Reviewer's report

Title: Method for Assigning Priority Levels in Acute Care (MAPLe-AC) predicts outcomes of acute hospital care of older persons - a cross-national validation

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Reviewer: Marianne E Weiss

Reviewer's report:

Thank you for the opportunity to review this interesting paper. There is an enormous need for tools to identify patients at risk for adverse outcomes of hospitalization and beyond. The authors present evidence supporting the use of the MAPLe-AC for use in identifying patients at risk for discharge home compared to adverse outcome, defined by the authors as discharge to an institution or death before discharge.

The strengths of the study are the multinational data and the use of 3 time points for the analysis. The results provide direction for optimal timing of implementation of standardized data collection for evaluation of change in level of priority during hospitalization and for prediction of disposition at discharge.

Major Compulsory Revisions

1. General comment: Throughout the paper, the term discharge outcome and adverse outcome are used. Institutionalization and death prior to discharge are treated as comparable ‘negative’ or ‘adverse outcomes’ and are aggregated for analysis. I think the notion of discharged alive is different than death prior to discharge, and I question the aggregation of these outcomes.

2. Background: Overall the background section is limited. There are a number of other tools that screen for discharge planning and placement post-discharge. In addition, a number of discharge transition programs for the elderly have provided evidence of the importance of identification of high-risk patients who will need discharge transition support services to permit discharge to home. Cost effectiveness has been evaluated in these projects (see the work of Coleman et al, Jack et al. Naylor et al.).

3. Methods:
   a. A description of the interRAI tool should be included. The Paragraph beginning Figure 1 and the related figure are not clear to those of us who are not familiar with the tool. The description refers to 15 unidentified subgroups and 5 priority categories that to this point have not been described.

   b. Participants: The authors state that patients were admitted for acute medical care. Does this mean to an acute care facility or does it mean for acute care for a medical, as opposed to surgical condition. Why were critical and intensive care
admits excluded and how does this exclusion impact the interpretation of results.

c. In addition, there was not mention of inclusion or exclusion on patients admitted from institutional care to acute care. I assume they were included and therefore the return to institutional care would not represent a decline in functional ability in the same way as admission from home to discharge to institutional care.

4. Statistical analysis:
   a. The authors state ‘negative outcome like discharge to institution or death’- are there other negative outcomes included that we are not aware of? The authors label having a new problem, exacerbation, and combined as co-morbidity adjusters. This term is not an accurate reflection of co-morbidity. A patient can have a new problem and multiple existing co-morbidities.
   
b. I did not note in the analysis model any inclusion of hospital fixed effects. Were there differences in the outcome variable attributable to hospital effects that needed to be controlled?

5. Results:
   a. Paragraph 3: The authors indicate that on day 7 or at discharge, there was an increase in the proportion of low and mild priority levels. This was true only for Nordic sample and in comparison to admission levels only. The authors also stated that there was an increased likelihood of going home for those with high priority compared to very high at both admission and 7th day. In Table 2 this statement is true for premorbid and 7th day but not for admission.
   
b. Regarding prediction of negative outcome, I am not sure why Table 3 was included. The logistic regression performed for discharge home used 0 as the institution/death and 1 as discharged home. The analysis of negative outcome is effectively the inverse and redundant.
   
c. Performance of the MAPL is in the same direction in both samples but the odds ratios are remarkably different in some areas – see 7th day assessments in particular. This issue should be addressed in the discussion. The results should be presented in more detail in the 6th paragraph.
   
d. Paragraph 7- states AUCs were somewhat higher in logistic models adjusted for age, sex, and reason for hospitalization for 1 year outcomes with a reference to Tables 2 &3. The AUCs in the tables are higher for discharge home and negative outcome than 1 year except for admission assessments. The table legends do not indicate any adjustment.

6. Discussion:
   a. General comment: Overall the discussion needs to reflect more directly on the analysis above with clear explanations for the findings. Additional referencing to support positions taken is needed. Terms such as ‘fairly well’ are too non-specific.
b. Paragraph 4: the statement ‘That applies to persons living in institutions’ raised the question stated earlier about sample inclusion and how prior institutionalization was addressed.

c. Paragraph 5: I do not understand the meaning of “Testing of predictive accuracy of MAPLe-AC, the AUC seems to be higher for discharge status indicating…. Which discharge status are we talking about? The statement that the purpose of MAPLe-Ac is to predict prognosis should be introduced earlier. The notion of predicting prognosis vs disposition are different and reaffirm the need for redefining ‘negative/adverse outcomes’ to disposition outcomes and separation of institutional disposition from death before discharge.

d. Paragraph 5 – reword ‘analysis of discharge home’ – perhaps to discharge destination. Reword ‘light MAPLe-AC’- this term has not been previously introduced and its meaning is not clear. The following statement about increased risk of excessive waiting is confusing. I did not see anything in the study about risk of waiting for services.

7. A section on limitations should be added. I noted, for example, that there were significant differences in the frequency of discharge to home vs discharge to institutional care and death in hospital between Nordic and Canadian samples that may reflect population differences in overall health status, and differences in post-discharge health care service referral/transfer practices, terminal care practices, and family preferences for continuing care between the populations sampled. This issue should be addressed in limitations.

Minor Essential Revisions

1. Abstract: In the background section, the name of the new modification (MAPLe-AC) should be included, rather than MAPLe-HC. In methods, change was to were in the first sentence – data are plural. The sentence ‘Data included’ should say ‘the sample included. Number of hospitals in the Nordic sample should be included. The term ‘negative outcome is introduced in the Results section, with no mention of its meaning. The last sentence of the Results says’ fairly good’. This section should include actual data. Conclusions: meaning of adverse outcomes is not clear – one needs to read the article to determine the meaning. The sentence that the tool that predicts adverse outcomes should be useful for early discharge planning is non –specific. In fact the tool predicts those who need further institutional care or who will die before going home.

2. Methods, paragraph 2 – comprises longitudinal… not comprises of

3. Figure 1: I couldn’t follow this at all, even after reading the text.

4. Tables 2 and 3:
   I assume the first set of data are pre-morbid assessments, the 2nd are admission assessments and the 3rd are 7th day or day of discharge – this should be clarified through labels
Discretionary Revisions
None

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**
I declare that I have no competing interests