Reviewer's report

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

**Version:** 1  **Date:** 1 August 2013

**Reviewer:** Pengbo Liu

**Reviewer's report:**

Dr. Kampf’s paper describes two aspects of hand sanitizer application: 1) the impact of volume on hand coverage, 2) antimicrobial efficacy of different volumes of hand sanitizers. The coverage study was performed with three handrubs applied at various volumes (1.1, 2, 2.4 ml volumes, 1 and 2 dispenser pushes). The results showed differences in coverage between the five volumes for all three handrubs, high volume with good coverage as expected. Antimicrobial efficacy test results indicated that application of small volume (1.1 ml) produced lower log reductions against S. marcescens.

**Major compulsory revision:**

1) For the antimicrobial tests, several variables (hand sanitizer types, ASTM versions, and neutralization) were introduced when the log reductions were compared between different volumes. These variables will make your results less conclusive and strong. In other words, while you want to determine the efficacy of different volumes, you need to diminish the confounding results from other variables.

2) The statistical methods were not powerful. For this type of data, two-way ANOVA, not chi-square, should be used to consider variances from both study groups (different volume groups) and subjects.

**Discretionary Revision:**

1) The objectives of this study are clear but the scientific significance and practical application are my concerns. Unless handrube is covered all surfaces of the hands, do we really care about volume? There is another layer of question; surface area varies by people, some with large palm some with small. To set an optimal volume is not appropriate scientifically and practically.

2) Figures 1, 2 and 3 provide confusing and less information. I could not see the differences of similar volumes of three products. Instead, I would like to see the images of different volumes with a specific product. For each figure, why the first two hands show the back of the hands and the next two are the palms?

3) Brief descriptions of ASTM and glove juice methods are necessary. Did you use both hands or only one hand? After hands were contaminated with S. marcescens, hand sanitizers were applied, and hands were rubbed one the other, were some of S. marcescens transferred to another hand?
Minor revision:
1) Need to follow up the guidelines of the MBC Infect Dis for making tables. Most journals do not allow vertical lines. Table title should be concise.
2) Statistics part should be moved to the end of the Methods.
3) Table 2. Why only the log reductions of small volumes were displayed? For each product, log reductions from all study volumes should be listed and compared.

**Level of interest:** An article of limited interest

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**
I declare that I have no competing interests.