Reviewer's report

Title: Multiple perspectives on clinical decision support: a qualitative study of fifteen clinical and vendor organizations

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Reviewer: Mariette van Engen-Verheul

Reviewer's report:

Summary: The purpose of this study was to discover how views of three groups in the landscape of computerized clinical decision support (CDS), clinical stakeholders, CDS content vendors, and electronic health record (EHR) vendors, are alike or different with respect to CDS challenges (development, management, and use of CDS) and to generate recommendations for improvements. They used the qualitative research method Rapid Assessment Process (RAP) to perform 15 site visits with 206 formal interviews and 268 hours of observation. The results are organized around 11 themes. The discussion names recommendations for the future of CDS. The authors conclude that the three groups share thinking about many aspects of CDS, but views differ in a number of important respects as well. A national impetus to improve the value and safety of CDS that would include legal protections and incentives for sharing content could move the field forward.

Relevance: The subject of this research is relevant as CDS can help hospitals to improve healthcare. However a recent series of six systematic reviews from Haynes et al shows that CDS led to significant improvements in the process of care in somewhat more than half of the studies. Attempts to identify critical success factors for CDS systems in a qualitative way and from different perspectives, as is done in this study, can be very useful for future development and implementation of CDS systems.

Major compulsory revisions

Introduction – 1. Although the subject is important the authors do not explain clearly in the Introduction section what is the problem in the field of CDS they would try to find an answer on. The goal the authors describe (‘To capture a picture of the entire CDS landscape…) is very general. It would be interesting if they could state both a more specific problem and a more specific goal for the research. 2. Furthermore they do not describe what lacks in existing (quantitative) knowledge and why a qualitative methodology is the best approach for their research goal. 3. Finally their research question naming three groups (clinical stakeholders, CDS content vendors and EHR vendors) is not original as the Methods section further on describes that the research started with only clinical stakeholders and that later on it was decided to add the vendor perspective to the study.

Methods – 4. The description of the Rapid Assessment Process (RAP) is a bit
vague for me. It would be helpful if the authors could describe this method more concrete and step by step. 5. Also other methods used lack a short description for the reader to understand all research steps, e.g. the grounded theory content analysis approach during data analysis and the use of a group of experts during site selection.

6. In the second paragraph of the Method section the authors suddenly state that their research adheres to the RATS guidelines for qualitative research. Actually, I do not agree with this. Several essentials from these guideline are not met in the paper, e.g. relevance of study question, transparency of procedures and soundness of interpretive approach. 7. Especially the transparency of procedures should get more attention in the Method section, to name some examples from the RATS guidelines: how big was the entire study population (how many hospitals and vendors), how where participants selected, details of who chose not to participate, role of the researchers themselves during data collection, selection of interview questions or topics, decision on needed amount of interviews and observations, why and when will data collection be stopped, which steps or model will be used to analyze, interpret and present the data of both the interviews and observations?

Results – 8. The results are described in 11 themes. However, the previous Method section lacks some essential information to understand how the themes were derived from the data. It is not clear how the themes connect to the research question on development, management en use of CDS. 9. Currently the results appear the be a long, selective summary of 206 interviews and 268 hours of observation and lacks a focus for the reader (e.g. should I pay attention towards problems, solutions or ideas for improvements?). 10. The decision of which themes are shared between the groups looks arbitrary (e.g. why didn’t EHR vendors say anything about interoperability? Was it not asked? Did they have no opinion? Or did they not have problems with that?). 11. Finally it is not described what was done with data which didn’t fit the themes.

Discussion – 12. The Discussion section lacks the often used structure for the discussion of scientific papers which is for instance described by BMJ (‘The case for structuring the discussion of scientific paper’, BMJ 1999). I would suggest the authors start with a statement of their principal findings and the strengths of their study instead of with their limitations.

13. Furthermore the second paragraph is a list with recommendations ‘for the future of CDS’. Again this is very general stated and it is not clear how the recommendations were derived from the data. 14. It would be interesting if the authors could be more specific, e.g. are this recommendations to improve implementation of CDS? Or the effect of CDS? For which groups (clinicians, vendors, policy makers, researchers) are all recommendations mentioned? 15. And if this was the main research goal of the authors, they should better present this recommendations in the Result section instead of in the Discussion section. 16. Finally the authors should better describe what is the relation of their results to other studies in the field of CDS.

Minor essential revisions
Introduction
17. The research question in the Introduction section should be the same as in the Abstract (Background section).

Methods
18. The RATS guidelines lack a reference.
19. What happened if an IRB did not approve study participation, how often did this happen?
20. The information on ethics approval and informed consent is now spread in multiple paragraphs and could better be combined in a separate paragraph on ‘Ethics’.
21. Are the terms ‘Clinical champions, normal users, and skeptical users’ derived from an existing model? In case so, please refer.
22. What were demands for persons to be classified as being a ‘CDS expert’?
23. Authors should better defend why data collection was done during such a long period of five years. In the Discussion section they should better describe the changes in the field of CDS during this five years.

Results
24. How many visits were done to EHR vs. content vendors?
25. Sometimes the EHR vendors and the content vendors are described separately, sometime they are together named as ‘the vendors’, this is confusing.
26. The verification interviews are not described in the Method section.
27. The statement ‘the quotes are representative of what we heard from numerous sources’ is arbitrary.
28. The phrase ‘We were told…’ is often used.
29. Parenthesis at the beginning of a new theme can be removed (e.g. ‘These subthemes include…’)
30. In the paragraph on Who is the customer, I do not understand how the health system itself can be a customer?

Discussion
31. New subjects are introduced which haven’t been described in the Result section (e.g. SOA approach).

Table 1
32. It is not clear why different topics were formulated for the three different groups. E.g. the future of CDS was only discussed during vendor verification, why not with clinical sites? How did that influence your results or recommendations?

Table 2
33. The table lacks summative information on the numbers of interviews and
observations for the three overall groups (clinical sites, EHR vendor or content vendor).

34. The dates lack the year. As data collection was spread over five years this is important information.

Figure

35. The figure lacks a title and it is not clear on how the themes in the figure were derived.

Discretionary revisions: First the major and minor essential revisions should be addressed before coming to this level of recommendations.

Closing: As the field of CDS can benefit from qualitative research results to identify critical success factors for CDS systems and ideas for improvement from both the clinical and vendor perspective, we hope the authors are able to work on our suggestions for their project.

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

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests