Author’s response to reviews

**Title:** Instruments for assessing the risk of falls in acute hospitalized patients: a systematic review and meta-analysis.

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**Author’s response to reviews:** see over
Dear Editor,

The manuscript has been revised in accordance with your recommendations. I’ve submitted a new version of the manuscript (Main Manuscript 2) which contains the modifications required (in red font). I redacted this new cover letter giving a point-by-point response to the concerns.

REVIEWER 1:
Minor comments:
Is there an abstract?
   Yes, I’ve attached the abstract to the main manuscript in this version.

Please provide a reference for this:
It is estimated that over 84% of all adverse events in hospitalized patients are related to falls.
   The reference [2] has been included.

What are "safety bars"? Are these grab rails? Can a more generic label be used?
   I changed to “bed rails”

Spell out WC
   I changed to “toilet”

What was the reason to focus on "acute" versus "sub-acute" or "rehabilitation" hospitals. Many tools have been developed in these settings?
   This is due to the special characteristics of the patients in the acute phase of their illness. The following text has been included in “background”: “Hospitalized patients in the acute phase of their disease have specific characteristics. Changes in acuity of illness and medication will affect mobility, physical status and cognition [9], requiring a
special assessment in this setting in order to prevent falls. Moreover, an unknown environment like the hospital can contribute to increase previous risk or generate new risk factors”... “The results of this review will contribute to the implementation of best practices related to preventing falls in an acute care hospital setting”

REVIEWER 2:

Major Compulsory Revisions

- The authors seem to have confused and mixed risk assessment and risk reduction/intervention initiatives. These should be evaluated separately. One review would evaluate the predictive validity of falls risk assessment tools and the other would evaluate the effectiveness of using risk assessments in reducing the rates of falls.

    As it is explained in the “background” section, “The aim of this review is to determine the accuracy of instruments for detecting fall risk and predicting falls in acute hospitalized patients”, so we focused on fall risk assessment tools. This aim is explicitly described in page 6, paragraphs 2 and 3: “this systematic review focuses on establishing the accuracy of instruments, scales or questionnaires (index) developed for detecting or predicting falls (target condition) in acute hospitalized patients, aged 16 or over (patients)”. These tools are usually part of multifactorial interventions to prevent falls and they appear very frequently in risk reduction studies, so we decided to include these studies in the review, with the consequent methodological warnings derived from this decision. We explain this in page 6, paragraph 4: “...the review determines what instruments are available for assessing the risk of falls by acute hospitalized patients, the differences among them in terms of diagnostic accuracy and/or psychometric properties and their potential impact on preventing falls when implemented in the clinical context.” In order to determine what type of studies are included for this purpose, we explain in the section “methods” that “This review focuses on three types of research papers: those which develop diagnostic validity (DV), those which accomplish psychometric validity (PV) and those which evaluate the effectiveness of fall risk assessment instruments (EFRA)”. The “inclusion/exclusion criteria” section details
the studies in what we focused. Additionally, specific review methods were designed for this purpose (described throughout the methods section).

- I am familiar with this literature and that there are a lot more than 14 studies eligible to this review. Many are not even on the list of excluded studies.

As we explain in section “search methods” we searched “MEDLINE, CINAHL, EMBASE, WEB OF SCIENCE, SCOPUS, COCHRANE, CRD, IME, CUIDEN PLUS, ENFISPO, LILACS, COCHRANE PLUS, together with these related websites: PROFANE (Prevention of Falls Network Europe), NSW Falls Prevention Network, Cochrane Bone, Joint and Muscle Trauma Group and Google Scholar. To avoid publication bias we also searched gray literature websites Open Grey, Teseo, Dart Europe and “Tesis Doctorales en Red” (TDR). The search languages were English, Spanish and Portuguese and the periods covered, from the date of the first study indexed in the corresponding database, up to and including 31 August 2011. In addition, linked searches were made in the references for the studies found”. Moreover, specific validated search filters were used as it is explained in page 9, paragraph 2.

All the review process was performed by two blinded reviewers into two phases, as it’s explained in “review method”: “The first stage of our review included a detailed assessment of the titles and abstracts to determine whether each article met the requirements for inclusion. If there was any doubt, the full text of the article was assessed to decide whether it met these criteria”, “After this initial process, all the references identified as potentially eligible were evaluated to see if they met the inclusion criteria for the review.”, and “…a pilot exercise was performed with the reviewers, for application of the inclusion criteria, on a sample of 15 items to reduce the risk of bias”.

As you can see in figure 1, our review process started with 2006 references. After evaluation of title and abstract, we obtained 78 potentially included references. The full text of the 78 articles was evaluated, and we found 14 articles that met inclusion criteria (we only included acute hospitalized patients, not psychiatric, not paediatrics, not community dwelling people, not sub-acute patients, not patients in nursing-homes, not rehabilitation hospitals). Perhaps the references that you mention are between the 1928 references excluded because of not meeting inclusion criteria.
Minor Essential Revisions

- Revise the writing structure; use more active voice and direct sentences.
- Include the citations for the claims, statements and previous studies’ data presented in each sentence.
- Minimize the use of acronyms.
- Request a native English speaker with scientific writing experience to review the manuscript.

The writing structure has been revised. The manuscript was translated from Spanish to English and revised by a native English speaker with scientific writing experience. A list of abbreviations is added to the manuscript. The citations have been revised.

- The search strategies used in each of the databases should be presented as an appendix.

The search strategies are available now as an additional file.

- The way the results are presented is not conducive to use by the reader. Try to present your data in a way that it is easy for the reader to get the main points. It should be user friendly and facilitate decision making on the choice of risk assessment tools.

Some concepts relatives to statistical analysis have been added in order to improve this section.

- The authors should compare their finding with those of other recent reviews and meta-analyses that arrived at very similar conclusions. It is unclear what this review adds that was not previously known.

The following text explaining what this review adds has been added to “discussion”:

“Since V. Scott [50] and T.P. Haines [49] published their systematic reviews of fall risk assessment tools in 2007, there were no new updates focused on that instruments concerning acute hospitalized patients. The systematic review published by Oliver in 2009 focused only on the STRATIFY tool and was not limited to acute patients. In the present review, 9 [22, 24–26, 41–44, 47] of the 14 selected studies have been published since 2007, allowing an update of knowledge available on this topic. This is one of the strengths of this study. Another strength of this review is that contemplated studies assessing the psychometric properties of fall risk assessment instruments.”
In reference to results of previous reviews, you can find this text on “discussion”: “In the systematic review and meta-analysis carried out by Haines in 2007 [49] one of the practical implications described was that although retrospective evaluations are still valuable for generating initial results and identifying the tools and cutoff points that may be useful in clinical practice, less weight should be given to their results than to those obtained from prospective studies, with respect to selecting a detection tool for use in clinical practice. In coherence with this view, all the studies included in the present review conducted a prospective validation of the various instruments examined.”

**Discretionary Revisions**

- State the objectives more succinctly.

  The wording of the objectives has been modified to accomplish this recommendation.

**ASSOCIATE EDITOR COMMENTS:**

Statistical methods used in the study may not be familiar to most of the readers, so please write out the basic idea of each analysis very briefly and include references to further material for interested readers.

References 36, 37, 39, 40, 41 have been added. The following text (and its references) has been included as an explanation in “synthesis”: “DOR combines positive and negative likelihood ratios and it represents a global performance measure: how greater is the odds of having the condition among those with a positive result with the instrument versus those ones with a negative result [36] “.....“This was carried out for exploring additional heterogeneity sources, by adding up co-variables to the model. The exponential transformation of the estimated coefficients can be interpreted as the relative DOR of that co-variable and it shows the change in the diagnostic performance when the co-variable varies[40]. ”
Figure 2 requires further explanation so that it can be read independently. Please also add references to study names. For some reason reference from the manuscript text to Figure 2 seems to be missing - please clarify.

“Forest plot” has been added to the title of figure 2.

This explanation has been added at the bottom of Figure 2: “Forest plot were DOR of each individual study is represented by the blue point and its correspondent 95% confidence intervals. The rhombus and the scattered red lines represent the global DOR and its 95% CI, respectively”

The following text has been added into “Results”: “Figure 2 shows the forest plots with partial DOR of each study included into the meta-analysis, as well as the global DOR for each scale and the 95% confidence interval. “


That article describes the protocol of the research project on which this study is based. PRISMA guidelines claim that prior publication protocol, as in the reviews Cochrane, reduces the impact of the biases inherent in the author and promotes transparency about methods and process, also keep redundant reviews. It is a common practice currently, and its purpose is to show to the scientific community the research efforts, as well as contrast the previously planned activity with what has been done finally. The results obtained are shown in the present submitted article.

Please make the following formatting changes during revision of your manuscript. Ensuring that the manuscript meets the journal’s manuscript structure will help to speed the production process if your manuscript is accepted for publication. *Please adhere to PRISMA guidelines for reporting systematic reviews. PRISMA Systematic Reviews [http://www.prisma-statement.org/](http://www.prisma-statement.org/)

The manuscript has been revised as recommended PRISMA guidelines.
*Title page:
Please include a title page at the front of your manuscript file. It should contain, at
minimum, the names, institutions, countries and email addresses of all authors, and
the full postal address of the submitting author.

A title page has been included. It contains the requested information.

*Abstract:
Please format your abstract according to the guidelines for authors
<http://www.biomedcentral.com/info/ifora/abstracts>. Potential referees will be
asked to review the manuscript having seen only the title and abstract, so it is
important that these are both informative and concise.

Abstract is added to the manuscript according to the guidelines for authors. The text
“systematic review and meta-analysis” has been added to “methods” section.

*Competing interests:
Manuscripts should include a “Competing interests” section. This should be placed
after the Conclusions/Abbreviations. Please consider the following questions and
include a declaration of competing interests in your manuscript:

Financial competing interests
In the past five years have you received reimbursements, fees, funding, or salary from
an organization that may in any way gain or lose financially from the publication of this
manuscript, either now or in the future? Is such an organization financing this
manuscript (including the article-processing charge)? If so, please specify.
Do you hold any stocks or shares in an organization that may in any way gain or lose
financially from the publication of this manuscript, either now or in the future? If so,
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Do you hold or are you currently applying for any patents relating to the content of
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organization that holds or has applied for patents relating to the content of the
manuscript? If so, please specify.
Do you have any other financial competing interests? If so, please specify.
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Are there any non-financial competing interests (political, personal, religious, ideological, academic, intellectual, commercial or any other) to declare in relation to this manuscript? If so, please specify.

*The section “competing interest” has been added.*

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Please acknowledge anyone who contributed towards the article by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. Please also include the source(s) of funding for each author, and for the manuscript preparation. Authors must describe the role of the funding body, if any, in design, in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication. Please also acknowledge anyone who contributed materials essential for the study. If a language editor has made significant revision of the manuscript, we recommend that you acknowledge the editor by name, where possible.

The role of a scientific (medical) writer must be included in the acknowledgements section, including their source(s) of funding. We suggest wording such as 'We thank Jane Doe who provided medical writing services on behalf of XYZ Pharmaceuticals Ltd.' Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements section.

*The section “acknowledgements” has been added.*

*Structure: Please check the instructions for authors on the journal website to ensure that your manuscript follows the correct structure for this journal and article type.*
The structure has been revised and adapted to your recommendations. Section “Results and Discussion” has been separated into two sections, as your guidelines for author explains. Sections “Author’s information” and “Endnotes” have been omitted because no relevant information was necessary to complete them.

We would be grateful if you could address the comments in a revised manuscript and provide a cover letter giving a point-by-point response to the concerns.

Please also ensure that your revised manuscript conforms to the journal style (http://www.biomedcentral.com/info/ifora/medicine_journals). It is important that your files are correctly formatted.