Reviewer’s report

Title: The Predictability of Claim-Data-Based Comorbidity-Adjusted Models Could Be Improved by Using Medication Data

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Reviewer: Guangxi Li

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In this manuscript, Dr. Bang et. al. tried to improve the Charlson and Elixhauser model by using medication data; specifically, they used medication data to estimate the omitted comorbidities in the claim data. This is an interesting study which showed that the predictability of comorbidity-adjusted models can be improved by the addition of missed comorbidities inferred from patients’ medication data. However, there are several significant limitations noticed in this study.

Major comments:
1. In the methods part, the different performance was compared with c-statistic while in the conclusion the author concluded the better performance in the enhanced model. However, the c-statistic value did not differentiate at all at a significant level. How could you come to a conclusion that enhanced model could improve the prediction?

2. The Charlson comorbidity index was developed to measure the baseline disease severity. It was well documented to show the good performance to predict the prognosis of cancer patients. The author excluded all the cancer patients without a good justification. Although the palliative care might affect the survival, many papers already documented CCI could be used to predict the hospital mortality in cancer patients. Since it is a comorbidity index and not a acute physiology score(APACHE), there is no reason to exclude cancer patients.

3. It looked like there was no place to show the model performance in the prediction of survival. The individual morbidity was given in the table 2. Please make table 2 more clear to the audience. Please summarize the CCI and enhanced CCI C-statistic for in hospital mortality.

Minor revision:
A figure should be given to the audience regarding the linear correlation between the enhanced score and original score. The score in the enhanced model might be higher than the original one. Please clarify this in the revised manuscript.

Level of interest: An article of limited interest

Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.