Author's response to reviews

Title: Performance of the Pediatric Index of Mortality 2 (PIM-2) in cardiac and mixed Intensive Care Units in a tertiary children's referral hospital in Italy

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Author's response to reviews: see over
To the Editor,
BMC Pediatrics

Dear Editor,

We have revised the manuscript entitled “Performance of the Pediatric Index of Mortality 2 (PIM-2) in cardiac and mixed Intensive Care Units in a tertiary children’s referral hospital in Italy”.

Please find below a point-by-point response to Reviewers’ concerns which have been addressed in the revised manuscript.

Reviewer: Angela S Czaja

Responses to Reviewer

Overall, I believe the authors have responded sufficiently to my comments and concerns.

We thank Dr Czaja for acknowledgment that her comments to a previous version of this manuscript have been met.

Issues with remaining concern are listed below:

Although I recognize that the researchers initiated the study with the specific goal of assessing the PIM2 performance in an isolated CICU, they also assessed its global performance in addition to performance within PICUs separate from the CICU.

As reported in Background, this study was conducted in tertiary care Children’s Hospital with three PICUs and one CICU, with the aim of assessing the PIM2 performance in children admitted to intensive care units after cardiac surgery. We have now modified the last sentence of the Background to further clarify this point.

I would argue that their results show potentially inadequate performance, in general (overall SMR of 0.7, AUC 0.79 and significant H-L test). therefore, I suggest that they add this more comprehensive finding to the conclusions of abstract as well as within the text.

Conclusions in the abstract and in the text have been modified as suggested.

Similarly, under the manuscript conclusions, I’m not certain that the study confirms how feasible the PIM-2 is to use. I don’t disagree that the score is easily applied with variables that are often readily available--hence, its attractiveness...just not certain that the study objectives cover this. Similarly, the findings of the study may actually suggest
that it (in its current form) may not be the best adjustment tool for monitoring outcome and QI as stated by the authors. It may mean that it needs recalibration of the coefficients or redevelopment.

Although assessing the feasibility of PIM2 was not quoted in the objectives of our study, confirmation that the score is indeed easily applied and acceptable for routine use by the health care professionals even in PICUs with high volumes of activity (as shown by the high completion rates) may be of interest to other hospitals who are considering its adoption. We have now included this point in the Discussion.

We agree with the reviewer that PIM2 in its current form may not be the best adjustment tool for risk adjustment. In the Conclusions, we have thus mentioned the need of score recalibration.

Additionally, I still believe that the multivariate model does not add much additional information (with respect to their intended study purposes). The authors just demonstrated that the tool has fair-to-moderate performance in this population--to then use it as an adjustment tool in a multivariate model is confusing. if is does not perform well, we don't know how it would impact the risk estimate of other factors (such as reason for admission) if the performance were better. Even if the score was an adequate adjustment, the only conclusion is that the admission for cardiac surgery is associated with a lower risk of mortality than admission for a medical reason (without adjustment for a host of other variables that may impact mortality)...does not say anything about the performance of the PIM-2. If the authors (and other reviewers and editor) feel this remains an essential component of their study, I would suggest discussing these issues within the text.

We feel that the multivariate model is a useful addition to the analyses, and helps to complete the picture. In fact, in our results SMRs did vary by Unit, and different Units admitted patients with different age distribution and main reason for admission. It was then of interest to investigate whether in our patient population these variables and the Unit of admission may have a significant influence on mortality in excess to the proportion predicted by PIM-2 score. To this regard, we have added a sentence to the Discussion. We hope that this revision can be considered as satisfactory by the Reviewers and the Editor. If not, we will revise the paper by removing the multivariate model.

Minor Essential Revisions:

1. In the background, third paragraph, i would suggest expanding "US" to United States. Done

2. In the methods section, I would suggest breaking up the sentence that beings with "The collection and analysis..." to improve the clarity. Done

3. Under the "data analysis" section, I would suggest adding in a sentence that clarifies that the unit of analysis was the individual admission. I believe in the sentence of the H-L test - "che" is intended to be "chi".

   As suggested, a sentence specifying the unit of analysis has been introduced at the beginning of the Data Analysis section. Typo has been corrected.

4. Table 1 - the row title for length of PICU stay has a couple of typos ("length"
misspelled, an extra word "to" in the line). *Typos have been amended.*

Thanking you in advance for your consideration.

Sincerely,

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