Author's response to reviews

Title: Evaluation of a pulsed-xenon ultraviolet room disinfection device for impact on contamination levels of methicillin-resistant Staphylococcus aureus.

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Author's response to reviews: see over
Dear Prof. Harris,

Thank you for the opportunity to re-revise the paper, “Evaluation of a Pulsed-Xenon Ultraviolet Room Disinfection Device for Impact on Contamination Levels of Methicillin-resistant Staphylococcus aureus” (MS: 4555114099752751). We have now addressed all of the issues raised by reviewers and feel the manuscript is much improved as a result. If there are any additional concerns, we will be happy to revise the manuscript.

Below please find a point-by-point response to the reviewer critiques. We look forward to hearing from you again.

Sincerely,

Chetan Jinadatha, MD, MPH
Point-By-Point Response to Reviews (our responses are preceded by “>>”)

1. Juergen Gebel: Version 4  Date: 9th Feb 2014

1. PPX-UV-Device (page 4): there is no explanation if the patients can stay in the room during the disinfection procedure.
   >> We appreciate the reviewer pointing out this important con of an UV device. We have now included a sentence highlighting the con of an UV device with reasoning. (Page 4, Paragraph 3, Lines: 2-3).

2. Methods (page 6): the description of the standard manual cleaning with Dispatch is not sufficient. Concentration, contact time and information of wipe materials (single use?) is missing.
   >> We have updated this information on page 6 of the manuscript to include all the missing information about standard manual cleaning with Dispatch. Here is what was added: “Dispatch® is a pre-mixed, ready-to-use 1:10 bleach solution with a contact time of 1 minute for killing bacteria. EMS personnel used cotton rags soaked in this pre-mixed solution with one to two applications and passes for all areas and surfaces in a patient room regardless of soiling. On an average, EMS personnel used 3-4 rags per room. These multiuse rags were then laundered for later use in another room.” (Page 6, Paragraph 2, Lines: 3-8).

3. Methods (page 6): PPX-UV - the description how to clean visibly soiled surfaces by hand is not accurate enough.
   >> We appreciate reviewer pointing out missing information. We have now updated that information to include the process of cleaning visibly soiled surfaces in PPX-UV arm. Here is what was added: "In the second group (PPX-UV arm; n=10), the room was pre-cleaned using same process described in the manual arm using Dispatch® except the focus was to clean only the visibly soiled surfaces instead of every surface in the room to achieve an aesthetic clean vs the thorough cleansing of the manual arm thus saving valuable turn-around time. Then the PPX-UV device was deployed according to manufacturer's protocol.” (Page 6, Paragraph 3, Lines: 1-4).

4. Measures and Analysis (page 7): The failure of the authors to implement a photo-reactivation of PPX-UV irradiated samples.
   >> We appreciate the reviewer bringing forth an important yet complex aspect of UV disinfection. Unfortunately this study was not designed to evaluate the photo-reactivation of PPX-UV irradiated samples. But in a separate study we checked for photo-reactivation and development of UV resistance in MRSA and Gram negative rods after 5 minutes of pulsed xenon UV light exposure (which is the standard run time for a position) and found that photo-reactivation or UV resistance was not a practical concern. We plan to publish these results in a separate manuscript. Our results are similar to published literature where coliforms exposed to low pressure mercury lamps or pulsed xenon lamp(10 flashes) have a higher tendency to photo-reactivation of up to 50%. But, when the number of flashes (>10) or the energy level (>35millijoules/cm^2) are increased, photo-reactivation reduces (Water Sci Technol. 2003;47(3):185-90)( Water Res. 2009 Feb;43(3):815-21). The measured irradiation of pulsed xenon UV light at 4 feet is >35 millijoules/cm^2, and the number of flashes per 5 minute cycle is 360 which are both above the threshold for photo-reactivation. The methodology involved in testing UV resistance and photo-reactivation is too complex to cover in the current manuscript hence our plan to publish a separate manuscript.