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:** 2 August 2012

**Reviewer:** Ginny Moore

**Reviewer’s report:**

**Major Compulsory Revisions**

Method:
1. Paragraph 2: sampling occurred one day a week for four consecutive weeks – why was this sampling period selected? Do the authors feel the four “snapshots” give a good indication of general ward contamination? Was the sampling period long enough to determine commonalities and/or trends (e.g. the re-contamination of high touch surfaces; the persistence of MRSA/C. difficile on inadequately or infrequently cleaned surfaces)? Bearing in mind the low number of positive sites should/could the study have been extended?

2. Paragraph 3: Rather than using a more conventional sampling technique (e.g. swabs, contact plates, sampling sponge), electrostatic (Swiffer) cloths were used to sample the surfaces - were they used dry? Whilst they may have been effective in removing loosely attached dirt and dust, how effective were they in removing contaminants that had adsorbed to the surface? Was their use validated? It is possible that the sampling technique reduced the recovery of the target organisms, particularly C. difficile.

3. Paragraph 9: Could size of sample site have influenced the results obtained?

**Minor Essential Revisions**

1. Abstract:
   a. Results section: results associated with C. difficile should also be presented

   b. Conclusions: bearing in mind statements in the background - were there “associations or commonalities between environmental contamination with MRSA and C. difficile”.

2. Method:
   a. Paragraph 2: the surfaces to be sampled were “pre-determined”– what was the basis for this selection – the authors’ previous work or the literature?

   b. Paragraph 5: were the clinical MRSA isolates nasal isolates or taken from other sites? Was the site of infection/colonisation recorded?
c. Paragraph 6: did the enrichment broth contain agents to neutralize any effect of residual cleaning chemicals picked up by the cloth during sampling?

d. Paragraph 6: did the authors plate the (patient) culture swabs directly onto blood agar or did they sub-culture the MRSA already isolated from the swab? If the former, why blood agar as opposed to the chromogenic agar?

e. Paragraph 6: please clarify why two methods were used to classify spa types.

3. Results:

a. Paragraph 3: 46 MRSA isolates from patients were collected – were these taken from 46 different patients or were multiple isolates collected?

b. Paragraph 7: It is stated that the variables “hospital” and “presence of C. difficile” were significant at the 25% level for the presence of MRSA on a surface. However, the overall statistical significance associated with these variables is cited in Table 6 as being 0.384 and 0.277 respectively.

c. Paragraph 8: “Identifying differences among hospitals was a goal of this investigation” – was this achieved? Could explanation(s) for difference(s) be provided?

d. Table 3: Hospital A C. difficile keyboards reads “0% (3/25)” should this read 0% (0/25) or 12% (3/25)? If the latter, are other results affected?

Discussion:


b. Paragraph 5: The difficulty in cleaning some surface materials has been highlighted, what about cleaning frequency? The authors allude to differing infection control policies (paragraph 6) did cleaning protocols also differ between hospitals?

c. Paragraph 10: Sampling surfaces after they had been cleaned may have provided information regarding cleaning efficacy and/or rapidity of recontamination.

Discretionary Revisions

Much focus is placed on the statistical model, both in the text and in the tables of results. Whilst, the analysis is obviously important, it is difficult for the reader to determine when and what surfaces were contaminated and, with respect to MRSA, with what spa type.

The authors identify the four surfaces most likely to be contaminated but they also acknowledge that the number of positive sites was small and advise caution when interpreting these results. With this in mind, there are other potentially interesting results that could be highlighted. For example, both MRSA and C. difficile were recovered from “clean” bed linen and “clean” isolation gowns –
could this have been due to contamination by staff; cross-contamination from a contaminated storage cart or a failure in the laundry process? MRSA and C. difficile were also recovered from carts located outside the rooms of patients under isolation. Were the isolated patients infected with MRSA and/or C. difficile? Did the environmental isolates have the same spa type or ribotype as those from the isolated patients?

Whilst typing data for all MRSA isolates is provided, individual spa types are only given for isolates recovered from surfaces that were positive on multiple visits. 53% of the surfaces sampled in hospital C during week 2 were contaminated with MRSA. It is hypothesized that this was due to a large number of one patient’s family members being present the night before sampling. Were all these surfaces contaminated with the same spa type? The patient was not known to be MRSA positive. Was the patient screened on the basis of the results obtained?

Similarly, in comparison to previous weeks, more surfaces were contaminated in Hospital B in week 3 and in Hospital A in week 4 – were these examples of widespread contamination of a single spa type or were a number of different strains isolated?

34% of the environmental isolates were spa type 7/t064 – these were all isolated from Hospital C – during the same week, periodically or throughout the study?

How much of the information in Tables 1, 3 and 4 is actually necessary – tables (one per hospital?) detailing when and what surfaces were contaminated (positive sites only?) and what spa types were isolated could benefit the reader.

Minor issues not for publication

Methods Section; Paragraph 7: “Presumptive” may be more appropriate than “Suspicious”

Reference 14: please change “Hospital Environments” to “hospital environments”

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

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