Author's response to reviews

Title: Lessons Learned from Implementation of Computerized Provider Order Entry in 5 Community Hospitals: A Qualitative Study

Authors:

Steven R. Simon (steven.simon2@va.gov)
Carol Keohane (ckeohane@rmf.harvard.edu)
Mary Amato (mamato1@partners.org)
Michael Coffey (mcoffey@pchi.partners.org)
Bismarck Cadet (bcadet@winhosp.org)
Eyal Zimlichman (ezimlichman@partners.org)
David W. Bates (dbates@partners.org)

Version: 2 Date: 17 May 2013

Author's response to reviews: see over
May 16, 2013

Journal Editorial Office
c/o Ms. Arlene Pura
BMC Medical Informatics and Decision Making

RE: MS # 5345512789980025 - (Simon et al)

Dear Editors:

Thank you for inviting us to submit a revision of our manuscript, “Lessons Learned from Implementation of Computerized Provider Order Entry in 5 Community Hospitals: A Mixed-Methods Study,” to BMC Medical Informatics and Decision Making. We have carefully considered the reviewers’ comments, and we have made extensive changes to the manuscript. We believe that the paper has been strengthened as a result. Below we address the reviewers’ comments.

Reviewer Comments:

Reviewer 1:

General Comments:
This manuscript reports a case study of Computerized Provider Order Entry (CPOE) implementation in five community hospitals in Massachusetts. The results presented are essentially qualitative, so it is questionable to use the term “mixed-methods approach”, which implies the use of qualitative and quantitative research methods. In general, the paper is clear and well-structured. I particularly appreciated the way that the authors describe how they used the Immersion and Crystallization analytical approach. It could be interesting to discuss the potential influence that the investigators’ background has had on the analytical process (reflexivity).

We have now indicated in the Methods section (page 9, paragraph 1) the backgrounds of each of the members of the analysis team:
“The inter-disciplinary project analysis team consisted of physicians (SRS, MC, BC, EZ) a nurse (CAK) and a pharmacist (MA).”

We have added a sentence to the Discussion (page 18, paragraph 1) that briefly acknowledges the potential influence of the investigators’ background on the analyses:
“Our inter-disciplinary research team included physicians, a nurse and a pharmacist, allowing us to bring varied clinical perspectives to the analyses of the broad array of attitudes and experiences represented in the data.”

The results are in line with those reported in recent studies and systematic reviews of IT implementation and this could be more highlighted in the manuscript. One novel element that emerges from this case study is the unintended consequences of the new system on staff leaving the hospital practice or retiring. Perhaps this could be identified as an avenue for future research.

We agree that this is novel and important. Accordingly, we have added a sentence to the Discussion (page 23, paragraph 1):
“Finally, this study raises several key topics for future study, including the extent to which CPOE and other HIT implementation efforts are accelerating the retirement or career transitions of nurses, physicians and other health care professionals.”
Major revisions:


We are grateful to the reviewer for taking the time to provide these very relevant references. We have incorporated them into the Discussion (page 18, paragraph 3), providing a richer context for our study:

“Considerable literature has emerged regarding the organizational factors and theoretical frameworks for the implementation of health IT.[20-22] Systematic reviews have shown that individuals’ perceptions of new technology, its ease of use, and its impact on the time they spend to carry out their day-to-day task are among the key factors that facilitate adoption, while technical concerns, lack of training and negative attitudes of the users frequently manifest as obstacles to successful implementation.[23-27]”

Minor essential revisions:

More references about the impacts of CPOE could be provided after the first sentence and another sentence could cite studies that did not report benefits related to CPOE.

We have added several relevant references and a sentence that provides additional balance and broader context to the Background (page 5, paragraph 1):

“Although most studies and systematic reviews have suggested that CPOE results in better, safer care, other reports have questioned the magnitude of CPOE’s effects and the generalizability of findings from the limited number of academic centers that have adopted CPOE.”

At the bottom of page 6, please explain what “house staff” means the for non-USA readers.

We have now clarified (top of page 7) that house staff are resident physicians-in-training.
On p. 7, under Site Visits, it is mentioned that you developed a “standardized instrument”. What does “standardized” mean in this context?

We meant that we used the same instrument in each of the site visits. On reflection, the word “standardized” is superfluous, and we have omitted it.

For the in-depth interview guide, please indicate if any theoretical framework was used to guide the questions? Terms such as Attitudes, Barriers, and Facilitators are very similar to the dimensions found in Ajzen’s Theory of Planned Behavior.

The development of the interview guide was indirectly influenced by our familiarity with a wide range models, including Rogers’ Diffusion of Innovation model, the Technology Acceptance Model, the Theory of Planned Behavior, among others, but more directly by the literature on health IT adoption that we cited.

In the Limitations section, please discuss the elements that could affect the rigor of the qualitative analysis by referring to known criteria, e.g. the COREQ statement:


We appreciate this suggestion and have incorporated these criteria into our Limitations section, as follows (page 23, paragraph 2):

“As with any qualitative research, the validity of the results of this study should be considered in the context of established criteria, such as the Consolidated criteria for reporting qualitative research (COREQ), which identifies three domains of criteria: the study team and reflexivity; study design; analysis and findings. While this study satisfies most of the 32 COREQ criteria, we note a few important limitations. In terms of the study team and reflexivity, we recognize that, despite attempts to remain objective, our own biases and experiences in research and health care delivery may have influenced our conduct of the interviews and observations as well as the analysis of the data. With respect to the study design, we did not return transcripts to the interviewees for comment or correction. In terms of the analyses, we did not formally conduct “participant checking” (i.e., asking interviewees to provide feedback on the findings); however, we did present our findings to the leadership of each hospital, who provided feedback that further guided our interpretation of the findings.”

Reviewer 2:

Discretionary Revisions:

The lessons learned from the implementation of CPOE in community hospitals described in this article would be helpful to other community hospitals that consider adoption of CPOE system in near future. The methodology is also well designed.

One suggestion for improvement is to clarity and highlight the new findings of this study compared with what was already known in this field. The studies on barriers to the adoption of COPE or EMR system have been widely investigated and reported. Therefore, if the authors highlight new lessons learned from the community hospitals, it will be valuable to other settings.

We have brought forth more extensive reference to the existing literature, as suggested by Reviewer 1, which now gives the reader a better perspective on the broad base of literature in which our study is situated. The most important “new” contributions from the present study is the assembly of the five “lessons learned.” As such, we have rephrased these as “five ‘lessons learned’ that may provide a new framework other community hospitals embarking on CPOE adoption.” (page 19, paragraph 2)
In addition, the general statistics of 24 interviewees and 5 settings participated in this study need to be added and summarized in a table.

We have provided a summary table, Table 1.

The period of interview and site visits also needs to be mentioned in the manuscript.

We have now indicated (bottom of page 8) when the data were collected:
“Interviews and site visits were conducted May-December, 2010.”

Reviewer 3:
The results presented are not unique. Several similar result have been reported in the last 10 years. To understand if this is still an issue in USA it is necessary to know more details about when the data was collected.
If this is new and recently data the article need a discussion about the reasons why apparently thing has changed during more than a decade in USA. The authors need to deliver information about the time of the data collection

We have now indicated (bottom of page 8) when the data were collected:
“Interviews and site visits were conducted May-December, 2010.”

They also said that they use a mixture of methods to collect data. It is not possible to see this mixture. The study is qualitative based. Use different tools to collect data.

We appreciate this reviewer’s suggestion and agree that the study is better described as qualitative. We have changed the title of the study and relevant text in the abstract and methods sections from “mixed methods” to “qualitative.”

Reviewer 4:
This is an interesting paper, however, issues related to technology implementation such as user training, management support, and interdisciplinary cooperation are not new. My suggestions are as the following:

1. One of the data collection methods is interview. There are five domains from the interview. However, for qualitative interview content, the emerged themes would be presented either in words, phrases or topic sentences. Further interpretation of these five domains may be needed for the reader to grasp the theme meaning.

We have attempted to synthesize the findings and elaborate on their implications as five “lessons learned”. In response to this reviewer’s comment and that of Reviewer 2 above, we have now introduced these as “five ‘lessons learned’ that may provide a new framework other community hospitals embarking on CPOE adoption.”

2. I would like to see how this paper describes the trustworthiness of the study.

We appreciate this reviewer’s suggestion. We have now incorporated a paragraph (page 24, paragraph 1) that assesses the trustworthiness of this study:
“Another useful rubric for assessing qualitative research is to consider the “trustworthiness” of the research, frequently operationalized as four constructs: a) credibility; b) transferability; c) dependability; and d) confirmability. To ensure credibility, we employed a variety of techniques, including the use multiple data collection methods (observation and in-depth interview), frequent meetings among the investigators to review and verify findings, and assessment of the findings in the context of prior literature. Transferability refers to the external validity or generalizability of the
study. We conducted a qualitative study among a select group of five community hospitals that, for the most part, completed successful CPOE implementations in the years preceding our observations and interviews. We are able to report only on the attitudes and behaviors that existed at these hospitals – as perceived by the stakeholders themselves. Whether similar perceptions and observed experiences and outcomes would occur in other settings remains to be tested. Nevertheless, insofar as these community hospitals are representative of hospitals of similar size and composition across the country, the lessons learned in these five institutions may be instructive for other hospitals embarking on CPOE implementation in the near future. The dependability of this study is reflected in the high fidelity between the research proposed (in a written application to the funder) and that which was conducted, as reported here. Finally, confirmability of the study was reflected in our presentation of the findings to the leadership of each study hospital and their general agreement with the findings; however, as noted above, we did not conduct participant checking with each of the interviewees.”

3. Only one reference [14] was cited in Discussion, I’d like to see the authors’ arguments compared and contrasted with others. Overall, this is an interesting paper so long as the author could emphasize its major findings in emerged themes and compared with others’ findings.

We have incorporated approximately 10 additional references in the Discussion and, as mentioned in the response to Reviewer 1, have placed the findings of this study in the context of this broader literature by emphasizing the novelty of the lessons learned (page 19, paragraph 2).

Thank you for considering the revised manuscript.

Sincerely,

Steven R. Simon, MD, MPH
Corresponding Author