Reviewer’s report

Title: Economic and organizational impact of a clinical decision support system on laboratory test ordering

Version: 2 Date: 15 Apr 2017

Reviewer: Andrew Georgiou

Reviewer’s report:

The paper's report of the impact of clinical decision support systems on laboratory testing is important and potentially quite valuable. I have the following suggestions:

1. It is not clear what the actual aim of the paper is. The Abstract says that the purpose of the study was to assess a project that sought to guide laboratory testing prescriptions. On page 9 we are told that the study reviews the effects produced by CDSS. The Discussion mentions four objectives and in the conclusion we are told that the project aimed to implement a software. Was the study one or all of the above? The authors need to settle on a robustly worded aim and carefully distinguish the results of any previous publications that have emanated from this project.

2. The Background section of the paper is long. Some of it is quite interesting and informative but its relationship to the purpose of the paper is not always clear.

3. Page 2 (line 15) Can the authors provide some relevant citations for the claim that "in 5 up to 40% of cases" involved inappropriate repeat testing?

4. Please provide a citation for the assertion that more than $6 billion of annual expenses for medical care in the US is spend on unnecessary tests or procedures.

5. Structurally, it would be better to introduce PROMETHEO much earlier in the paper to make clear that the paper is centred on an investigation of its impact.

6. The paper needs to provide much more details about the hospitals in which it was utilised. What was their size, type, makeup etc.? It is hard to draw comparisons or make judgements if the reader does not have this information.

7. There is reference made to an intervention and control group in the cost assessment section of the manuscript. I was left unclear what the intervention and control groups were.

8. The Usability Assessment needs more information. Can the author/s explain why it was distributed to 149? Is this a representative sub-set? If so, on what basis was this judgement made?
9. The Discussion section reports that there was not a statistically significant difference in inpatient characteristics. This is something that should be reported in the Results section with some extra details about how this was assessed.

10. The Discussion reads too much like a summary of the findings. It needs to position its findings in the context of prior research in this field. This would help to underscore the meaning and importance of the study relative to existing evidence.

11. There are a number of problems with expression in the manuscript which could be resolved with careful attention.

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

Yes

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

Unable to assess

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

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

**Quality of written English**
Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

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