Reviewer's report

Title: Computerized Clinical Decision Support and Knowledge Management in Community Settings: A Qualitative Study

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Reviewer: Niels Peek

Reviewer's report:

The manuscript by Ash and colleagues addresses an important issue in health informatics, the implementation of computerized decision support (CDS) in clinical practice. This has proven to far more complicated than many people anticipated ten to twenty years ago, when CDS represented the promise of a nearby, better future in health care. So far, this promise has not become reality because CDS is not used in most of clinical practice, and the question is why this is so. Such a "why"-question can only be answered by ethnographic methods, and therefore the study reported on in this manuscripts is timely, relevant, and utilizes the appropriate methodology.

Yet, there are substantial conceptual and methodological concerns which need to be addressed before the manuscript is suitable for publication. It is currently not possible not judge whether the ten important themes reported by the authors and the corresponding recommendations are indeed scientific results from the study. Below, I will address these concerns one by one.

Major compulsory revisions

1. Study objective and design. The purpose of the study was to identify recommended practices for CDS development and implementation and for knowledge management processes in ambulatory clinics and community hospitals. Recommended practices are defined as procedures and practices actually in use at study sites that both subjects and an external panel of experts deem worthy of consideration by other organizations. In my opinion, this objective is too broad for a scientific study, and should be refined and made more concrete. This is partially a matter of terminology (see below, comment no. 2). Furthermore, a major limitation of the study design is that no sites were visited that did not successfully implement CDS or (better) experienced a flawed CDS implementation. Perhaps these sites did everything exactly as was recommended in this paper, and still experienced a failure. Only by contrasting such sites with those that were successful, we may learn what works and what does not work. This important limitation should be addressed in the discussion and to qualify the conclusion of the study.

2. Concepts studied. The study only addresses CDS in the context of CPOE, and even seems to equate the two. But there also exists other forms of CDS, such as those used for primary prevention (reminders), diagnosis, and chronic disease
management. Similarly, there exist CPOE systems without CDS. The manuscript would benefit from more clearly delineating these different concepts, and indicating whether the reported themes and recommendations hold for CPOE + CDS only, for CPOE with and without CDS, or for CDS in general. Also the definition of knowledge management, and the reasons for investigating it should be better described. Currently, knowledge management is mentioned in the study's objective without further justification. The definitions of workflow and knowledge management (provided at pages 8 and 9) are very broad. Also these concepts should be better delineated from the other concepts, and where possible adjusted to the context of the study.

3. Theory and framework of the study; data collection; data analysis methods. This is the most problematic part of the manuscript. Very little is reported on the method of data analysis. The Results section only describes some characteristics of the raw data and all the final results, but no intermediate findings or results, and many questions remain for the reader. For instance:

- How many people were invited to participate in the study, and how many of them accepted?
- How were "sceptics" and "champions" (p. 6) identified, and how were sceptics involved in the study? How many of them were willing to participate?
- How were the ten themes that are presented in the Results section identified? How was it determined that saturation was reached?
- How were conflicting statements or recommendations from interviewees dealt with? How were other conflicting observations dealt with, e.g. when people did not do what they said they did?
- How were people selected for the expert panel? Did they have conflicting opinions? How was agreement reached between the panel members?

Also the explanation about the Multiple Perspectives Model raises questions. It should be better explained what this model entails and how it was used in this study. The figure is not very helpful.

4. Results. There many interesting issues discussed in the Results section that are clearly relevant for the field. However, it is often unclear what the underlying sources are for statements in the manuscript. For instance:

- "Model sites conducted cyclical reviews for curation and maintenance" (p. 9). Who decided which sites were 'model sites' and which were not? On p. 13, "more mature sites", similar remark.
- "CDS presentation was of utmost importance." (p. 11) How was this determined?
- "Patient-specific, accurate and complete information is needed to measure both the use and effect of CDS. Also, metrics must be established to measure the impact of the EMR over time." (p. 12). Are these findings from this study, or statements derived from the literature? In the former case, please qualify these
statements phrases like "Interviewees stated that ...". In the latter case, please add references. There many similar examples of such statements.
- "This study confirmed that these roles are critical for effective CDS as well." (p. 15) Please explain how this was confirmed by the study.

5. Discussion. The procedure for crafting recommendations should be placed in the Methods section, and the recommendations should be placed in the Results section.

Minor essential revisions

6. Theme 3 (Data as a foundation for CDS): It is reported that none of the study sites had complete patient data. Please clarify what is meant by this. Was data improperly recorded, or was it properly recorded but not all of it electronically? Or was it not sufficient to provide CDS?

7. Theme 4 (User computer interaction): It is written that all of the systems could be customized. Please clarify what is meant by this. Which aspect of the system or its UI could be customized? Could each individual user customize the system, or only system administrators? How many sites/users actually customized their system?

8. Theme 5 (Measurement and metrics): What is the relationship between the purpose of the study and this section?

9. Theme 10 (Communication, training and support): The concept "communication about CDS" is too general, please clarify what is meant by this.

Discretionary Revisions

10. p. 13, "The sites with commercial systems depended a great deal on decisions about CDS made by their EMR vendors." Interesting point, please elaborate.

11. Theme 7 (Translation for collaboration): This is a very challenging task. Were any difficulties noted?

12. Theme 8 (Meaning of CDS): This is a very interesting observation. Perhaps you can consider the implications of this observation in the Discussion section.

13. It is written on p. 20/21 that sites with locally developed systems provided excellent examples of recommended practices. But it is generally not feasible (and probably, not recommended either) for smaller institutions to locally develop IT systems. Please comment on this issue.

Level of interest: An article of importance in its field

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.