Reviewer's report

Title: Enhancing an adult-based computerized provider order entry system to meet the unique needs of children: description of an advanced dosing model

Version: 2 Date: 28 July 2010

Reviewer: George Kim

Reviewer's report:

“Enhancing an adult-based CPOE system to meet the unique needs of children: description of an ADM” is part of an important and ongoing discussion within the pediatric informatics community. The results should be published in some form with the following caveats, in context of the questions posed by BMC:

1. Is the question posed by the authors well defined?
   a. As a “technical advance article”, the submission does not clearly focus on the goal of enhancing “an established adult-focused CPOE system to meet the unique medication dosing needs of children”. It seems to be more about “meeting the prescribing needs of pediatrics via CPOE” by modifying CDS (the ADM), is it not?
   b. What are the problems associated with pediatric prescribing in general and at Duke, and with which medications? There does not appear to be data from Duke regarding its own vulnerabilities pre-implementation (which speak to outcomes). As a tertiary pediatric center, are there variations in clinical areas (ICU, surgery, oncology) or specific medication processes (insulin, anticoagulation, chemotherapy, continuous infusions, total parenteral nutrition) which have their own error rates that vary from the average?
   MAJOR COMPULSORY

2. Are the methods appropriate and well described?
   a. The notion of “regions” is not well described. Please clarify and give examples.
   MAJOR COMPULSORY
   b. The broad clinical parameters suggests that the authors may have been thinking of some sort of logistical regression and begs the question as to how they impact on errors before and after implementation/deployment
   DISCRETIONARY

3. Are the data sound?
   a. See 2b.
   b. As the authors note, voluntary reporting is not very robust as a measure of quality or safety regarding the medication process.
4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
   
a. Yes, but see 3 regarding the data
   

5. Are the discussion and conclusions well balanced and adequately supported by the data?
   
a. It’s all over the place. Needs to be made more coherent, focused and structured.
   MAJOR COMPULSORY

6. Are limitations of the work clearly stated?
   
a. No. What is limited, the study or the implementation (the latter is what the authors describe)? Please make this clear.
   MAJOR COMPULSORY

b. Re: ADEs, were they stratified as to impact (mortality, for example)?
   MINOR (would be helpful)

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
   
a. Longhurst CA, Parast L, Sandborg CI, Widen E, Sullivan J, Hahn JS, Dawes CG, Sharek PJ. Decrease in hospital-wide mortality rate after implementation of a commercially sold computerized physician order entry system. Pediatrics. 2010 Jul;126(1):14-21 probably should be cited, since it uses an advanced time-series analysis approach
   MAJOR COMPULSORY (Review this article)

b. There is previous work on pediatric CPOE and CDS for the "problem areas" of medication prescribing: infusions, chemotherapy, etc. How were these handled and resolved at Duke?
   MAJOR COMPULSORY (Please state something about how some of these specific problems were navigated re changes in ADM).

8. Do the title and abstract accurately convey what has been found?
   
a. More or less

9. Is the writing acceptable?
   
a. Grammatically and syntactically, yes.
b. Needs work on organization (Example: the parts re: weight-based dosing, in several places)

MAJOR COMPULSORY (review the organization of the content)

Overall, the work described is important to be shared, but the execution of this paper is flawed:

a. It may be more suited for an informatics journal than a pediatric journal, especially in light of what was published by Longhurst from Lucile-Packard earlier this year.

b. The authors should pick a focus: Is this a descriptive study of an implementation or is it an evaluation of one? In either case, the STARE-HI model for publication should be used.

o In the case of a descriptive study, as a reader, I want to hear about what the problems are within the institution as well as within the domain of pediatric prescribing. Clearly, Duke is a high-throughput and high-risk environment for medical care (by virtue of the services listed: PICU, NICU, cardiac surgery (with a big sentinel event within recent memory), liver transplant, BMT, etc). This paper homogenizes these into “a single mix”, while each unit probably has its own unique story to tell. What are the characteristics of pediatric prescribers? Are there residents? Tell me more about the ADM and how it has been modified in different domains. This is definitely an area of sharing, how is the CDS codified and made portable (or is it)?

o Re: evaluation, I don’t see too much on usability (ie it’s scattered and doesn’t give a good idea of problems that users may have had with the system) or on clinical workflow. A picture of the interface you describe that illustrates how the ADM CDS is incorporated into CPOE would be helpful.

Again, this is very important work and that it should be published, but not in its current state. Break it down into more than one paper if necessary.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.