Reviewer's report

Title: Improved risk adjustment for surveillance of healthcare-associated bloodstream infections: a retrospective cohort study

Version: 1 Date: 27 January 2009

Reviewer: Deverick Anderson

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Major compulsory revisions:
1. The abstract is not well written. There is no background in the "background" nor methods in the "methods."

2. The authors never present their raw data. I am left wondering 1) how many infections occurred at each institution (for all four groups)? 2) what was denominator for each hospital? I recommend that the opening paragraph to the results provide a summary of the unadjusted data prior to launching into the many models. This will help readers determine if the authors’ results are generalizeable to their own institutions.

3. More information is needed on data entry. (can be a reference if previously described). Authors mention "voluntary" involvement - this raises questions about completeness of data. For example, results from the CDC’s NNIS system are often questioned b/c they only require a minimum amount of data entry (one month per year) and it is up to the hospital to choose which month. Clearly, it is very easy to "cook the books" with such a method to ensure that your hospital looks good. So, was data entry complete for all hospitals during the study period? Were similar definitions and methods used. These questions must be explicitly answered in your methods.

4. The discussion contains nothing on the limitations of the study. One major limitation that the authors need to expand upon - If you are not actually examining the contributions of infections/rates specifically from the services you included, you are making a leap that the mere presence of a service leads to more complex care and thus higher risk of infection. Second, more discussion of the definition of each of these services are needed. While some services may be broadly generalizeable (renal dialysis), others are not. What type of patients are seen in Infectious Disease service for example?

5. I have great reservations about the exclusion of intensive care unit service from the analysis. In most published work and in my own experience, ICUs are considered the epicenter of BSIs, particularly central-line associated BSIs and/or BSIs due to resistant pathogens. The authors say that this service was excluded due to collinearity. To what? I would make every effort to include this service in your analysis. This, however, inevitably raises the issue of different types of ICUs - trauma, post-op, cardiac, etc. All of which have different risks associated with
them. Still, to exclude ICUs is a mistake in my opinion.

6. The discussion needs to be expanded to better help readers understand the results of this study in the greater context of HAIs, public reporting, and benchmarking. The second paragraph of the discussion should be moved to the results - otherwise there is no mention of Figure 1A or 1B in the results section. The authors note that interhospital variation decreased after applying their model. Can't this happen simply b/c of a large model due to regression to the mean? Is this necessarily a good thing? Seems that this model actually makes it even harder to determine differences between hospitals. Finally, the authors suggest hospital-specific risk adjustment for OBSI and staph - why didn't they do this as a second part of the analysis?

As it is now, this analysis seems mainly to be of use solely to the group for which the authors work. The novelty of the approach and the impressive statistical analyses provided may still be enough to keep some readers' interests, but I think it will leave most readers wanting more explanation.

Minor essential revisions:
1. Please add note to methods - were models checked for confounding as variables were removed?

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

**Declaration of competing interests**:

I declare that I have no competing interests.