Reviewer’s report

Title: The Impact of Inappropriate Antibiotics on Bacteremia Patients in a Community Hospital in Taiwan: An Emphasis on the Impact of Referral Information for Cases from a Hospital Affiliated Nursing Home

Version: 2 Date: 9 July 2013

Reviewer: Marin Schweizer

Reviewer’s report:

This study by Yang et al., assessed the association between inappropriate antibiotics therapy and mortality. While the setting of this study is interesting, a community hospital with ties to a nursing home, the statistical analysis and definitions of variables need much work.

MAJOR COMPULSORY REVISIONS
1. More information needs to be included about the logistic regression analysis. How were variables chosen to be included in the initial model? How were variables removed from the model?
2. In order to determine whether a factor in table 1 is a risk factor for severe bacteremia or part of the causal pathway from bacteremia to mortality, the timing of when these were measured should be documented. For example, WBC and other labs collected prior to hospital-associated infection could be an indicator of underlying severity of illness, while these labs after the positive culture would be an indication that the patient is dying from the infection, which of course would be associated with mortality. Another example of this is the ventilator variable, ventilator use prior to infection would be thought as the primary source of the infection while ventilator use after the infection means the patient is dying from the infection, which is less interesting.
3. Confusion and septic shock should not be in a model with mortality as the outcome. Of course these are associated with mortality since they are in the causal pathway between infection and mortality.
4. ‘Delayed appropriate antibiotic administration’ needs to be explained better. Was day 0 the first day that an antibiotic was given as described on page 7 or the day the patient was admitted as shown in figure 1. Is this only compared with patients who had initial inappropriate antibiotic therapy or all patients? Were there any patients who never got appropriate antibiotics? Were there patients who had more than 4 days to appropriate antibiotics (figure 1 only goes to 4 days)? This should really be measured using survival analysis not a bar chart. Also, how was the p-value calculated? Did the authors use multivariable analysis? What was in the model?

MINOR ESSENTIAL REVISIONS
1. Table 1 need subheaders. “Lung” doesn’t mean anything unless it is under a
subheader called primary source of infection.

2. The ORs in table 1 all need a reference group when you have more than 2 categories for a group. For example, the OR for a normal WBC should be set at 1 and the OR for the other WBC groups should be compared with the normal reference not with everyone else who is in the cohort.

2.a. Similarly, page 11 states, “those with... nursing home-acquired BSI were more likely to survive,” but it doesn’t say what this is compared with. According to table 1, a smaller proportion of patients with community-acquired infections died compared with nursing home-acquired (11% vs 14%) so why wasn’t community acquired mentioned here?

2b. What are the comparison groups for Table 2? Does it make sense to compare nursing home-acquired infections to a combination of both community-acquired and hospital-acquired infections? This is assuming that “came from nursing home” means nursing-home acquired but this should be specified since a patient may have been admitted from a nursing home but had a hospital-acquired infection.

3. The mortality rate is very high, especially among patients with hospital-acquired infections. A subset analysis should be performed using 30-day in-hospital mortality as the outcome rather than all in-hospital mortality to see if patients are really dying from their infections or from other causes.

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests