Author's response to reviews

Title: Hospital accreditation, reimbursement and case mix: links and insights for contractual systems

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Author's response to reviews: see over
To: Editorial office of BMC Health Services Research journal

Dear Editor and Reviewers,

Thank you for the opportunity to revise and resubmit the above manuscript to your esteemed journal. We thank the reviewers for their detailed and helpful comments which we have addressed in the revised version of the manuscript. Kindly find below a point-by-point description of the changes made to the manuscript.

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Reviewer's report
Title: Hospital accreditation, reimbursement and case mix: links and insights for contractual systems
Version: 2 Date: 25 September 2013
Reviewer: Che-Ming Yang
Reviewer's report:

Comment 1. Searching for better severity measures within each healthcare system’s unique context is always important and has widespread implications for health services. As such, the authors’ attempt should be encouraged.

Response 1: Thank you we very much appreciate this.

Comment 2. The authors tried to come up with CMIs based on ICD-10 to be their gold standards in examining the correlations between severity and their accreditation or reimbursement schemes. This a valid approach based on previous experiences. However, there are a few points that I would like to bring to the authors’ attention and for their further consideration.

Response 2: Thank you for the feedback.

Comment 3. The authors aimed at shedding lights for the contractual system and the most important conclusion is that the current link between accreditation and reimbursement is not appropriate. The evidence is significant difference is only noted between category A hospitals and the others in terms of CMI. But no difference can be found among other categories. The authors only described in the text that category A is paid more and D is paid least. I would like to see more description with respect to the reimbursement schemes to have a better picture of how strong accreditation results can affect hospitals’ financial incentives.
Response 3: Thank you for the feedback, we have described further regarding the reimbursement scheme.

We have added on page 6:
“Using D hospitals as reference, reimbursement rate for category C hospitals is on average 15% higher for medical cases and 10% higher for surgical cases. Category A and B hospitals are on average 30% higher for medical cases and 20% higher for surgical cases in comparison to D hospitals. Thus there is a strong financial incentive for hospitals to have higher accreditation category.”

Comment 4. Three proxies considered by the MoPH are brought up in the article. But I cannot get a clear picture as to for what they are going to be proxies. What are the intended uses of these proxies proposed by the government? The ends justify the means. The bad correlations between these so called proxies and CMIs do not necessarily denote that they are bad proxies. Chances are they could have better performance than CMIs in the uses proposed by the government.

Response 4: Thank you for the feedback. We have clarified the intended use of the proxies and we take your point that no correlation is not bad, however it means that these proxies cannot replace CMI.

We have added on page 10:
“The proxies were developed by MoPH to discourage adverse behavior. The purpose of looking at correlations between these proxies and CMI is to investigate whether or not they are compatible. For example the proxy to discourage misuse by avoiding resource-intensive cases would at least not contradict CMI-based payment.”

Comment 5. In Table 1, the lowest CMI for category A hospital is 0.92, and yet the highest CMI for category C hospital is 2.06. The authors kind of indicated that this points to the inappropriateness of the reimbursement system. However, I will have to pose two questions with respect to this finding. First of all, how confident are the authors about coding accuracy? In the limitation section, the authors said that there is no direct link between reimbursement and coding, therefore there is no financial incentive for the hospitals to upcode. This reality also gives rise to the suspicion that there is no need to code correctly either. Especially in the lower accreditation level hospitals, their staff might be ill quipped to code correctly. If, for argument’s sake, there is no coding problem, the second question is that the phenomenon some C hospitals treated seriously ill patients might not be evidence of the inappropriate reimbursement schemes. This might be caused by the problems of health care delivery system. For instance, really sick people are stuck in the health care delivery system, i.e. category C hospitals. Even though they should be transferred to a higher level hospital, they could not due to the barriers in access. Therefore, more discussions could be developed in these two aspects.
Response 5: Thank you for the feedback. We are confident that the codes entered are accurate due to the following reasons:

1. We have added on page 17:
   “whose tasks include oversight of codes recorded, as well as proper medical archiving being a criterion for accreditation […]”

2. Medical archiving and ICD coding are part of the accreditation standards. All hospitals are trained and audited against these standards. This provides an incentive to code correctly to get higher accreditation score (higher class) and hence better payment rates. At the same time there is no financial incentive for over-coding.

3. One of the main tasks of MoPH physician controllers is to check coding accuracy, as well as approve all admissions and procedures undertaken by the hospital. Controllers have regular trainings on coding. However we wanted to mention that despite this, events of miscoding do occur as would be expected in any other system. We do try to minimize these by analysis of admissions in the MoPH utilization review system.

We thank you for your pertinent remarks regarding possibility that problems in the delivery system may keep people with serious conditions stuck in for example category C hospitals. We should include this in our analysis. Nevertheless we believe in such cases that C hospitals should not be penalized by being underpaid just because they belong to this category. This strengthens our argument that rates should take into account CMI.

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Reviewer's report
Title: Hospital accreditation, reimbursement and case mix: links and insights for contractual systems
Version: 2 Date: 2 September 2013
Reviewer: William Reinke
Reviewer's report:
General
Comment 1. The paper gives a clear presentation of an important health care classification problem, describes an appropriate methodology and database for assessing the problem, and subjects the data to analysis that is for the most part careful and thorough. For example, cognizance is taken of the likelihood that variances in subsets of the data are unequal.

Response 1: Thank you very much for the feedback.

Major Revisions
Comment 2. The formula for distinguishing hospitals according to their case mix index is appropriate and clear. It is not clear, however, how weights were determined in each of the disease categories. Nor is there a discussion of the ease and feasibility of establishing such weights. The system chosen is a substitute for the use of DRGs. It can be justified if it can be shown that the system is easier to use in a setting like Lebanon and is nearly as valid as the DRG system. It is essential, therefore, that the necessary description and justification be provided.
Response 2: We had mentioned on page 4 that there had been a past initiative to implement DRGs in Lebanon, however it was not carried out due to limited resources at the time. To address this issue, please find below a summary of changes made.

We have added to page 4:
“Currently all hospital admissions covered by the MoPH are coded using ICD-10, and as such an ICD-derived CMI would be of greater ease to use due to a decade of experience by both MoPH and hospitals in use of ICD-10.”

We have added on page 8:
“In developing the ICD weights we excluded all ICD codes that had less than 5 admissions in the population, a practice which has been widely used in the literature [12]. A total of 217,550 cases across 122 hospitals (96.4% of all records) were thus included in our study population.”

We have added on page 9:
“The weight for each code was determined by dividing the average cost of the code by the average cost of all codes.”

We have added on page 16:
“The calculation of hospital CMI and ICD weights is relatively easy to perform, and in the case of the latter, more accurate weights for low-volume codes can be obtained as additional cases collected across two or more years.”

Comment 3. Certain differences are statistically significant and therefore declared to be real. Where differences are found to be non-significant, they are erroneously considered not to exist (effect 0). In fact, real differences may exist but have not been shown beyond a reasonable doubt. The analysis of readmissions by Accreditation in Table 4 is a case in point. A hierarchy of mean values (.027 to .007) clearly exists from A to D, even though some of the paired differences may not reach statistical significance. The discussion of statistical findings should make clear the difference between "an effect does not exist" and "an effect has not been shown to exist."

Response 3: Thank you for this important note, this has been edited in the updated submission.

We have edited on page 13:
“Examining hospital accreditation and readmission measures revealed a hierarchy of means from 0.027 for A hospitals to 0.007 for D hospitals. Significant difference was noted with C hospitals having a higher proportion of readmissions than D hospitals for both readmission measures, and category A having a higher proportion than D for any-hospital readmissions. The difference between category A and D hospitals did approach significance for same-hospital readmissions.”

We have edited on page 15:
“Readmission increased as accreditation category increased, with the lowest accreditation category (D) having lower readmissions than each of category A and C hospitals, though no significant difference was found between these latter two categories.”
**Discretionary Revisions**

**Comment 4.** Undoubtedly, the number of observations differs among hospitals. Therefore, differences between categories (e.g., Accreditation levels) could be due to differences generally in a category, or due to the effect of a few exceptional hospitals that contributed a large number of observations. There is no evidence that precautions were taken to prevent the latter confounding, and there is no discussion of how serious the effect might be. The authors admit that the hospitals are not homogeneous; therefore, the concern for confounding is not trivial.

**Response 4:** Thank you for the feedback. To address this we have run an ANCOVA with CMI as dependent variable, accreditation category as independent variable, and volume (number of admissions) as covariate. The results were the same as in previous analysis. Therefore after controlling for volume, and for size (as mentioned in the article) our findings regarding CMI and accreditation do not change.

We have added on page 11:
“...To address possibility of confounding due to either volume (number of admissions) or hospital size, we performed analysis of covariance (ANCOVA), with our findings regarding accreditation and CMI remaining unchanged.”

**Additional general response:** Reviewers’ comments and suggestions also provided us with the opportunity to do further updates in the Ministry of Public Health database and billing system which we have further refined this manuscript. The p-value of public versus private hospitals CMI decreased further and we have edited on page 14: “The CMI of private hospitals was higher than that of public hospitals, however the range of CMI was wider among private hospitals, with some admitting lower CMI than public hospitals. This suggests that some private hospitals may be shifting resource-intensive patients towards public hospitals [...]”

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We sincerely hope that our response adequately addresses all the suggestions and concerns of reviewers and we look forward to hearing from you.

Yours sincerely,

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