Reviewer's report

Title: Lesser and lesser - the impact of volume on quality of hand coverage and antimicrobial efficacy in hand disinfection

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Reviewer: Celso Cardoso

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The manuscript by Kampf and colleagues provides interesting data on the hand antisepsis. The results suggest that the application of small volumes (~1.1 mL) of alcohol-based hand rubs seems to be insufficient to cover all surfaces of the hands and may present a limited antibacterial efficacy. The study is overall well conducted and the data appear to support the conclusions of the authors. Studies such as this are necessary because the ideal volume of alcohol-based hand hygiene products to apply to the hands is still a matter of debate.

Discretionary Revisions

Title
1 Page 1: I suggest to replace “Lesser and lesser – the impact of volume on quality of hand coverage and antimicrobial efficacy in hand disinfection” by “Less and less – influence of volume on hand coverage and antibacterial efficacy in hand antisepsis”.

Abstract (pages 2-3)
2. Background. Line 1: replace “Some alcohol-based handrubs recommend using 1,1 mL per application.” by “The label on some alcohol-based hand rubs recommends using 1,1 mL of the product for effective disinfection of the hands.”
3. Lines 5-7: the phrase - “All products were tested at 1.1 mL, 2 mL, and 2.4 mL; and 1 and 2 dispenser pushes; the foam product was tested at 1,1 mL, 2mL, and 2,4 mL foam.” - is not clear, please clarify.
4. Line 8: “responsible application” should be explained in the abstract.
5. Conclusions. Page 2-3, lines 3-5: In my opinion, the phrase “Infection-control practitioners should ensure patient safety by not reducing the volume of handrub recommended for adequate hand disinfection” should be removed. This statement (effectiveness) is not supported by the data presented (efficacy). This should also be considered in the conclusions (page10).

Background (pages 4-5)
6. Line 4: “Rub hands until dry (IB)” (IB) can be removed; otherwise, it should be explained to clarify to readers.
7. Line 14: “(i.e., 60%-70% ... v/v or w/w ? ... ethanol).”

Methods (pages 5-8)


9. Product application. Line 7: the “responsible application technique” should be briefly described.

10. Assessment of untreated skin areas. Line 3: please include the source of “Dermalux Box” (i.e., company name, city, state and country).

11. Efficacy according to ASTM E 1174-06. Line 1: rephrase: “ASTM E 2755-10”; Line 14: “Products were rubbed on the hands until dry”... What was the handrubbing technique used?; Line 15: Microbial samples were taken within 1 minute after product application using sampling solution …”, How this was done? Line 18: rephrase: Butterfield’s phosphate buffer solution containing the same …”; Line 21: “A neutralizer assay was conducted according to ASTM E 1054-08”. This procedure should be briefly described. The ASTM E 1054-08 should be listed in the references section.

12 Efficacy according to ASTM 2755-10. Rephrase: ASTM E 2755-10; in the subheading and line 1; Line 10: “Each product was rubbed on the hands until dry” What was the technique used?; Line 11: “Test products were effectively neutralized (data not shown)”. This procedure should be explained.

Results

13. Table 1. In the title, line 2, the clause “the foam product was applied in three additional foam volumes”; and the 7th column (1.1ml foam), 8th column (2 ml foam), and 9th column (2.4 ml foam) can be removed (There are repeated data and empty cells). This information can be presented in the text.

Discussion

14. Page 9, line 9: rephrase: “Edmonds et al. (7) described …”

15. Page 9, line 12: rephrase: “data in Edmonds et al (7) were …”.

16. Page 10, line 4: The observed incomplete coverage rates indicate that the WHO recommendation “cover all surfaces of the hands” is still fulfilled, but the technique we used seemed to be the best possible solution. Using other technique such as the six steps of EN 1500 or a volume < 2 mL are likely to jeopardize effectiveness goals.

This text is not very clear as written, and should be reworded.

Conclusions

17. Page 10, the last phrase should be removed.

References

18. Reference 15: it should be completed.

19. Reference 17: it is complete?
Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

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

Declaration of competing interests:

I declare that I have no competing interests.