**Author's response to reviews**

**Title:** Coding of procedures documented by general practitioners in Swedish primary care - an explorative study using two procedure coding systems

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**Author's response to reviews:** see over
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Thank you for the opportunity to revise and resubmit our manuscript “Coding of procedures documented by general practitioners in Swedish primary care – an explorative study using two procedure coding systems”. Particular attention has been focused on language during our revision and the manuscript was reviewed by a professional English language editor. We found the reviewers’ comments very helpful for improving the manuscript and appreciate the feedback. In the attached pages, we have addressed each of the questions raised by the reviewers. Based on the reviewers’ comments, we have revised the manuscript as indicated below:

In this cover letter:
- The headings of the reviewers’ comments are in **bold type**.
- The headings of the authors’ comments and revisions are in *italic type*.
- Revised text appears as underlined.

We have not included an acknowledgement section in the manuscript, since no one other than the authors has made any substantial contribution to the manuscript or contributed materials. The figures are cropped as closely as possible.

Please contact me if further explanation is required. We look forward to hearing from you.

Sincerely,

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Reviewer 3

Major Compulsory Revisions

1. The objectives presented for the study should be more clearly stated. They seem to comprise three elements: description of the procedures documented, analysis of how the procedure content/ descriptions within the records map to the two selected terminologies, and comparison between the two terminology systems. The scope of these objectives should also be clarified: the study is described in the title as an explorative study. This should be clear in the objectives and linked to an overarching aim e.g. to indicate areas for future research and investigation/ to inform practice/ policy etc..

Authors’ revision:
1. Page 6-7. A sentence with the overarching aim is added. Objective no. 2 is divided into two objectives and a new objective is added.

2. a. The description of method is insufficient in two key dimensions. Firstly, it is not clear why only 200 records were sampled from a dataset of 11,000,000. It is also not clear why the year 2005 was selected. This may have been because it was the most recent full year of data but this is not explained.

Authors’ revision:
2. a. 200 record entries and the year 2005.
Two new sentences are added on Page 7 under “Methods and material” to clarify the rationale behind the study sample.

2. b. Secondly, the method of analysis is not sufficiently detailed. It is not clear whether this work was done manually or computer-assisted. In the authors’ contributions there is a mention of algorithms used in the analysis but this is not mentioned in the text and further information is not provided. To this end the study is not replicable and therefore cannot be published unless these points are addressed.

Authors’ revision:
2. b. Method of analysis - Manually or computer –assisted.
   - A new sentence is added on Page 8 under “Coding process” to clarify that the coding process was manual.
   - A revised paragraph on Page 10 under “Aggregation and abstraction”.
   - A revised sentence on Page 10 under “Aggregation and abstraction” clarifying that the grouping of KVÅ-concepts was a manual process

3. The information on terminology systems (or ontologies) is insufficiently developed. There is a paragraph describing different generations of terminology systems but this matter is not further referred to in the paper, therefore there is an issue of relevance. Does it matter that KVA and SNOWMED CT are from different generations and therefore displayed different characteristics? This should be further developed. A box detailing the characteristics, together with examples, of the generations described would assist the reader.

Authors’ revision:
- New sentences on Page 4 under “Procedure coding systems”.
- New sentences on Page 16 under “Description and comparison of the degree of concordance”.

Discretionary Revisions

4. The paper does not address the international dimensions of this debate, for example the planned migration of all systems in the UK to SNOWMED-CT re-inforces the value of considerations of this coding framework.
   Authors’ revision:
   New paragraph on page 17 under “Implications for health care and research”

5. The term "terminology binding" (p.17) should be clarified with examples. This term is referred to in the conclusion and should be explained fully.
   Authors’ comment: Terminology binding is explained on page 6 as “Usage of terminology in information systems requires decisions on how the terminology should fit into the information structure, for example with information standards. This process is often called terminology binding [20].”

6. IT solutions are described for end user support. Skills development and training offer complementary support to IT assisted mechanisms and should be considered in relation to this issue.
   Authors’ comment: We agree, but believe that such issues are outside the aim of the study and the scope of the paper and therefore have not made any changes in the article.

7. In the discussion there is a lack of consideration of the importance of coded data in research, for example in epidemiology. This type of secondary usage adds significantly to the case for coded data within EHRs and I would suggest the authors’ draw on this to support their case for further studies.
   Authors’ revision:
   A new sentence is added on Page 19 under “Implications for health care and research”.

Reviewer 1:
Discretionary comments

1. In the methods section, it might be helpful to present one example of how the codes from the different coding systems were mapped to procedures – perhaps in a graphical way.
   1. Authors’ comment: An example is presented in the results in Table 5

2. Can the authors comment on the generalizability of their work to health care systems in other countries?
   2. Authors’ revision:
   See revision under “Implications for health care and research” on Page 17.

3. It might be useful if all the procedures that were matched to SNOMED-CT and KVA codes were included as an appendix – this might be useful to international readers proposing to carry out similar work.
3. Authors´ comment: An appendix is not added because a translation of procedures in the terminology system KVÅ from Swedish to English would be required.

Reviewer 2:
Discretionary revisions

1. Please clearly state the research question
   Please elaborate on why it is necessary
   Authors´ comment: Please see revision of objective in response to reviewer 3, no. 1, 4 and 7.

2. Define terms as much as possible (i.e, concordance, procedure etc.)
   Authors´ comment: A definition of procedure is given on Page 8.

3. Describe how electronic systems and how free-text is documented
   Authors´ comment:
   A new sentence is added on Page 3.

4. Tables 4 & 5 – line separation
   Authors´ revision:
   We have revised Tables 4& 5