Reviewer's report

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

Version: 3 Date: 1 May 2013

Reviewer: Angela S Czaja

Reviewer's report:

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

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 it 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.

Minor Essential Revisions:

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

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

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"

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)

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests