of the main manuscript.

Reviewer 1:

Theo Georghiou (Reviewer 1): Thank you for the responses to my comments. I'm satisfied with the responses to the majority, but still have two remaining concerns:

Comment 4. The first involves comments 5/7/11/16. I'm grateful for the clarification, but I would recommend that the phrase 'ignoring planned readmissions' (in GBT models section) should be changed, and made more explicit - for two reasons.

My initial confusion had been caused by two possible readings of that phrase. One was correct (as confirmed by your responses) - that you strictly classified any first readmission within 60 days as planned or unplanned, and then in modelling - you set aside (somehow - see paragraph below) the planned readmissions, with no subsequent admissions taken into account (whether planned or unplanned). The second possible reading was that 'ignoring' overruled your prior statements and you entirely ignored planned readmissions (ie you were blind to them, and took the first unplanned readmission). Hence comment 7 - which only made sense with the second incorrect reading. Thank you for clarifying this - this also clarifies my confusion about numbers (comment 11).
However, the phrase ‘ignoring planned readmissions’ is ambiguous in a second way - in that it doesn't explain how you treated those (up to) 13.7% with a planned readmission. From your response to comment 16 you've confirmed that these individuals were removed from the validation sets. Did you similarly remove these individuals from derivation set? Or were these people left in the derivation set, but with the readmission ignored (with future unplanned readmission outcome = false)?

These are two different models with slightly different interpretations and it's not clear which you have built. One of these models would also be difficult to implement in a real world situation - some discussion of this might be helpful.

Response 4:

Following the reviewer’s advice, this sentence has been rephrased in the manuscript (line 203):

“Each predictive model was built and evaluated using 10-fold cross validation on the derivation set. Patients with a planned readmission were ignored and removed from the derivation and validation datasets”

Regarding this choice, we have followed the method that Donzé et al. [1] carried out in their JAMA paper: “Among the included patients, there were 3 possible outcomes: admissions not followed by any 30-day readmission, admissions followed by a 30-day potentially avoidable readmission, and admissions followed by a 30-day unavoidable readmission. Because we were interested in the identification of predictors specific to avoidable readmissions, and to give a clear contrast, we chose to compare the admissions followed by a potentially avoidable readmission with those not followed by any 30-day readmission. We excluded the unavoidable readmissions because they correspond to an intermediate and heterogeneous population of patients (eg, some of these patients might have subsequently developed an avoidable readmission had they not already been readmitted). “

In a similar fashion, we are interested in the identification of predictors specific to first unplanned readmission.

Comment 5. My second comment relates to comments 6 and 19. The points I'd been trying to make in these questions still stand (comment 6 was not about the index admission and 19 was not answered by the response to comment 5). In discussing differences between different time periods I would recommend that there is at least some acknowledgement that you have a hidden competing event in the post index admission period - a (first) planned readmission. This event - which disallows subsequent unplanned readmissions from counting as (first) unplanned readmissions - will have its own relationship with all your potential predictors. For anyone to
have a unplanned readmission between 30 and 60 days - they first must have had no planned readmission between 1-30 days, for example.

Response 5:

This study does not model sequences of readmissions, it only models risk of first unplanned readmission following an index admission. It is worth noticing that the index admission could be a planned readmission itself. In this way, in discussing differences between different time periods, we are comparing the predictors of risk of first unplanned readmission in each period.

Reviewer 2:

Comment 6:

Hadi Kharrazi (Reviewer 2): Thanks for submitting your revision. You have addressed all of the comments/questions. No further questions. Great work!

Response 6: Thank you very much.

Reference