

Author's response to reviews

Title: Reduction of Clostridium Difficile and vancomycin-resistant Enterococcus contamination of environmental surfaces after an intervention to improve cleaning methods

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Author's response to reviews:

Dear Editor,

We would like to submit a revised version of our manuscript entitled "Reduction of Clostridium Difficile and vancomycin-resistant Enterococcus contamination of environmental surfaces after an intervention to improve cleaning methods" for consideration as a Research Article in BioMed Central Infectious Diseases. Our responses to the comments of the reviewers are below.

Thank you,

Curtis Donskey, M.D.

In response to Dr. Hayden's comments:

Minor revisions

1). The author omitted a word in the Results section of the abstract.

We have inserted the word "staff" as recommended.

2). They should state the general class of the disinfectant.

We have noted that the disinfectant is a quaternary ammonium compound (page 6, paragraph 1).

3). The authors do not report the total number of cultures obtained.

We have added information regarding the total number of cultures obtained. Six sites were cultured in each room (Methods, page 6 paragraph 3). The total number of cultures and overall % positive for C. difficile and VRE has been stated in the Results section (page 9, paragraph 2 and 1st 2 lines of page 10).

Discretionary revisions

1). The authors should consider mentioning the 4 month followup period in the abstract.

We have added this to the abstract Methods section.

2). Was each surface wiped and sprayed?

We have clarified that we wiped the surfaces with bleach to provide physical removal of dirt or other substances and then sprayed with bleach to ensure that surfaces were thoroughly wet (top of page 8).

3). Was the same spot swabbed for culture, then disinfected with bleach, then cultured again? If so, the initial swab may have removed residual bacteria.

Yes. However, we routinely performed swabbing followed by broth enrichment cultures on sites that had already been swabbed for direct plating and found that none of the sites had negative cultures (see response number 4 below). We have not modified the manuscript.

4). In Figure 1 and in the Results section, are the results those of broth culture or direct plating?

We have clarified that the results are for broth enrichment cultures (page 9, 2nd paragraph, line 1). We have noted that all cultures positive by direct plating were also positive by broth enrichment (page 10, 2nd paragraph).

In response to Dr. Bloomfield:

1). Background, sentence 2--I'm not sure what is meant by "transmission by direct contact".

We have reworded the sentence to the following: Although direct contact with patients is generally considered the major source for acquisition of pathogens on healthcare workers' hands and subsequent transmission to other patients, several recent studies suggest that contaminated environmental surfaces may also play an important role in pathogen transmission [2-10].

2). The authors should give more details on how they confirmed the efficacy of the disinfectant products.

We have added additional information to clarify the method used (page 11, first paragraph). The original manuscript incorrectly stated that 10(8) of the pathogens were used; we have corrected the number to 10(6).

3). I think the figure should say after cleaning by research team.

We have modified the figure as suggested.

In response to Dr. Dettenkofer:

1). The term cleaning should be used when detergents only are applied. In other cases, the term disinfectant

is more adequate.

We have modified the manuscript in several areas to use disinfection rather than cleaning when application of bleach is described. However, we have often continued to use the general term cleaning to describe the work of the housekeeping staff (i.e., cleaning of the room may include both use of detergent to mechanically clean surfaces and application of bleach to disinfect selected surfaces).

2). A key question is whether the remarkable improvement was due to improved performance or use of bleach.

We agree that improved performance is probably more important than the use of bleach, although use of bleach is necessary when killing of *C. difficile* spores is required. We have added a statement clarifying this fact (last paragraph, page 13).

3). Spraying disinfectants should be avoided whenever possible for patient and healthcare worker safety.

We have noted that this practice should be avoided if patients or healthcare workers are present (last paragraph, page 13). However, our housekeeping staff stated that spraying of surfaces at the end of their usual terminal cleaning was simple and not associated with any adverse effects.

4). Abstract, next to last sentence--add "staff"

We have added the word staff.

5). Figure 1. The numbers of rooms assessed should be indicated.

We have added this to the figure legend.