Author's response to reviews

Title: Evaluation of an automated ultraviolet radiation device for decontamination of Clostridium difficile and other healthcare-associated pathogens in hospital rooms

Authors:

Michelle M Nerandzic (michellenerandzi@aim.com)
Jennifer L Cadnum (cadnumil@gmail.com)
Michael J Pultz (michaelpultz@gmail.com)
Curtis J Donskey (curtisd123@yahoo.com)

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Author's response to reviews: see over
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Dear Editor,
We would like to submit a revised version of our manuscript entitled "Evaluation of an automated ultraviolet radiation device for decontamination of Clostridium difficile and other healthcare-associated pathogens in hospital rooms" for consideration as a Research Article in BioMed Central Infectious Diseases. We appreciate the helpful comments of the reviewers. We have modified the manuscript accordingly. Our responses to the comments are below.

Thank you for your consideration,

Curtis Donskey, M.D.
Cleveland VA Medical Center, Geriatric Research, Education and Clinical Center,
10701 East Blvd., Cleveland, Ohio 44106
Phone: 216-791-3800 ext. 6153 or 4788
Email: curtisd123@yahoo.com
In response to the comments of the Editor:

Editorial request:
You have stated that the manufacturer provided the devices used in this study. Please could we ask you to clarify if you got them for free or if the manufacturer was involved in the study in any way, and if so, the 'Competing interests' declaration will need to be amended.

In 'Acknowledgements' we clarified that the device used in the study was temporarily loaned to us free of charge (Lines 308-309) and that the manufacturer was not involved in the study in any way.

The questions that are asked of authors are:

Financial competing interests

In the past five years have you received reimbursements, fees, funding, or salary from an organization that may in any way gain or lose financially from the publication of this manuscript, either now or in the future? Is such an organization financing this manuscript (including the article-processing charge)? If so, please specify.

**No, we have not received any reimbursements, fees, funding or salary from an organization that may in any way gain or lose financially from the publication of this manuscript, now or in the future. The study and the manuscript processing charge were funded solely by a grant from the Department of Veterans Affairs.**

Do you hold any stocks or shares in an organization that may in any way gain or lose financially from the publication of this manuscript, either now or in the future? If so, please specify.

**No, we do not hold any stocks or shares in an organization that may in any way gain or lose financially from the publication of this manuscript, now or in the future.**

Do you hold or are you currently applying for any patents relating to the content of the manuscript? Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript? If so, please specify.

**No, we are not applying for any patents relating to the content of the manuscript. We have not received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript.**

Do you have any other financial competing interests? If so, please specify.

**No**
Non-financial competing interests

Are there any non-financial competing interests (political, personal, religious, academic, ideological, intellectual, commercial or any other) to declare in relation to this manuscript? If so, please specify.

No

In response to the comments of Reviewer 1:

This report is much improved. The authors have attended to the comments, which would have involved considerable work, and is appreciated. I do not personally think that this methodology is going to spare hospitals the requirement for cleaning by professional domestic and other staff, but it represents innovation and interest, and could always lead to additional and superior technologies. Regarding appropriate notation for Enterococcus in a scientific paper, it has always been my understanding that when the genus is mentioned in the text bereft of specific species, or species notation, it is not necessary to italicise, e.g. Enterococcus; Legionella, etc..
If the genus is coupled with a species, e.g. Enterococcus faecalis, or with singular or plural species notation, e.g. Enterococcus sp. or Enterococcus spp., then italicisation is the norm. Maybe we do things differently re. UK examining or indeed, for the Journal of Hospital Infection. You decide.

We appreciate the reviewer’s comment. The editorial staff may edit the genus and species names in accordance with the journal’s usual style.

In response to the comments of Reviewer 3:

The authors have responded quite well, with the revised manuscript being an improvement and the added details have aided reader understanding. This is a good article with importance in this particular area, as non-toxic means of room decontamination are required.

Discretionary revisions:

The authors may wish to leave out line 38 to 39 after the word "monitoring".

The line after the word monitoring has been omitted (line 38).

Suggest that the section in the methods which deals with microbiology be moved towards the beginning of the methods, perhaps after preparation of c. diff spores.

The 'Microbiology' section of the manuscript was moved to the Methods section after 'Preparation of C. difficile spores' (Lines 88-98).

Although the authors have accepted the limitations of the technology, they may
choose to acknowledge some limitations of their methodology. For instance they use direct plating of swabs to ascertain the concentration of bacteria inoculated to a surface and to ascertain how many remain after exposure. How can direct plating (and counting!?!?) lead to there being a known quantity of 10,000 bacteria inoculated onto a surface as is indicated from what was done with the positive control? Direct plating also has inherent limitations, typically, less than 30% of bacteria are released from the swab, and depending on the swab, 100% recovery from the surface would rarely be achieved. As such there may be an underestimation as to how much may have actually been applied, but also how much was actually recovered.

We added a paragraph addressing these methodological limitations in the 'Discussion' section of the manuscript (Lines 283-290). We do agree that it is difficult to quantify 10,000 bacteria with precision using the direct plating method. Serial dilutions of the baseline for each bacterial solution (pre-swabbing) established the maximum load inoculated onto each surface. As noted, recovery and release of bacteria from swabs is less than 100%, therefore the majority of the samples had levels that were easily counted using traditional colony counting techniques. All samples (before and after treatment) were processed in a standardized fashion, and therefore any methodological limitations were equally shared by baseline and experimental groups.