Author’s response to reviews

Title: Factors influencing microbial colonies in the air of operating rooms

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EDITORS' Comments:

This is an interesting paper that largely supports previous findings in the literature. The paper needs to be improved before it is suitable for publication.

1. Abstract. Last line in methods. What is the difference between operative characteristics and operating room characteristics? Perhaps this is a typo or another choice of words is needed here.

   Ans 1: (1) Thank you for your affirmation and guidance.

   (2) We have replaced ‘operating room characteristics’ with ‘surgical environment (environmental- and personnel-related factors) characteristics’. (Please see ABSTRACT page 2, lines 9-11; METHODS page 7, lines 7-8; RESULTS page 8, lines 15; and Table2 title)

2. Background. The authors identify objectives, but it would be helpful to write them as a hypothesis. As written it is not clear what is unique or innovative about this data collection, which clearly took a significant effort. For example, the previous literature had already shown that the number of people entering the OR is related to microbial contamination.
Ans 2: We have added the hypothesis and more detail the described in the BACKGROUND section. (Please see page 4, lines 22-25 and page 5, lines 1-2)

3. Methods. Additional information is needed on how the 250 procedures were selected. Also, 4 procedures a day x 5 work days per week x 12 weeks does not equal 250.

   Ans 3: We have added the information about how the 250 procedures were selected in the METHODS section (page 5, lines 16-19). Also, we added the described about the estimated sample size in the Statistical Analysis section (page 7, lines 11-13). In addition, the study period was 4 months (16 weeks).

4. Methods. Did the authors collect any controls or blanks? If not, why?

   Ans 4: In order to reduce the detection bias, the laboratory personnel was blinded from the information of ORs and surgical procedures. We have added the illustrated in the METHODS section. (Please see page 7, lines 4-5)

5. Methods. Some additional information about the sampler is needed. Is the MAS-100-NT a one stage sampler?

   Ans 5: The MAS-100-NT is a one stage sampler. We have mentioned in the METHODS section. (Please see page 6, line 21)

6. Discussion. Active sampling is known to be highly variable. It would be helpful to readers to reiterate this point here. When the authors refer to cfu/m3 data from other groups they need to add how that data was collected (e.g., one-stage Andersen sampler, etc.). Also the authors data seems to be a little lower than some of the other papers I've read. It would be helpful to the reader if possible explanations for this were identified, if possible.

   Ans 6: As editor stated, using active sampling method is to be highly variable. We added a reference (no. 22; page 20) and have added more detail the described in the DISCUSSION section. (Please see page 10, lines 22-24 and page 11, lines 1-10)
REVIEWER 1 (Xiaoling Ma, M.D.): comments

This manuscript assesses microbial colony counts in working ORs and analyses the factors affecting air contamination in a tertiary referral medical center.

The observation of this study is "The number of personnel and their activities critically influence the microbe concentration in the air of the OR." This conclusion seems to be a common sense.

The innovation of this manuscript is to some extend weak and the content of experiments is not plentiful.

Ans: (1) Thank you for giving the guidance and the opportunity to revise the manuscript. We tried to make the plentiful content.

(2) Due to the lack of more powerful documentary evidence, we like to demonstrate the important factors and their level affecting the number of microbial colonies. We have revised the conclusion in the ABSTRACT section (page 2, lines 24) and CONCLUSION section (page 3, lines 1-4).

In addition, the following points need to be improved:

1. The author mentioned that "More than 31,500 surgical procedures were performed in the ORs annually, with an average of approximately 100 surgical procedures per workday." This study was conducted from Monday to Friday, May through August 2015. But we notice that only 250 surgical procedures were enrolled in the study. It is not clear whether there is a screening criterion?

Ans 1: We have added more details about screening criterion in the METHODS section (page 5, lines 16-19); and have added the mention about the estimated sample size in the Statistical Analysis section (Please see page 7, lines 11-13).

2. Were 250 surgical procedures collected from different ORs? Did author measure the microbiologic air counts before performing an operation. It is not clear whether there are any differences in microbiologic air counts in different ORs?

Ans 2: 250 surgical procedures were collected from different ORs. We measured the microbiologic air counts in working operating rooms. The surgical stages at air microbial
sampling were included before initial incision, during incision to wound closure, and after wound closure.

We have added the more clearly information about the bacterial sampling in the METHODS section. (Please see page 6, lines 17-20).

3. No details are provided on the bacterial species detected in this study and are there any differences between bacterial species and types?

   Ans 3: Thank you for the reminded. Our purposes of the study were to assess microbial colony counts in working ORs and to determine the factors influencing air contamination. Thus, only bacterial genera were identified. Our study did not detect the bacterial species and perform the molecular typing. We suggest that future studies can add molecular identification, especially in a study of the relationship between microbes in the air and SSIs.

   We have added the described about the bacterial detected in the METHODS section (page 7, lines 3-4), and have addressed the limitation in DISCUSSION section (page 15, lines 17-22).