Author's response to reviews

Title: Relationship between efficiency and clinical effectiveness indicators in an adjusted model of resource consumption: a cross-sectional study

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Author's response to reviews: see over
Reviewer's report
Title: Relationship between efficiency and clinical effectiveness indicators in an adjusted model of resource consumption: a cross-sectional study
Version: 3 Date: 15 December 2012
Reviewer: Wui-Chiang Lee

Reviewer's report:

Point-to-point response to Authors’ responses:
1. The authors have added on information about the measures such as EI, RI, and SI. However, the appendix about the clinical outcome measures are in Spanish that I am not able to figure out.

Unfortunately, the reference document, prepared by the Catalan government, is not provided in official translation from Catalan into any language other than Spanish. To address this question, we have provided two new appendices:
Appendix 1. Components of the general synthetic index (SI): definition and calculation of each indicator
Appendix 2. Construction of the synthetic index (SI): obtaining elements and scores, by Primary Health Care Centre (PHC).

2. The authors redefine and explain the PHCs and BCTs and their relationship in the revised manuscript.
Thank you.

3. The typo “ICD-9-MC” has not been corrected. The authors did not reconfirm them before submission.

We sincerely apologize and have corrected the typo.

4. Last time I suggest to use fewer parameters in comparison. For example, to deselect the visit-based EI. The authors echo my suggestion but did not change anything except remove the visit EI from the Table 5.

We appreciate the reviewer’s comment. We agree that we can work to simplify the presentation of the Efficiency Indices (EI), but all three underlying indices (cost, visits and episodes) are needed for a more robust assessment and for greater comparability of data. Taken together, they help to define the efficiency of each centre or team related to system-wide averages. However, we have again attempted to simplify Table 5 to improve clarity.
5. I am not convinced that the authors adopted Synthetic Index (SI) representing the effectiveness or outcomes of the PHC and BCTs. The authors provide comprehensive Technical Report for reference in Spanish that I could not read. The validity and reliability of using a proxy index based on 20 indicators is questioned. The authors had better elaborate more on the sensitivity and specificity of the SI to the effectiveness of PHCs.

We added two appendices in which we explain in detail how to obtain the 20 indicators and how to calculate the synthetic index. We did not perform sensitivity and specificity analysis. We have added this point of interest to the limitations of the study.

6. The validity, reliability, sensitivity, and specificity of the RI, SI, and EI are crucial to the comparison between ACG-based efficiency and effectiveness. I wonder if almost all measures are proxy indicators for both efficiency and effectiveness, how confident the authors could draw a conclusion to their relationship---the main purpose of the study.

In our study, we apply economic concept of cost instead of the financial concept. In this sense, economic cost is related to the broader concept of resources consumed, both human and physical, direct and indirect.

Using the Palmer & Torgerson framework, efficiency is concerned with “the relationship between resource inputs (costs, in the form of labour, capital or equipment) and either intermediate outputs (number treated, waiting time, etc.) or final health outcomes (lives saved, life years gained, quality adjusted life years (QALYs))”. Expressed graphically:

This article refers to efficiency only as it relates to resource inputs associated with episodes (defined by the care process or arising from explicit patient demand for health services, initiated with the first contact and ending with the completion of contact pertinent to the episode), number of visits (which generate both direct and indirect costs), and the appropriate cost index (Cost EI) measured by the ACG tool. These kinds of efficiency measures have been widely used in different studies where ACG and other case-mix measures assess their capacity to group persons with equal resources. And the use of the Efficiency Index of these three variables is widely accepted in the management area of health services.
We analyse outcomes based on a set of **clinical indicators** (hypertension control, diabetic control, etc.) that we have called the Synthetic index. This indicator is a proxy clinical index of effectiveness, i.e., effectiveness in the clinical context.

<table>
<thead>
<tr>
<th>Efficiency</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Episodes</td>
<td>Synthetic index</td>
</tr>
<tr>
<td>Visits</td>
<td>(Specific Clinical Indicators)</td>
</tr>
<tr>
<td>Costs</td>
<td></td>
</tr>
</tbody>
</table>

This approach shows us how the same ACG can consume more or fewer resources (visits, costs or episodes) while achieving similar, better, or worse outcomes based on the synthetic index of clinical indicators. Measuring or comparing the capacity to do more – better clinical outcomes - with less – lower resource utilization in visits, episodes, and total costs-- is another way of measuring efficiency.

In reference to the risk index (or morbidity burden), this has been used in other international publications, including BMC Public Health,\(^5,6\) as an indicator of the complexity of the set of patients attended by a GP.

We believe it's important to continue to display all indicators that allow us to address different aspects of the same problem.

Reviewer's report

Title: Relationship between efficiency and clinical effectiveness indicators in an adjusted model of resource consumption: a cross-sectional study

Version: 3 Date: 2 February 2013
Reviewer: Richard Glazier

Reviewer's report:

Major Compulsory Revisions

1. Clarify Risk Index (RI). The current paper defines RI as “…the ratio between average expected visits and average number of visits”. In the footnote to Table 4, the RI is “computed as expected visits divided by the average number of visits in the whole population”. The Results state “The RI obtained from the distribution of ACG in each centre…”. Using the ratio of visits to expected visits to define risk is very confusing and makes it difficult to distinguish RI from visits EI which is the ratio of observed to expected quantity of visits. The mean relative weight makes the most sense as a measure of case-mix and risk.

Thank you for pointing out this confusion. We have clearly defined the risk index in Methods and have eliminated any restatement.
The average number of expected visits was obtained indirectly from the average number of visits of the total population in each ACG group.
Risk Index is defined by the ratio between the average number of expected visits to a PHC or BCT for an episode and the average number of visits of the reference population.

2. Provide more details of how the process and outcome indicators were collected and how the synthetic index (SI) was constructed. For example, were process and outcome measures taken directly from the electronic records or were they extracted in some other way? How were judgements made about the whether the indicator had been met? Was the SI based on equal weighting of all 20 factors or was some other method used? The methods appear in reference 19 but it is an unpublished technical report that has no website address (url). On examining the full report, it only defines each indicator and does not describe how it is collected or how scoring of the index is done.

We have provided two new appendices detailing how to obtain the 20 indicators and how to calculate the synthetic index:
Appendix 1. Components of the general synthetic index (SI): definition and calculation of each indicator
Appendix 2. Construction of the synthetic index (SI): obtaining elements and scores, by Primary Health Care Centre (PHC).
We have added a reference with the website address of the original data. Unfortunately, the reference document, prepared by the Catalan government, is not provided in official translation from Catalan into any language other than Spanish, and only the Catalan-language pdf document has been posted, but at a minimum we can respond to the reviewer’s concern about unpublished data.

Minor Essential Revisions
3. It would be important to add the total study population to Table 3 for comparative purposes.

The total study population, 196,593 patients, is included in Table 3 and we have attempted to clarify in the study design that this is the number of patients actually attended in the PHCs of Catalonia in 2008, of a total population of 284,013 assigned to these centres.

Discretionary Revisions

4. It would be very helpful to add a total to Table 3.

Thank you. We have expressed the total results of episodes, costs and visits in Table 1.