Reviewer's report

**Title:** A prospective study to examine the epidemiology of methicillin-resistant Staphylococcus aureus and Clostridium difficile contamination in the general environment of three community hospitals in southern Ontario, Canada

**Version:** 1 **Date:** 3 August 2012

**Reviewer:** Maria Clara Clara Padoveze

Reviewer's report:

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Ref.:

A prospective study to examine the epidemiology of methicillin-resistant Staphylococcus aureus and Clostridium difficile in the general environment of three community hospital in southern Ontario, Canada.

Authors: Meredith C. Faires et al

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Review recommendation: Major Compulsory Revisions

**Is the question posed by the authors well defined?**

1. **Background**

   The authors proposed in the study objectives different questions to be answered. However, in the Background section it remains unclear what is the advantage in studying concurrently MRSA and C. difficile to answer these questions. Is there any biological or epidemiological interaction between them which justify such choice?

**Are the methods appropriate and well described?**

1. **Methods. Setting:**

   The settings should be better characterized. The authors have stated they are studying the environment in an endemic scenery of MRSA and C. difficile, therefore it is indispensable to inform how about the endemic situation, i.e. the prevalence or incidence in each hospital. The number of beds for each hospital should be informed and not only from 150 to 495, since it is a reasonable difference in bed numbers, which impose differences in these sceneries that are being evaluated.

2. **Methods. Sampling:**

   2.1. Please clarify the criteria for the surfaces choice and how was defined the representativeness of sample for each type of surface and material.

   2.2. The authors informed that there were no changes in the cleaning protocol during the study period. Therefore it is necessary to give a general information
regarding the cleaning protocol (at least whether they use or not disinfect on surfaces and which type of disinfectant) and if all hospitals had followed the same protocol.

2.3. Sampling from patients:” MRSA isolates from patients hospitalized during the study period were obtained”. Please clarify the following: a) what was the topography of samples (anterior nares?), b) what was the criteria for sampling patients (All patients, patients after 48h of admission?), c) how many samples per patient; d) were the patients readmitted during the study period re-sampled, d) what was the method for sampling patients (dry swabs? moistened swabs?)

3. Methods. Processing:

"The presence of methicillin-resistance was confirmed by testing for penicillin-binding protein 2a". Please clarify why this method was used instead of evaluating oxacillin and cefoxitin.

Are the data sound?

The data sound partially and some of them should better clarified.

1. Results. Descriptive statistics:

1.1. "There was no significant difference in the crude prevalence between MRSA and C. difficile." Please, clarify the meaning of "crude prevalence" in this situation. The number of 11.8% is clearly different from 2.4%, therefore it is surprising finding no statistical significance (if the crude prevalence refers to this data).

1.2. The findings that Hospital C have higher prevalence highlighted the importance of better information regarding the settings characteristics, as mentioned previously in this report, and may be related to other factors rather those explored in the study.

1.3. "Over the study period, the prevalence of MRSA and C. difficile fluctuated in all three hospitals." It is difficult to understand this fluctuation without knowing relevant epidemiological data in those hospitals, at least information regarding infection rates, patient case-mix, etc. This point of view also applies to the information regarding environmental prevalence which was different among the surgical and medical wards.

2. Results. Positive on multiple visits:

Comments on results showed in Table 3. The number of samples collected was quite different among types of surfaces and material. It would be interesting to know if this difference is representative in those hospitals environment. Taking into consideration this point, the differences found in contamination among this surfaces and materials may be attributable by a chance and not a true risk factor. Once again here, the patient's epidemiological data may play a role not assessed by the study

3. Results. Statistical Model:

3.1. Please clarify why plastic material and computer keyboard was used as a reference for statistical analysis.
3.1. "The variable hospital was forced into the final model as a fixed effect, as identifying differences among hospitals was a goal of this investigation." This goal was not clearly stated in the objectives mentioned in the Background section. To identify and understand potential differences, more information regarding hospital characteristics are needed.

3.2. Results from Table 8 is difficult to interpret. Please, clarify the meaning of the comparison done for each type of surface, since it was done also a multivariable logistic regression.

Does the manuscript adhere to the relevant standards for reporting and data deposition?
Yes. I suggest to authors to reduce the number of tables to be more concise in data report.

Are the discussion and conclusions well balanced and adequately supported by the data?
I suggest improvement in data discussion, mainly a better exploring the true meaning of some data.

1. Discussion

1.1. Some comments on Discussion section regarding the hospital C ("in this facility, visitors are not required to put on gloves and isolation...hospital personnel, patients, and visitors were present...") would better fit in the Methods section to better characterize main features in each hospital to be evaluate and the conditions of environment sampled. However, I do not recommend to include any commentary that are not based on systematic process evaluation or at least document standard from the hospital because it can introduce a bias since they are vague and were not homogenously assessed by the study design among those settings.

1.2. It would be very useful to better comment and compare against the literature the meaning of the mean predicted probability showed in the Figure 1.

Are limitations of the work clearly stated?

1. Some limitations of the study were previously mentioned in the present report and I suggest they may be considered by the authors.

2. Mentioned limitations as "not all environmental surfaces were sampled each week should be stated in the Results section since they are more related to fails in data collection rather than to the study design.

3. It remains inconclusive whether the higher prevalence in some surface type / materials is due to hospital infection prevalence rates, inherent characteristics of the materials, poor quality of cleaning and disinfection protocols, failures in the application of these cleaning / disinfection standards or even due to flaws in the study design.

Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
Yes.
Do the title and abstract accurately convey what has been found?
Yes
Is the writing acceptable?
Yes.

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

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I do not have any financial or non-financial conflict of interest relevant to the reviewed paper.