Author's response to reviews

Title: The importance of comorbidity in analysing patient costs in Swedish primary care

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Author's response to reviews: see over
The authors have decided to respond to both of the reviewers of our two papers at the same time, as there is a proposal that both papers might be published in the same issue of the same journal. Our responses address the reviewers’ comments point-by-point in two parts, as follows:

PART A: Response to reviewers Jonathan P Weiner (and Chad Abrams), regarding:
Clinical categories of patients and encounter rates in primary health care – a three-year study in defined populations and The importance of comorbidity in analysing patient costs in Swedish primary care.

PART B: Response to reviewer Amy K Rosen, regarding:
The importance of comorbidity in analysing patient costs in Swedish primary care.

PART A: Response to reviewers Jonathan P Weiner (and Chad Abrams), regarding:
Clinical categories of patients and encounter rates in primary health care – a three-year study in defined populations
and
The importance of comorbidity in analysing patient costs in Swedish primary care.

1) General:
The reviewers of this paper Clinical categories of patients… (Paper #1) have also reviewed the second paper The importance of comorbidity … (Paper #2) and suggested the two papers to be published as two parts in the same edition of the same journal. In that case the two papers need to be bridged to one another in some way.

The letter from BioMed Central Editorial confirms that the two papers might be published separately in the same journal with consecutive citation numbers. The authors very much appreciate the proposal and prefer that the papers be published in BMC Public Health. Revisions have been made in both papers in order to connect them with one another – see under 2a) below.
2) **Major compulsory revisions:**

   a) **Linking the two papers to each other.**

      In paper #1 one sentence has been added in the Discussion (10th paragraph, last sentence).
      In paper #2 one sentence has been added in the Introduction (4th paragraph, last sentence),
      and one paragraph has been added in the Discussion (10th paragraph).

   b) **A more substantial discussion on implications of findings for management and further research,** e.g. the stability from year to year observed.

      In paper #1 the order of the two aims has been switched (the proportion of inhabitants
      having an encounter with a GP, and the distribution of ACGs over three years), enabling
      the readers to follow the results and the discussion in a more logical way. Two sentences
      are inserted in the Discussion, commenting on the value of the stability over time (1st
      paragraph, last sentence and 5th paragraph, last sentence). Also, there is an extension in
      one sentence about this in the Conclusion (last sentence).
      In paper #2 a new paragraph is added in the Discussion (10th paragraph), and one sentence
      is added (11th paragraph, last sentence).

   c) **More discussion of limitations, data holes and biases.**

      In paper #1 one new paragraph has been added in the Discussion (6th paragraph).
      In paper #2 one paragraph has been added in the Discussion, pointing out the need for a
      more comprehensive database on costs (10th paragraph).

3) **Minor essential revisions:**

   **Paper #1**

   a) **Including some descriptive statistics comparing morbidity burden across the clinics.**

      The authors had considered this, but did not want to bring up the analysis of differences
      between units as a topic – this was an intended limitation of our results. We want the
      focus to be on the time dimension and the variation over time for each unit.

   b) **More discussion on why use varies so significantly across the clinics.**

      Same comments as in a) above.

   c) **The use of ‘RUBs’ as stratifiers.**

      The focus is limited to clinical aspects, and there is a paragraph in the Discussion (10th
      paragraph) that relates that the resource allocation aspects will not be dealt with in this
      study – but in the following one. Thus the RUBs are not appropriate here. Instead, we
      introduce **ACG clusters, or basic clinical groups.** As for the subset of ACGs we are aware
      of the incompleteness, but think that the 1% limit of ACGs will be understandable (as
      seen in Table 2 and Fig. 1).

   **Paper #2**

   d) **Calculation R-square for concurrent and prospective analyses.**

      The authors realise that the words **concurrent** and **prospective** are useful for understanding
      the different models and agree that they may be used when dealing with ACGs. These
      terms have now been included in a number of sentences throughout the paper (in
      Materials and methods, Results, Discussion and Conclusions). Since we had calculated
      suitable relative weights, based on Swedish costs, we have used the ACG weights in the
      R-square calculation and have found them more useful and easy to understand in this
      context than just dummy variables for the ACGs.

   e) **Applying Ödeshög’s weights or rescaling Ryd’s weights.**

      The method of rescaling might be done, but that might make it even more difficult for the
      general reader to follow how the weights have been constructed and implemented. We
      have preferred not to do any rescaling (as seen in Table 1, last row).
f) **Comment on the dramatic change in the CMI and proportion of females in Table 1.**
The variations seen at Ryd between the two years are quite interesting. The increment in number of patients contacting the PHC centre might be explained by the fact that two trainee physicians started in 2002, increasing the capacity a great deal. However, we consider that the impact of this on our major results is rather small. Some minor comments have been made in the Results (1\textsuperscript{st} paragraph, last sentence, and 2\textsuperscript{nd} paragraph), and in the Discussion, (7\textsuperscript{th} paragraph).

g) **Labelling of tables.**
Have been changed accordingly (see Table 3 and Table 4, headlines).

h) **Extending the prospective analysis.**
The authors agree that this might be interesting, and the proposed scheme is in a good logical order. However, we have chosen not to extend the work with the prospective model in this paper.

i) **Discussion of the implications of the prospective analysis.**
To some extent this has been performed by adding a new paragraph in the Discussion (10\textsuperscript{th} paragraph).

4) **Discretionary revisions:**

**Paper #1**

a) **Page 4 – first paragraph – confusing ADGs and ACGs.**
The ADGs are essential for the understanding of the construction of ACGs, and they have to be understood and therefore they need a sentence of their own. The paragraph has been rewritten (in Material and methods, under subheading Data processing ...., 1\textsuperscript{st} paragraph, 4\textsuperscript{th} and 5\textsuperscript{th} sentences).

b) **Page 4 – last paragraph – variation of an ACG?**
We have changed it to variation within an ACG (in Material and methods, under subheading Data processing ...., 2\textsuperscript{nd} paragraph, 1\textsuperscript{st} and 2\textsuperscript{nd} sentences, and under subheading Application of ACG weights, 1\textsuperscript{st} paragraph, 2\textsuperscript{nd} sentence).

c) **Table 2 – interpretation not intuitive – exclusion of some ACGs?**
The headline of the table has been altered (see Table 2, headline).

**Paper #2**

d) **Translation issue – mean plus three standard deviations.**
Corrected in line with the proposal (in Material and methods, under subheading Creating ACG weights, 1\textsuperscript{st} paragraph, 2\textsuperscript{nd} sentence).

e) **Translation of ICD-10 to ICD-9 codes and version 6.0 or 7.0.**
The authors are aware of the possibility of using another version of the ACG grouping software today. We assume that using the ICD-10 grouper, more accurate ACGs might be the result. However, we are not sure that the implications for our study will be of any other character. Given the time limits for the various authors, this is chosen not be done in this study.

f) **Types of costs included in the analysis.**
Types of costs are described more in detail (in Material and methods, under subheading Cost calculations, 1\textsuperscript{st} paragraph, 5\textsuperscript{th} sentence).
PART B: Response to reviewer Amy K Rosen, regarding:
The importance of comorbidity in analysing patient costs in Swedish primary care.

Major compulsory revisions

1. Regarding articles about Veterans Health Administration.
The authors agree that articles written about VHA are relevant for this article, and one of the references proposed is already within the reference list as #12. We consider this to be enough, because the focus in our study is on the application of ACG weights in a Swedish setting.

2. Choice of the two PHC centres?
The PHC centre at Ödeshög is the only unit where the patient-level clinical costing method has been performed within primary care in Sweden. The choice of Ryd is more pragmatic, but is favourable because this unit has a reliable and diagnosis-promoting EPR system. We have commented on the small scale (see Discussion, 8th paragraph, 3rd sentence), and have contrasted it by adding a paragraph about a trial on Swedish weights in a much larger scale (see Discussion, 10th paragraph).

3. Inpatient care included?
All data are from primary care and PHC centres, which is stated in the aim of the study and in Methods and materials. To be very clear, we have added that data about costs per patient were also solely from primary care (see Material and methods, under subheading Cost calculations, last sentence).

4. Using ADGs instead of ACGs.
The authors agree that this could be done, preferably as a further analysis. However, in our study we very much wanted to stress the patient perspective, especially as we had the actual cost per each patient in both PHC centres. Thus we prefer to concentrate on ACGs and not to explore the ADGs.

5. Application of ACG weights is unclear – better distinction between concurrent and prospective models – deleting prior costs in prospective analysis.
Concerning Application of ACG weights … is not that clear …, we have rephrased the first paragraph and divided it into two paragraphs to be more specific and clear (see Materials and methods, under subheading Application of ACG weights).
Concerning … the regression models run should be clearly specified … concurrent and prospective models …, we have added concurrent and prospective [model] to the text in many places in the paper (in Methods and materials, in Results, in the Discussion and in the Conclusions).
Concerning the suggestion … to delete 2001 costs as the independent variable from the prospective model …, we understand that aspect but we do not agree - we find it worthwhile to study what impact prior costs have in the model. However, we have brought up this topic in a new paragraph (see Discussion, 2nd paragraph).

6. Limitations of the study listed – references? Adding other variables?
Regarding … literature on the limitations of diagnostic coding that they could add …, the last reference in the list deals with this (see Reference #27). To strengthen the focus on limitations of diagnostic coding in a Swedish setting, one reference has been added (see Reference #25).
Regarding … other variables are also worth mentioning and testing …, we found this worthwhile to mention in our paper and have added this in the Discussion and in the Conclusions as well (see Discussion, 11th paragraph, last sentence, and Conclusions, last sentence).
7. Some discussion directly connected with Table 1 – and Table 2.
   The authors agree that the results are interesting, but are eager to stick strictly to the application of Swedish weights in the analysis. However, we have made two small comments in the Results, and have added a new paragraph in the Discussion (see Results, 1st paragraph, last sentence, and 2nd paragraph, last sentence and Discussion, 7th paragraph).

8. Imbalance in discussion of regression results compared to Tables 1 and 2.
   See our comments above (point #7).

   The authors prefer not to extend the paper with more than has already been brought up in the Discussion (8th paragraph, 5th-7th sentences).

Minor essential revisions

- awkward phrasings;
  Changes have been made – most often by constructing full sentences (e.g. Results, 2nd paragraph). The paper has been revised again by a skilled translator.

- the acronyms ACG system and ACGs;
  Changes have been made so as to be consistent (e.g. in Conclusions).

- omitting gender in Table 4;
  Gender had no impact and was omitted. Instead this has been commented in the Results (see Results, 4th paragraph, last sentence).

- indicating tables to be inserted in main text;
  Instructions have been made (as seen in Results).