Response to reviewers’ comments

We appreciate the assistance provided by the referees and we are now submitting our revised manuscript. Our response to each of the reviewer’s comments is below.

Reviewer 1, Benjamin Brown

Major compulsory revisions

1. Authors state that a grounded theory analytical approach was used, though it is unclear what this means. . . a constant comparative approach was used, but there is only mention of comparison across different groups of participants . . . more detail is needed on the steps taken during analysis.

Citation number 18 is a lengthy published paper that outlines in detail each step of the methods developed and used routinely by this research team, so we had thought that we could shorten the methods section of this paper by referring to the prior paper. However, we agree that some readers may want to read more about methods in this paper, so we have lengthened the methods section considerably. We have explained our approach, which included aspects of grounded theory, clarifying exactly what those were. We have also described step by step how the analysis was accomplished.

2. The results do not necessarily support the recommendations drawn in the discussion section of the paper.

We have completely rewritten the discussion section so that it is clear how each
topic in that section relates back to the results.

3. More detail is needed about the data collection process . . . more detail about data analysis is needed.
We have expanded these sections and described in detail the entire process.

Minor compulsory revisions
1. Authors state interviewers practiced reflexivity by noting personal thoughts in fieldnotes . . but this is only one aspect of reflexivity.
We have expanded our description of reflexivity and clarified throughout the methods section the backgrounds of the research team members who gathered and analyzed the data.

2. State that all of the subjects were purposively selected.
We have done this at the beginning of the subject selection section.

3. How was the purposive selection done?
We have described in further detail how we selected the clinical site users and CDS experts as well as how we selected the vendor site subjects.

4. More detail is needed about kinds of subjects, numbers, etc.
We have given numbers in Table 2 and described in the text the types of subjects at clinical sites and at vendor sites. We have not given details such as demographic data/occupation/experience with CDS, however, because with over 200 individuals interviewed and over 150 observed, the complexity of categorizing them in any useful way is not possible. This is a situation somewhat unique to CDS and explained in citation 23 (now 24 in the revised version), a paper in which we describe the roles and activities of the broad range of people involved in CDS in the sites we have studied.

5. Clarification of the verification interviews is needed.
We have deleted mention of the verification interviews throughout the paper since this step caused confusion and was a minor part of the study.

Discretionary revisions
1. Was the interview schedule pilot tested or modified at all?
We have offered further detail about the iterative nature of our study, during which the interview guide was revised for each study site and tailored for each individual interviewee.

Reviewer 2, Mariette van Engen-Verheul

Major compulsory revisions
1. The goal of the research needs to be clarified further.
Since this was an exploratory study, the goal was necessarily broad. We have rewritten the purpose statement in the abstract to better match that in the introduction section because the different wording might have contributed to a
lack of clarity about our goal.

2. Why is a qualitative approach the best approach to use for this study?
We have now described the benefits of the qualitative approach and why it was used here.

3. “Their research question naming three groups 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.”
Our understanding of this question is that the reviewer would like to know how we could ask a research question later on in the study rather than asking it at the very beginning of the study. In hypothesis driven deductive quantitative research, one must identify hypotheses in the beginning and then test them. However, in inductive qualitative research, one should keep asking new questions based on what you are learning throughout the research process. We had already conducted research asking about the perspective of CDS users and clinical site representatives in a prior study, followed by a similar question related to representatives from vendor sites. A natural progression was to ask the question about how the perspectives differed, resulting in this comparative study.

4. The description of the Rapid Assessment Process is a bit vague for me.
We have added much more description of RAP and given step-by-step details. Citation number 18 to one of our prior papers not only describes the steps in even greater detail, but offers explanations about why each step is important.

5. Describe in more detail the analysis steps.
We have added a great deal more text to this section.

6 and 7. I do not agree that this paper adheres to the RATS guidelines as stated in the paper, “several essentials from these guidelines are not met in the paper, e.g. relevance of study question, transparency of procedures and soundness of interpretive approach.”
We believe we adhered to the RATS guidelines but did not describe them in this paper in enough detail to convince the reader, so we have now added the needed detail. We had been depending on citation 18, thinking that readers with a deep interest in methods would look at that prior paper, but we are proud of the rigor of our methods and therefore pleased that the reviewers want more information about them.

8. The results are described in 11 themes but it is not clear how these themes were derived from the data.
By providing details about the analysis strategy used throughout the study, we believe we have addressed this issue.

9. The results are a long selective summary which lack a focus (should I pay attention to problems, solutions or ideas for improvements?)
The focus is on the differing perspectives of the three groups. We have clarified the text to make it very clear that each issue in the results section is one that was raised by two or more of the stakeholder groups and what each had to say about it.

10. The decisions about which themes are shared between the groups looks arbitrary.
In our rewriting, we have clarified the methods used for developing the themes and also which stakeholder groups expressed which opinions about each one.

11. It is not described what was done with the data which didn’t fit the themes.
These themes are all inclusive. The data were analyzed in such a manner that all substantive information gleaned from observations and interviews could be categorized into these themes. Indeed there were nonsubstantive and irrelevant pieces of data, with interviewees at times wanting to chat about public transportation or sports events, etc., and we did not code them.

12. The discussion section lacks the often used structure for the discussion of scientific papers which is for instance described by BMJ.
We have rewritten the discussion section so that it conforms to the reviewer’s suggestion.

13 through 16. The authors should better describe the relation between the study results and the recommendations.
The discussion section has been completely rewritten. The recommendations have been clarified and tied directly to results.

Minor essential revisions
17. The research question in the introduction should be the same as the abstract.
We agree, so we have rewritten them so that they are identical except that one is expressed as a question.

18. The RATS guidelines lack a reference.
We have now supplied a reference.

19. What happened if an IRB did not approve study participation, how often did this happen?
We never had an IRB refuse to approve a study. Often, IRB personnel will ask for revisions or ask questions, but we always work with them until approval is granted.

20. The information on ethics and approvals is in multiple places and could be put together into one paragraph.
We have done this.

21. Are the terms clinical champions, normal users, and skeptical users derived from an existing model?
Yes, and we have cited the paper outlining the model.

22. What were demands for persons to be classified as being a CDS expert?
We have clarified that these CDS experts play a formal role in the development and management of CDS as opposed to subjects who were users and had no formal role.

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 these five years.
We have clarified in the methods section why the study spanned five years. We have described in the discussion what changed in that period.

24. How many visits were done to each type of vendor?
This is shown in Table 2.

25. Sometimes the different kinds of vendors are grouped together and sometimes separately, this is confusing.
We have added text to clarify exactly when we are referring to one type of vendor or both types of vendors.

26. The verification interviews are not described in the method section.
We have deleted reference to the verification interviews in the paper.

27. The statement “quotes are representative of what we heard from numerous sources” is arbitrary.
We have clarified in the text that the quotes are not only representative but each one also illustrates a theme or subtheme especially well.

28. The phrase “we were told” is often used.
We have rewritten each of these.

29. Parenthesis at the beginning of a new theme can be removed.
The parentheses contain content which points the reader to the correct area in Figure 1, so we believe they are needed.

30. In the paragraph Who is the customer, I do not understand how the health system itself can be a customer.
We have rewritten this to clarify our statement.

31. New subjects are introduced in the Discussion section.
We have rewritten the discussion section and no new subjects are introduced.

32. It is not clear in table 1 why different topics were formulated for the three different groups.
We have clarified in the text how this list of topics relates to the interview guides
and how the interview guides changed over time depending on what was being learned in the field in previous visits.

33. Table 2 lacks summative information on the numbers of interviews and observations.
We have added a column for totals as requested.

34. The dates in Table 2 lack years.
Actually, the dates included month and year, but we have now made it much clearer that is the case. Also, we have rearranged the table so that from left to right the site visits are listed in chronological order.

35. The figure lacks a title and it is not clear on how the themes were derived.
We have rewritten the text in the methods section about analysis and how themes were derived. The title is listed separately as required by the journal.

Reviewer 3, Brian Bell
1. What was the level of agreement between the two researchers who worked in pairs when conducting analysis?
In qualitative analysis, we do not measure levels of agreement like one would do in a quantitative study. The researchers code a sample transcript and compare their coding. When they have coded something differently, they discuss it to discover why their perceptions differed. They then reach a mutual understanding, often by creating a new code or by enhancing the definition of a prior code.

2. For table 2, it would help to provide summary statistics. Also, one of the sites had a much larger number of interviews than the other sites. Did the data unduly influence the conclusions that were drawn?
We have provided totals in Table 2 in a new column. The number of interviews at the different sites does not influence the results except that with more data, we hope to gain richer insight into issues. Since numbers are not the goal in qualitative research, sometimes small numbers of subjects can provide excellent information and large numbers of subjects might provide information at only a superficial level. We strive to collect the best data regardless of the number of subjects available to us.

3. You mention that RAP uses both qualitative and quantitative methods, so why are more quantitative data presented in the article?
RAP, like ethnography, takes advantage of quantitative data to enhance the qualitative data, but not by using statistical techniques. We have clarified in the text that at some sites we conducted small surveys through brief five-minute interviews to get a general sense about whether what we were hearing from interviewees and seeing during observations was representative. The 20 or so surveys were useful, but not worthy of reporting here.

4. No information about the respondents is reported.
We have not reported in Table 2 the kinds of people we interviewed and
observed, but we have outlined this in the text. We have not given numbers because CDS experts are not only hard to categorize, but usually they play many roles. If a clinician is a CDS analyst, for example, and also a developer, she plays three different roles. We have published a paper, citation 24 in the revised version, which describes the nuances of CDS personnel.

5. The ad hoc nature of data collection is a concern.
This is the nature of qualitative work and it is one of its greatest strengths. As further research questions arise, they can be pursued. We have clarified in the text how the five-year research progression evolved and why.