Reviewer's report

**Title:** Comparing potentially avoidable hospitalization rates related to ambulatory care sensitive conditions in Switzerland: the need to refine the definition of health conditions and to adjust for population health status

**Version:** 3  
**Date:** 1 December 2013

**Reviewer:** Gary Teare

**Reviewer's report:**

This is an interesting paper that points out the need for more than just age-sex adjustment for truly comparable use of Ambulatory care sensitive condition hospitalizations as an indicator of Potentially Avoidable Hospitalizations.

**• Major Compulsory Revisions**

The author must respond to these before a decision on publication can be reached. For example, additional necessary experiments or controls, statistical mistakes, errors in interpretation.

NONE

**• Minor Essential Revisions**

The author can be trusted to make these. For example, missing labels on figures, the wrong use of a term, spelling mistakes.

1. The cohort structure is a little confusing. The authors state that the period of observation was from January 1, 2005 to December 31, 2005 or December 2006. They say that independent variable values were determined in the period Jan 1 – June 30, 2005 and that follow up time to outcome was up to 182 and 547 days. This is a bit confusing. Was it that they had one year of data from some Cantons and two years of data from others – (or some insurers provided one years of data and others provided 2 years)? In other words - why the difference in follow up time? This should be explained in the “Studied Population” section of the Methods. If the different lengths of follow up are due to different amounts of data (ie. Follow up time) being made available by different data sources, then the authors should demonstrate that bias wasn’t introduced into the analysis by non-random distribution of the independent variables among the various sources – since the frequency of occurrence of the outcome (PAH) would be different among the data sources, given the different follow up times available. Is the IRR the same for the various independent variables when only 6 months vs 18 months of follow up time are available?

2. The description of how number of medical visits/services was parameterized in the final model is not clear. All morbidity variables were included as dummies (present/absent). The description in the Methods section makes it sound like the...
actual number of medical services/visits was included as a continuous variable, however in the Discussion section the authors say “information on previous medical visits is also useful for identifying the healthiest individuals (without any visit) and the sickest (> 19 visits in 6 months)”... and “..We did not include the category ‘1 to 20’ consultations in the adjustment model....” So – was the parameterization of “medical visits” done as 2 dummy variables; the first coded as 1/0, where 1 = patient had NO visits; and the second coded as 1/0, where 1 = patient had 20+ visits? Please clarify in the Methods section in the description of independent variables.

3. The study would be strengthened if the analysis had involved splitting the population randomly and building models in one half of the data and applying the predictive model to the other half. The modelling, as performed, give an overly optimistic value for prediction power of the model (pseudo-R-squared) – considering that the way risk-adjustment models are applied is that they are generated based on data in one year (or a portion of the total data set) and applied to data from a subsequent year (or a different portion of the data set) – in order not to apply adjustments derived from ‘over-fitting’ data. The fact that this was not done for this paper does not take away from the central message of the paper... that age-sex adjustment is insufficient, and that adjustment is improved by using multiple sources of morbidity data and by including a measure of prior ambulatory health care service utilization. I would, however, like to see a statement in the Discussion section pointing out that the fit statistics shown would not likely be replicated in ‘real world’ application of the model for risk-adjustment, since one would not properly risk adjust a set of data using a statistical model derived from that same set of data.

4. In Table 2, ACSC-related multi-morbidity is mislabelled as “ASCS-related multi-morbidity”

5. Table 2 is long. If it will span more than one page in the published version it needs the header/labels row to be repeated on each page.

• Discretionary Revisions

These are recommendations for improvement which the author can choose to ignore. For example clarifications, data that would be useful but not essential.

6. The “Conclusion” section should put greater emphasis on the value of previous intensity of ambulatory medical service as a predictor for ACSC hospitalization. This is a major finding in your paper – it’s inclusion out-weighs the effect of most of the morbidity measures and nearly doubles the predictive power (as measured by pseudo-R-squared) of the risk-adjustment model.

7. I am not exactly happy that the morbidity definitions are not entirely transparent – that is, they are taken from an apparently proprietary classification system (SQLape) and the ICD codes associated with each of the groups is not listed in the paper or appendices. This limits the replicability of the study. This is not a “show stopper” because the paper is not advocating a specific risk-adjustment model, but is rather just pointing out the need for morbidity and health service intensity to be added to risk-adjustment to ACSC rates.
Level of interest: An article of importance in its field

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