Author’s response to reviews

Title: Poorly processed reusable surface disinfection tissue dispensers may be a source of infection

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Version: 3 Date: 10 January 2014

Author’s response to reviews: see over
We thank both reviewers for the careful assessment of the manuscript and all the comments which have clearly helped to improve the understanding of the paper and the description of some relevant details. Please find enclosed our point by point response:

Reviewer: Ojan Assadian

C1: It is true; we did not track any infection in association with the contaminated disinfectant solutions. We have chosen the title because we expect that in outbreak investigations hospital epidemiologists probably do not consider a surface disinfectant solution as a possible source of infection. Since we also found Serratia marcescens in one dispenser and since outbreaks of infections quite frequently occur (e.g. in neonatology units) we thought it would create awareness of this possibility in outbreak investigations. Therefore, we would prefer to leave the title as it is.

C2: Comment in paragraph 1: We have changed the wording and hope that the meaning is clearer now. Comment in Paragraph 2: We have addressed the issue in the last paragraph of the discussion already but have seen the necessity to focus it even more. That is why the wording in the last paragraph of the discussion section has been changed.

C3: An explanation is now provided.

C4: The other types of formulations are now mentioned.

C5: The chosen mixture of neutralizing agents was effective and validated for all tested products. This is now described.

C6: We did not expect such a high contamination rate of disinfectant solutions, and we also are not aware of published data showing that surface disinfectant use solutions are frequently contaminated. We were surprised by such a high rate.

C7: That is an important thought. We have changed the wording accordingly.

C8: That is again a helpful comment, we have changed the wording accordingly.

C9: We have now briefly described some effective processes including their reference.

C10: We are not completely convinced that there is sufficient evidence to conclude that aldehyde-based disinfectants provide the broadest safety margin in terms of antimicrobial activity despite our data presented in the study. It was in 2000 that a surface disinfectant based on various active compounds including aldehyde was also not effective enough to compensate for a contamination with Klebsiella oxytoca resulting even in clinical infections with associated fatal outcomes (Reiss I, Borkhardt A, Fussle R, Szegoleit A, Gortner L: Disinfectant contaminated with Klebsiella oxytoca as a source of sepsis in babies. The Lancet 2000, 356:310-311.). And there are more reports in the literature with occasional reduced susceptibility of bacterial isolates to aldehyde-based disinfectants, often in the context of using central dosage systems which are not recommended anymore. The spectrum of antimicrobial activity of aldehyde-based surface disinfectants is often broader (including e.g. tuberculocidal activity) but regarding an assumed safety margin we are not really convinced. We agree with the reviewers proposal that the use of surface disinfectants based on surface-active biocidal ingredients will require staff training, e.g. how to process tissue dispensers. This is certainly a conclusion directly related to our results and worth a few lines in the discussion section. This was added to the final paragraph of the discussion section.

C11: We have not done this type of investigation. But we know from one hospital that the heavy contaminations of the inanimate surface soon after the use of the soaked tissue lead to the tissue dispenser as a possible source of the surface contamination.

C12: Compatibility of two formulations is the major concern. That is why dispensers should always be cleaned before another type of surface disinfectant is used especially when changing from a formulation containing amines to a formulation containing aldehyde. A number of formulations based on QAC also contain amines. From our point of view the idea will therefore not be a possible solution. In addition, no data are available to show that altering between two types of formulations prevents re-colonization of the use solution. We
consider the probability of success low because only mechanical cleaning will be able to remove biofilm.

C13: The correction has been done.
C14: The figures have changed due to a mix-up by the authors (please see comment 8 to reviewer 2). We have nevertheless looked at the proposal of the reviewer. The new figure 1 was found to have a good scale because we see most bars in range up to 10, nine bars in the range up to 20, four bars in the range up to 30 and two bars in the range up to 50. But one bar is even beyond the upper scale limit of 140. The upper scale has therefore been changed so that the highest value is within the figure. The new figure 1 has also most bars in the range up to 10, eleven bars in the range up to 20, three bars in the range up to 30, and one bar in the range up to 70. In this figure the y-axis is now also “broken” so that the values should be easier to read. We hope that our changes are satisfactory although we did not follow all recommendations of the respected reviewer.

Reviewer: Heike Martiny

Major compulsory revisions
1. A reference is now provided.
2. The part of the sentence has been moved to the beginning of the paragraph.
3. Tissue roles were inserted before filling the dispenser with use solution. This is now described including the type of tissue roles.
4. That was a mistake, thank you for the careful reading, it has been corrected.
5. Three disinfectants were chosen because they are based on surface-active ingredients. The explanation is now provided in the section.
6. Figure 2 is now also referenced.
7. A very brief explanation was available at the end of the method section already. We have, however, extended the description of the Figures.
8. That was a very helpful comment because it helped to find out that one figure was mistaken. Figure legends and figures were triple-checked and are correct now.

Minor essential revisions
9. We added “70” in order to include all dispensers including those with aldehyde- or alcohol-based surface disinfectants.
10. The wording has been changed.
11. The wording has been changed to “At both concentrations…”
12. “not available” in this context means that the data are not available because they were not considered necessary if bacterial growth has been clearly shown at an earlier time.