Reviewer’s report

Title: First multicenter study on multidrug resistant bacteria carriage in Chinese ICUs

Version: 2

Date: 21 May 2015

Reviewer: Matthew P Muller

Reviewer’s report:

Review – First multicenter study on multidrug resistant bacterial carriage in Chinese ICU

This study evaluated the prevalence of colonization with MRSA, ESBL Enterobacteriaceae, and 3rd generation cephalosporin resistant P.aeruginosa and Acinetobacter species at 8 Chinese ICU. All ICU patients were swabbed on admission and then weekly. Multivariate analysis was used to identify risk factors for positivity at baseline and for acquisition in the ICU. Baseline prevalence and attack rates are presented. This study presents important data on the prevalence of MDRO in Chinese ICU.

Major Comments

Abstract:

The methods section of the abstract is too brief. More information on the methods used, particularly the multivariate analysis, should be included.

In the results section, it would be worth including more of the key results (e.g. results of multivariate analysis for both baseline prevalence and acquisition and some data on the individual pathogens assessed separately if space permits).

In the conclusion, it should be mentioned that in addition to a high baseline prevalence of MDRO there was also a high attack rate, exacerbating this problem. These appear to be the two key findings of this report. Many studies have evaluated risk factors for MDRO acquisition but what is unique about this report is that it represents Chinese data and therefore these are the key results (i.e. prevalence and attack rates in Chinese ICU – not the risk factor data)

Introduction/Background:

This section is relatively clear. There are some language issues (see minor comments)

Materials and Methods:

Please provided data about the ICU’s involved in the study other than their geographic location. Data should be presented on the type and size of these ICU
and ideally a ‘table 1’ that described the population of each ICU in terms of mean age, gender, a severity of illness score, common diagnoses, and % ventilated would allow comparison with ICU outside China.

Results are presented in terms of prevalence rate, prevalence density rate, attack rate, etc. These terms should be defined in the methods.

In the Methods section, Surveillance program subsection, it states that patients were swabbed on admission and then weekly. How were clinical specimens dealt with (e.g. what if a urine or blood specimen obtained for clinical purposes was positive for an ESBL? Was this data included?)

In the Methods section, Analysis subsection, it is mentioned that multivariate analysis was done. In fact, it appears that there were at least 2 and possibly more multivariate analyses done and each one should be specified in terms of the outcomes studied in each meta-analysis.

In the Methods section, Analysis subsection, it is stated that a backwards regression was done. More details should be provided about how this was done. What criteria were used to remove variables from the model? Was this an automated process? How was model performance evaluated?

Results:

No results are presented comparing ICUs. Data on the key outcomes should be presented for each ICU to allow an assessment of variability between regions and ICUs. Did some ICU have very high attack rates and some have lower rates or were rates similar? Were some pathogens more significant by ICU or region?

It appears that a large number of variables were assessed in univariate analysis and then included in the multivariate analysis. Is there a potential problem with multiple hypothesis testing when considering the univariate results? Should bonferoni corrections be applied and if not, why not? Were an appropriate number of variables included in the models relative to the number of outcomes? This should also be mentioned in the limitations section.

In the results section, paragraph 4 it is stated that “surprisingly, receiving a glycopeptide before MRSA acquisition remained associated with a high risk of MRSA acquisition”. Was this the outcome of a multivariate analysis – this should be specified? Why is this result surprising?

The multivariate findings should be presented in their own table.

Discussion:

In the first paragraph it is noted that “As expected, the risk of acquisition increased with the duration of ICU stay and the use of antibiotics”. Was duration of stay included in the multivariate model? If so, was it significant in the multivariate model?

Was colonization pressure considered as a potential variable to include in the
multivariate analysis addressing attack rate (e.g. was the number of patients colonized with MDRO at admission within a given time period and ICU associated with the risk of acquisition of MDRO within the same time periods and ICU? Could colonization pressure be presented or included in your models?

MRSA rarely occurs 'de novo' and the high attack rates seen in your study therefore suggest potential deficiencies in infection control practices. It is stated that hand hygiene and other infection control metrics were not assessed but it should be stated at some point that, in addition to antibiotic use, poor infection control practices likely contributed to the high attack rates seen.

In the 3rd paragraph, it is stated that “besides length of stay, the most important risk factor for MDRO acquisition was antibiotic exposure”. What was the basis for this conclusion – were these variables compared together in the multivariate analysis? Or is this simply ‘obvious’? Also, did length of stay vary between the 8 ICU?

Tables and Figures:

Table 1 should include numerator and denominator data in addition to the percentages to allow complete interpretation.

Minor Comments:

In the introduction, last sentence of the 3rd paragraph (“consequently, available data on bacterial resistance based may bias results…”). This sentence is unclear and should be revised.