Reviewer's report

Title: Is it possible to identify cases of coronary artery bypass graft surgical site infection accurately from claim data? A multi-model comparison study

Version: 2
Date: 15 November 2013

Reviewer: Maaike SM van Mourik

Reviewer's report:

In this paper, the authors set out to validate the use of ICD9-CM for the detection of surgical site infections following CABG procedures and compare performance to three alternative approaches.

The aims and motivation put forward by the authors is clear, however the manuscript could be considerably improved in several ways.

Major compulsory revision

1. The authors do not clearly explain the ‘traditional method’ of surveillance. This is a key component of any research of surveillance methods and should be presented clearly to readers (who performs surveillance, how is it performed, are there any validations etc…?). I would strongly recommend using the STARD guidelines for reporting of diagnostic accuracy studies.

2. For their ‘identification based on use’ the authors describe three alternative approaches (criteria-based, probabilistic and based on CART) using combinations signs of infection. In the logistic regression model, the authors do not specify how co-linearity between variables was handled, if variable selection was performed and what arguments were for selection of the predicted probability cut-off. In the CART model, model reduction (pruning) was allowed, therefore perhaps giving an unfair comparison.

3. In the results, the authors do not specify whether a threshold could be found for model 4 (logistic regression) that gives similar performance to model 5 (in other words, if accepting a sensitivity of 87.5, what are the associated specificity, PPV and NPV). This would allow for a more balanced interpretation of the findings. I would also be very interested to know what variables were included in the logistic regression model and what the overall performance of the model was (eg area under the ROC curve, calibration).

Minor essential revisions

1. In the introduction, the authors discuss several approaches to using data in models for SSI detection. They refer to the probability-based approach, also in comparison to the criteria-based method. I would like to point the author’s attention to a recent review in Clinical infectious Disease comparing exactly these two methods for HAI surveillance (vol. 57 p 85 – 93).
2. In tables 2 and 3, the authors present their performance estimates as percentages. Could the authors somehow present raw number or confidence intervals for their estimates of performance?

3. In the exclusion criteria paragraph, it is stated that cases of ‘postoperative surgical site infection and mortality’ are excluded. This is unclear to me, isn’t this an important group of cases that one would be interested in finding? Or perhaps I misunderstand what the authors mean.

4. Figure 1 is very difficult to understand for untrained readers. It requires better lay-out and a more comprehensive legend.

5. Table 1: could you present length of stay as a median with interquartile range? This is likely to be a heavily skewed variable.

6. In your discussion, you may want to expand your statement concerning the lack to generalizability “to hospitals offering different levels of care” to include other payment systems. In other words, do you expect that your findings will be applicable to other countries/payment systems?

Discretionary revisions
1. Abstract: The wording ‘alternative use-based models’ does not have a clear interpretation. Perhaps the authors can rephrase

2. The authors refer to their third approach of surveillance as data mining. This word, however, is used so broadly in the current literature that it is interpretation is not unequivocal. Perhaps they can use more specific wording.

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

Quality of written English: Needs some language corrections before being published

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