Reviewer's report

Title: Injury coding in a national trauma registry: A one-year validation audit in a Level 1 trauma centre

Version: 0 Date: 13 Jul 2019

Reviewer: Alan Cook

Reviewer's report:

EMMD-D-19-00027

Thank you for the opportunity to review this interesting manuscript entitled "Inaccurate injury coding in a national trauma registry: A one-year validation audit in a Level 1 trauma centre" by Bågenholm, et al.

Briefly, the authors have performed an audit of their trauma registry at a single institution using data from 2015 for 144 patients. The study design is a review by 2 experts as the gold standard who reviewed the raw data from the HER and PACS system. Their results were compared to the coding results from the original coding registrars. Cohen's kappa statistic and Bland-Altman plots were tested the significance of the outcomes of interest. They found 166 missing AIS codes and 157 incorrect codes. Kappa was 0.43 for total AIS codes per patient in the registry. There was good agreement between the reference standard and the registry for ISS and NISS values (0.81 and 0.79, respectively). The authors conclude "the quality of the registry codes was inaccurate, influencing individual patients’ injury codes and ISS/NISS reliability."

The authors are to be commended on their rigorous quality review of their registry data and transparency or their results. This paper has the potential to be an important contribution to the literature. It could also serve as an example for other centers to follow in similar quality improvement initiatives.

There are areas where attention is needed before the paper is suitable for publication in BMC Emergency Medicine.

1.) I disagree with the conclusion, "…across institutions benchmarking comparisons without correction of inaccurate injury codes in the trauma registry." This study is single trauma center study and thus inadequate to support such a broad generalization of the results.

2.) Were there any clinical characteristics at the patient level associated with higher numbers of inaccurate injury coding?
3.) There were two categories of incorrect AIS codes, 1.) coding of a non-existent injury, or 2.) incorrect AIS code with correct or incorrect severity grade. Were there any injuries found on the review of the EHR and PACS data not coded originally?

4.) At what point during the patients' hospital course are the codes gathered by the registrars?

5.) How meaningful are the median ISS and NISS for the entire 144 patients? How sensitive would those measures be to changes of a few AIS severity values of individual patients?

6.) If the AIS severity values were changed in 38 patients in the reference standard, how can that be a true reference standard and why were they changed?

7.) Why were the severity values aggregated into 3 categories?

8.) Did the proportion of inaccurate codes increase as a function of total number of codes per patient?

9.) If the expert coders were involved in any of the original registry data coding, how could their involvement as a reference standard not be biased? I would not expect recall bias but a propensity to miscode a particular injury or injuries? Their objectivity would be tainted.

10.) How many cases did the expert coders participate with? A sensitivity analysis could be performed to determine the amount of bias caused by this limitation.

Minor issues:

1.) In the second paragraph of the Background section, please give example(s) of "…They typically report inter-rater variability between registrars…show low inter-rater reliability…”

2.) Diffuse axonal injury is used once and doesn't need to be abbreviated.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

Quality of written English
Please indicate the quality of language in the manuscript:

Acceptable

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?
If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal