Reviewer’s report

Title: Validity of the CR-POSSUM model in surgery for colorectal cancer in Spain (CCR-CARESS Study) and comparison with other models to predict operative mortality

Version: 0 Date: 14 Sep 2016

Reviewer: Kate Walker

Reviewer's report:

This is a well written paper with clear methods and results. However, the authors do not make sufficient case that the study is needed. Part of the issue with this is that they only compare 4 models and there are many in the literature, some of which they reference in the discussion. Justification is needed for the choice of these 4 models. Secondly, there are already external validation studies comparing the models in similar patients, as referenced by the authors. Thirdly, the authors are not clear whether they are comparing a model for risk adjustment in order to make comparisons between healthcare providers or a prognostic model to guide clinical decision making. This is an important distinction which affects the requirements of the model and the variables that should be included in it. Fourthly they do not sell this comparison of models as an external validation or make wider recommendations from their findings about which model should be used. Instead they focus on the use of the models in one setting (Spain), which limits the potential of the study.

The main conclusion of the study is that a new model is needed to discriminate patients with high risk of death. This conclusion cannot be drawn when only 4 models have been compared.

Some more specific comments:

1. Line 201: R is not defined. It is not necessary to give the link function for a logistic regression as this is standard.

2. The "enter" method of recalibration needs more explanation and a reference. Does this method differ from re-fitting the model with the same variables in the new dataset?

3. What was done about missing data?

4. In the results it needs to be clearer whether each of the AUCs is for re-calibrated models.

5. When looking at calibration of the models, more emphasis should be given to the calibration plots and less to the statistical test (Hosmer-Lemeshow) as the latter is under-powered to give evidence of a lack of calibration with fewer than 50 deaths.
6. The impact of exclusions and missing data is not sufficiently acknowledged as a limitation, or investigated where possible.

7. The authors describe the study as large and yet there were fewer than 50 deaths. This needs to be acknowledged as a limitation.

8. The authors say that none of the models they compare is specific to colorectal cancer patients. But at least two of their references are models specific to these patients they need to justify why these models were not included in their comparisons.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

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