Reviewer's report

Title: Evaluation of a hand-held far-ultraviolet radiation device for decontamination of Clostridium difficile and other healthcare-associated pathogens

Version: 1 Date: 9 February 2012

Reviewer: John M. Boyce

Reviewer's report:

The authors have addressed the timely issue of the use of new technologies for decontaminating surfaces in healthcare facilities. The study is well-designed, the methods are appropriate (and are more complete than those used by other investigators for similar environmental decontamination studies). The manuscript is well-organized. Including methods that evaluated efficacy on surfaces with organic load (bovine serum albumin and fecal material) was appropriate, and something omitted in studies by other investigators.

Minor essential revisions
1. Page 6, lines 113-115 and page 10, lines 188-189. It was not entirely clear to this reviewer whether ozone measurements were conducted by the investigators, and if so, what methods were used.

2. Page 11, lines 223-225. The text states that UV-C room devices may require 45 min to disinfect a room, and that hydrogen peroxide vapor (or mist) systems may require hours for disinfection of a hospital room. The study by Boyce et al. of hydrogen peroxide vapor did not evaluate various cycle times to determine the shortest time required to eliminate C. difficile from hospital rooms. So shorter cycle times may have been effective. Otter et al. (J Clin Microbiol 2009;47:205) found that C. difficile suspended in 0.3% BSA was eliminated in 30 minutes. Therefore, consider modifying the statement made in this paragraph.

3. Page 17, Table 1. How could mean colony counts for C. difficile and VRE be less than 1 (0.23 and 0.47), when the lowest number of colonies listed in the ranges was 1 colony? It seems that the mean would have to be greater than 1. Also, how did you establish that some surfaces had MRSA colony counts of 1000? With most standard agar plates, it is nearly impossible to count more than 200 colonies on a single plate.

Also, if 28 sites were positive for C. difficile Before Sterilray treatment, and only 11 sites were positive After Sterilray treatment, then 17 sites must have revealed no growth after treatment. So wouldn’t colony count ranges for surfaces by 0-2 for C. difficile After Sterilray?

Discretionary Revisions
1. Page 11, lines 226-227. The text states that the Sterilray was used “repeatedly”, without apparent adverse effects on surfaces. Was the device used more than 3 times on any given surface? If so, give some indication of how many
times a single specific object was decontaminated, without effect.

2. Page 12, lines 234-236. Consider mentioning that ATP assay systems could be used in future studies to establish the relative level of organic material on surfaces before use of the Sterilray device, and the impact on decontamination efficacy.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

I serve as a consultant to Bioquell LLC, 3M and Clorox Company, and previously served as a consultant to Cardinal Health. I have received honoraria from Advanced Sterilization Products. I received research support from Lumalier and Clorox.