Reviewer’s report

Title: The most dangerous hospital or the most dangerous equation?

Version: 1 Date: 18 June 2007

Reviewer: Jerod Loeb

Reviewer’s report:

General

To begin, I was really intrigued by the title of this paper; however, I'm afraid I found rather little that is new in this short rumination on statistical methodology. I should note immediately that I am not a biostatistician. The observation that hospitals with smaller sample sizes (although the authors do not refer to the sample size directly but a surrogate of the sample size, namely the number of hospital beds) have more variability in measure rates is well known. Perhaps more importantly, one might wonder whether the authors should have focused on actual mortality associated with a specific procedure (i.e., CABG as in the hypothetical construct in the paper) and its association with case volume (rather than global mortality and bed size alone). We can only hope that no one appropriately using statistical methodology would make a decision about whether a hospital is a high or low performer based only on the hospital’s overall mortality rank; the standard deviation and confidence interval need to be taken into account as well. Even better would be to use a statistical methodology that incorporates the sample size into a measure of the hospital rate, such as hierarchical methods, to determine the statistical significance of the HSMR. If the Dr. Foster report only reported the HSMR with no measure of variation or statistical significance, then the observation that the results could be misinterpreted is valid, but perhaps more appropriate as a letter to the editor rather than a paper.

Specific Comments

I found the abstract very confusing. It appears that the authors meant that the true mortality rates are independent of hospital sizes in the second sentence from the end, but this is a very strong assumption. I think the authors meant to point out that the variation is proportional to the square root of the sample size in the fourth sentence, as they assume in the paper (without any justification), but this isn't made clear here.

A 352 bed hospital small would not be considered small by US standards. More appropriately, the actual sample size of the measure should be used to evaluate the potential variability of a hospital’s rate, not a surrogate such as hospital beds. Sample sizes of this magnitude would not be expected to vary appreciably, although only if all the hospitals actually had the same rate and the same patient mix (again a strong assumption) would this be expected to misidentify a hospital as being an outlier.

The assumption is implicitly made that the patient populations are similar across hospitals. No mention is made of the risk-adjustment methodology that the Dr. Foster report used and its potential influence in identifying poor or good performing hospitals.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

See comments above.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

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Discretionary Revisions (which the author can choose to ignore)
What next?: Reject because too small an advance to publish

Level of interest: An article of limited interest

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:
I declare that I have no competing interests.