Author's response to reviews

Title: The expenditure of time using clinical decision support systems in chronic pain therapy

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Response to reviewer comments:

Reviewer 1:

1. The authors list this as a limitation in the Discussion but perhaps they could be more specific about this in the title, abstract and Introduction. I would think that when they use the term ‘workload’ in the Objectives and line 39 in the Introduction and that the title states ‘The expenditure of time..’ this could imply they carried out a complete evaluation of the time required to assess drug-drug interaction with the aid of a clinical support decision system—this they do not do in this study. Perhaps the authors could make the title more specific by adding ‘computer-related’ workload ...

   • Since we did not do a qualitative analysis of the found potential drug-drug interactions but assessed the time for data input, processing and printing the results we changed the title to “The expenditure of computer-related worktime using clinical decision support systems in chronic pain therapy”.

Reviewer 2:

1. As discussed below, the reviewer believes that a complementary evaluation and comparison of what pain physicians think about the three systems would be useful. A short questionnaire would probably be enough to highlight values and problems with each system.

   • As suggested by the reviewer the three employed CDSSs were additionally evaluated and compared by five pain physicians at the University of Regensburg to highlight the main advantages and problems of each system. Furthermore, these physicians were asked to rate main advantages of each System to determine their preferred CDSS. This information was added to the manuscript (Abstract, Methods, Results, Discussion).

2. The authors used three CDSS available in Germany but it is unclear if other tools are available in this country. Why were these three tools chosen?

   • Other CDSS are available in Germany. However the AU, MS and AID check systems were chosen as they are representatives of the major types of CDSS: freely or commercially available, designed for use by both patients and physicians or by health care professionals only, applicable to drugs approved in a specific country or internationally. The reasons for choosing these three CDSSs are now also listed in the manuscript.

3. Also, it is mainly a descriptive study and objective comparisons are very limited. Time was the major criterion used and comparison of other variables is presented in the Discussion section with very few comments. Because some of the variables discussed are rather qualitative, comparison of physicians’ evaluation would have been useful by questioning which of the three systems they would prefer or by asking them to rate the main valuable advantages of each system.... The reviewer believes that the article usefulness would significantly increase if an additional qualitative evaluation is added.

   • As already mentioned above a questionnaire was implemented in the study and five pain physicians at the University of Regensburg were asked to rate the three employed CDSS according to their different characteristics. Furthermore, they were asked to choose their preferred and most practicable check system.

4. Also interpretation of data is limited. For example, is it better to detect a larger
number of interactions or can this be harmful or at least helpless? A discussion between experts to determine if a DDI detected by one of the three CDSS but not by the others would improve medical decision or not.

- Although a qualitative evaluation is not the primary interest of our study we had already mentioned that a large amount of potential DDIs provided by the CDSS can negatively affect a physicians’ work for example due to reduced awareness. Nonetheless, we address the reviewers concern in the newly added pain physician questionnaire. This revealed that the CDSS AU provides many irrelevant DDIs and information. This was taken into account when rating the different CDSSs and discussing how practicable they are.

5. It does not seem that the authors made any analysis of the intrinsic quality of each of the three CDSS used. An in-depth recording of all possible interactions through a specific research made by the investigators could have been the basis for comparison of the validity of each of the three tested CDSS. The study only evaluated if these CDSS “worked” and how much time it takes to use them. It was a pragmatic study but there was no verification that the CDSS were high-quality tools.

Cross analysis of the DDI results obtained with each of the three tools has not been performed. For example in Table 3, the AU CDSS displays a drug interaction between tramadol and pregabalin while this interaction is not described in any of the two other CDSS. As well, the amitriptyline-tramadol interaction is highlighted in the AU CDSS and also in the AID CDSS but not in the third one. This suggests that they are not interchangeable and it would be useful to see if one is better than the others. Time expenditure is certainly one factor but clearly not the only one to decide if this DDI search strategy is useful or not and to choose the best CDSS. It would also be useful to cross check the severity of expected reactions among CDSS and see if severity is consistently described and/or if one of these systems.

- We agree with the reviewer that the reliability of information provided by the CDSSs is an important aspect. The CDSSs may differ in the sensitivity of finding potential DDIs but they are undoubtably popular high performance tools. This has been proven for example for the CDSS AID by previously published studies (www.aidklinik.de/index.php) and by the fact that the CDSS AU drug databank is based on information approved by the Federal Institute for Drugs and Medical Devices and is continuously updated. Irrespectively of this, such a performance rating was not the goal of our study. In fact, several investigations showed that for many physicians the expenditure of time is the major reason not to use a CDSS. Therefore, the aim of this study was to determine how much time the process of analyzing a patients’ drug regimen takes and to evaluate the different CDSSs’ impact on the expenditure of computer-related work time. An extensive qualitative comparison of the three CDSSs as suggested by the reviewer is beyond the scope of our current research and would be the subject of an entire study on its own.

6. Propanolol was not recognized by the Medscape CDSS as the real drug name is propranolol. Similar minor errors in writing were observed for other drugs and the internal search engine was unable to correct them. Interestingly this suggests that the drug name library in this system cannot compensate even minimal for errors in writing.

- Patient regimens that were mistakenly not analyzed because of spelling issues were reentered and analyzed again. Tables and parts of the manuscript which were thereby affected have been reviewed and updated. Additionally, the fact that spelling errors are not tolerated by the CDSS AU and MS was added to the discussion part of the manuscript.
7. Additionally, we are not told if the CDSS used are updated in a regular basis.
   
   • All three CDSS are updated regularly. This information was added to the Materials and Methods section of the manuscript.

8. There are many wrongly written drug names in Table 3 (pantoprazole, amitriptyline, oxycodone...). This should be reviewed in depth and corrected.
   
   • The entire article and especially Table 3 were reviewed and wrongly spelled drug names were corrected.