Authors’ response to reviews

Title: Clinical decision support tools: analysis of online drug information databases (MS 1777467325120759)

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Dr. Puebla,

Please find the attached revision of our manuscript, Clinical decision support tools: analysis of online drug information databases (MS 1777467325120759), which has been modified in accordance with the referees’ requests. We are also including a point-by-point response to the reviewers’ comments.

Sincerely,

Kevin A. Clauson, Pharm.D.
Referee 1 (JCD)

General
“...body of knowledge doubles every two years” but do not mention from where this evidence is issued?

The citation for medical information doubling is the listed reference 1 (Hotvedt MO). This was provided at the end of the sentence along with reference 2 which corresponded to the assertion about health information technology and safety.

Li publication – What is the interest of categories here? The use of standalone in referring to comprehensive is confusing and unusual.

The Li publication (9) we mentioned (which we would be happy to provide to JCD) is one model of categorizing these types of databases and the one we thought most useful. Granted, the categories are not always mutually exclusive, but for our purposes we used them as an element of inclusion and exclusion criteria. Our primary focus mandated a commercially available database that was comprised of information from a full set of information or the full-text equivalent of multiple books/resources. In contrast, a database that was merely a full-text version of a print book available online did not qualify for inclusion. Similarly, our secondary focus was on freely available databases. If the word ‘standalone’ presents too much of an issue in terms of confusion – we would be willing to modify it, but do not believe this to be this case given the specific context.

...they do not explain what they call an “important category” and why are there categories more “important” than others?

Importance of categories stemmed from a number of sources mentioned in the manuscript. The main determinant was association with how closely correlated with patient safety the categories were, which was the basis for the provision of the example of drug interactions.

The authors have to better explain the interest and validity of the so-called “composite score.”

The interest in the composite score was generated by feedback in early stages. Healthcare professionals were interested in one score that integrated all the elements of the evaluation as a ‘bottom line’. This score has not been validated, but does take into account all three areas. Additionally, a sensitivity analysis was performed based on the choice of weighting and did not result in a change of the rankings of the composite score. We do not believe the correlation with the score for scope to be a problem as that is the primary determinant. A factor such as ease of use should be a deciding factor, not the deciding factor and the composite score reflects this. Additionally, we believe the provision of all three elements’ scores helps to mitigate the concern and the validity of
the composite score. The composite score is simply a tool and, in fact, readers can even calculate their own composite score based on their preferences by simply weighting scope, completeness, and ease of use as they deem fit.

...the authors must reconsider their allegation (cf. the following phrase in the 2nd paragraph of the discussion “However, given the [...] finding of similarity or equivalence is very significant.

Our statement about equivalence and/or similarity is probably too strong. Our intention was simply to point out that despite the fact that (for example) Clinical Pharmacology had a higher score than Micromedex, we could not state it was actually superior...so we couched it in terms of equivalence or similarity. We agree with your assessment and have softened the statement and removed the assertion of equivalence from the manuscript.

The conclusion makes us believe that what has been found for online drug information databases can be extended to all clinical decision support, which this study does not prove.

The intent of our conclusion was definitely not to try and extrapolate our findings to all clinical decision support tools. This is why we focused on and qualified the conclusion to “such as online drug databases”. The conclusion does not attempt to make a sweeping generalization in our minds as we provide the specific subset (online drug information databases).

The authors wish to thank JCD for his review and contribution and hope we addressed his concerns adequately.

Referee 2 (WS)

General
The flaw in this methodology would be the possible lack of reproducibility when a different set of questions were derived by different authors.

We agree with your statement but did not feel the need to state this originally as we believed it to be a universal concern with this type of evaluation. However, we added the sentence, “We also acknowledge that an evaluation conducted with an entirely different set of questions could result in different findings” to the limitations section in the discussion to reflect this possibility.

One could argue that this rationale by stating the level of importance is most dependent on the nature of the question and not the category unto which it falls.
In regards to category rankings, we tied their ‘importance’ to patient safety…So a question type/category more related to patient safety was given more weight. For example, drug interaction (17 questions) is more important in that respect than foreign drug identification (7 questions). However, your point is well taken about context and the nature of the question as a drug identification question could be the key to all the related issues in a given situation.

Major Compulsory Revisions
1. Overall, I agree with the authors on this point….if not, I would use less strong language there and not state it as a fact. This sentence is also repeated…

We agree and have softened the statement from “has been made” to “is likely made“ per your suggestion. This change was made in both places.

2. This is an overstatement…I think a more fair statement would be...

We agree that to make such a definitive statement, additional support would be required. As such, we modified the statement to “have been targeted for their potential value in enhancing safety and improving outcomes”

Minor Essential Revisions
1. F&C 4.0

All instances in the text and tables were changed to Facts & Comparisons 4.0

2. PubMed and Medline

PubMed has been changed to MEDLINE

3. e.g. vs. eg vs. e.g.,

We have encountered different journal requirements/styles but when originally searching through this journal found the format of e.g. was used [most recently in doi:10.1186/1472-6947-6-38, doi:10.1186/1472-6947-6-35, doi:10.1186/1472-6947-7-2]. However, we will conform to the preferred method of the referees/editors.

4. Brand and generic names

We agree and drug names have been converted to the generic names.

5. HIV

It is now listed as “human immunodeficiency virus (HIV)” in the text.

6. HIT and HIT
Both have been removed and both health information technology and heparin-induced thrombocytopenia are spelled out in the text.

7. 3mg vs 3 mg

Dosages in the results section have been changed to the requested format.

Discretionary Revisions
1. It may be fair to include all of the wrong answers…

We actually encountered very few incorrect answers and provided all of them. The manuscript was changed to clarify this.

2. You may want to be more precise in defining what section of Micromedex you used...

We believed that defining what sections of each database we used in the text would be too cumbersome and placed all of that information in Table 1.

The authors wish to thank WS for her comments and believe that the changes made in conjunction with her recommendations will result in a clearer and more correct manuscript.

Referee 3 (PT)

General
It seems to me to be an article that would be of greater interest to the medical librarian community than to the general health informatics community.

We agree that this article would be of value to medical librarians but as practitioners, we also identify its utility and remain confident it will be well-received and valued by clinicians/healthcare professionals.

There is little novelty in terms of what is evaluated or how

We strongly disagree that there is a lack of novelty as there has never been an evaluation of online drug information databases published in the literature.

…the databases are evaluated as databases rather than aids to decision making

Our intent was to evaluate the content of these databases from an unbiased perspective. The content from these databases is used to support decision making for individual patients as well as for patient populations. Additionally, we believe these could be some of the sources that will be considered when content will be integrated into other clinical decision support tools and used in conjunction with the EHR, etc. Finally, there are of
course a number of definitions for clinical decision support, clinical decision support
systems, and clinical decision support tools. Similarly, as you likely touched on in your
book, just because much of the early work in CDSSs was focused on diagnostic tools
does not mean it is limited to that area today.

Major Compulsory Revisions

p4

*More needs to be said about the process by which the set of questions were created. How
was the published literature used? How many questions came from this source?*

The authors assert that the level of detail provided in question development is adequate
and is consistent regarding depth with other evaluations cited in the manuscript.
The published literature was used to provide guidance as to which types/categories of
questions healthcare professionals thought were important. No specific questions were
taken from the literature.

*Describe the NSUDIC’s record of queries, how were the questions selected from this
source? How questions were sent to review, by how many pharmacists were they
reviewed?*

As mentioned in the text, categories were populated with questions after the rankings
were determined. Questions from the NSUDIC database were selected based on need in
a given category. Questions were sent to review by email. Pharmacists representing
areas of community pharmacy, hospital pharmacy, academia, and industry reviewed the
questions. Pharmacists were chosen as they have the highest level of expertise regarding
pharmacotherapy. Examples of questions were included in the text. Again, we assert
that the current level of detail in this section is adequate and consistent with this type of
publication.

*The methods for assessment of ‘ease of use’ seem deeply flawed. …The time taken to
access the information or the user’s assessment of the cognitive effort required would be
much better measures.*

We agree that the method to evaluate ease of use is flawed. However, it attempts to
demonstrate differences in the nature and format of the databases using an unbiased and
easy to conceptualize format. Nevertheless, we listed it as a limitation in the manuscript.
That is also why we explored other options as described in the Ease of Use section
including Referee 3’s suggestion of time (while certainly an appropriate measure for the
Referee in his recent BMC articles - is too volatile and subject to learning curve
development in this instance) and user’s assessment (which is even more subjective).
There is no perfect method to evaluate ease of use. In this evaluation, we tried to select
the least-flawed method for this case and believe we did.

*The weighting of different elements of the evaluation in the creation of the composite
score needs to be justified*
A sensitivity analysis was performed based on the choice of weighting and did not result in a change of the rankings of the composite score. A factor such as ease of use should be a deciding factor, not the deciding factor and the composite score reflects this. Additionally, we believe the provision of all three of the area scores helps to mitigate the concern regarding of the composite score. The composite score is simply a tool and readers can even calculate their own composite score based on their preferences by simply weighting scope, completeness, and ease of use as they deem fit.

*It would seem important to include the manner in which the databases are created and how frequently they are updated.*

Delving into the origin of how each database was created is outside the scope of this article.

**Minor Essential Revisions**  
On page 5 the phrase ‘dose of Refludan for HIT’ occurs. I assume this is either a misprint (HIV?) or a different meaning of the acronym.

We have removed the acronyms for health information technology and heparin-induced thrombocytopenia and have left only the full text per your suggestion.

*In the same passage, I am unclear what an ‘aPPT ratio’ is.*

A change was made from aPTT to activated partial thromboplastin time(aPTT) per your suggestion.

The authors wish to thank PT for his time and contribution toward improving the manuscript.