Reviewer’s report

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

Version: 1 Date: 04 Oct 2017

Reviewer: Theo Georghiou

Reviewer's report:

Thank you for the responses to my comments. I'm satisfied with the responses to the majority, but still have two remaining concerns:

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.

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.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

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