Author’s response to reviews

Title: The Sydney Triage to Admission Risk Tool (START) to improve patient flow in an Emergency Department: A model of care implementation pilot study

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Dear Uffe Koch Wiil,

Thank you for giving us the opportunity to resubmit our paper. We are very grateful to have yourself and three expert reviewers who have a strong background in the field review our paper and are very appreciative of the time and feedback provided.

We have done our best to clarify the aims and models of care used in this implementation pilot and we have previously prospectively validated and reported PPVs in another study referenced below. We have also indicated this is part of an ongoing grant application that will seek to trial this more rigorously across multiple centres.

The individual reviewer comments are addressed below:

Leon Dahomey Sanchez (Reviewer 1):

1. There needs to be an explanation of the START protocol and scoring system for audiences that are not familiar with it.

We have added lines 73-74 in addition to lines 67-73 to further explain the START system as well as adding the START tool an appendix.
2. An explanation of the organization of tertiary care EDs in Australia with regards to how physicians see and evaluate patients would be valuable.

We have added lines 90-94 to help explain this process.

John David Halamka (Reviewer 2):

1. I did not find the START algorithm included in the manuscript - will it be an appendix?

Yes we have added the START tool as an appendix.

2. The article needs to be revised to include comparative outcomes

We did not include comparative outcomes and have added this to the limitations section (lines 248-250) and acknowledge this is an area to explore in future implementation studies.

3. Have you considered using machine learning models to predict admission?

Yes, this is being planned as part of further implementation studies to enhance the tool. We are currently applying for a grant to do a multicentre implementation study.

4. The authors make the comment that this is the first automated triage scoring system that enhances ED throughput, that's probably not a reasonable claim.

The authors sincerely apologise for this oversight, we have clarified this statement to the Australian context (lines 210-211)

Mikkel Brabrand (Reviewer 3):

1. I am unsure what the paper is testing. Is it the use of START, an experienced decision maker early on, the combination or something else? I simply cannot deduct this out of the paper.

We have re-worded the aim (lines 84-87) and part of the introduction (lines 76-79) to make it clearer that we are evaluating the impact of the START score in combination with senior early assessment compared with senior early assessment met alone.
2. I really struggled to see the difference between intervention and control, but believe that the explanation on lines 210-218 gave some insight. May I suggest moving this to the introduction so the reader can understand the study?

We have revised lines 71-75 in the introduction to address this point.

3. On line 104, it is stated that the intervention was used on "selected patients". What is meant by this? To me, this opens a door to selection bias, but I must have misunderstood it.

We have changed the wording to convey the meaning intended, being the tool could be used to select patients (line 110)

4. On lines 117-123, the selection of controls is stated. But as I read this, the only difference between the groups were the experienced consultants. Is this correct?

We assume that all control patients were managed by a senior consultant as this is part of our usual standard of care.

5. Could you add information on the rest of the population? This would make it easier to understand the effect of the intervention. Also, because, as I read the paper, the most experienced staff looked after the intervention patients, and this must have affected the care of the rest of the population.

All patients were managed by ED consultants. Table 1 compares the intervention and control groups with the difference being the application of START to expedite bed management. The care was otherwise identical. The table compares inpatient admission rates between the 2 groups.

6. I do not understand the numbers presented in the results section. 155 patients were evaluated using START. But I thought both controls and intervention must have START calculated?

That is correct, 155 initially assessed as likely admission by the START tool but only 113 of these got this in combination with the senior early assessment. We have adjusted lines 147-148 accordingly.

7. The aim of accuracy of decision making is not mentioned in the abstract. I take it this is due to word constraints.

We have validated and cited the PPV in a previous study as referenced and re-reference here:

8. On line 129, what is meant by "correctly assigned as an admission"?

We have reworded this to clarify meaning (line 133)

9. Were patients initially seen by an experienced consultant later followed up by the same consultant?

No, outcomes were independently assessed by the investigator.

Thank you again for considering our revisions, we look forward to hearing your response.

Kind regards,

Michael Dinh