**Reviewer's report**

**Title:** Evaluation of Infectious Diseases and Clinical Microbiology Specialists' Preferences for Hand Hygiene: Analysis Using the Multi-Attribute Utility Theory and the Analytic Hierarchy Process Methods

**Version:** 2  **Date:** 18 Apr 2017

**Reviewer:** Virginia Mumford

**Reviewer's report:**

This paper uses two multi-attribute decision tools to determine the preferences for infection control specialists (IDCM) for improving hand hygiene.

Although this is an interesting approach to an important problem I feel the paper does not do enough to explain the technique or the findings.

The paper and references also need a good edit (the text is quite repetitive, I could not easily check some of the references as the issue numbers were not given, and the figures need to be checked for appropriate units), but I will just comment on the content issues in this review.

L60 given the importance of the WHO program, it seems more sensible to use some of their comprehensive papers and reviews to underpin their study (wrt REF 1,2)

L62 the reference given is from 2005, a more recent publication will be needed to illustrate recent trends

L71 The WHO program is famously based on the Five Moments of Hand Hygiene, so best to use this for consistency rather than discuss four situations.

L75 Statements that "hand washing is still poor in the world" is not specific enough - it would be helpful to add some statistics and also acceptable compliance levels in different situations.

L77 There is a significant amount of research on the best ways to motivate staff, this study is an interesting addition to the literature but needs to be placed within a wider context.
Although relevant, these are quite old studies, it would be helpful to use newer data if available.

It would be helpful for the authors to put a stronger case for their methodology, is this study being done because the evidence is not available or because other studies have not consulted with IDCMS? Some of this is in the discussion section which would be better placed here.

Fig 1 contains results and should not therefore be included in the methods section.

The criteria selection needs to be fleshed out more, this is critical for the study and more detail on how these criteria were shaped and defined would help clarify the paper considerably. For example, it is not clear how "glove use" is being assessed, or how the intervention type is being scaled. It would be helpful to see the actual questions being surveyed, ie "How important is the application time". Without this I found it very difficult to understand how the authors measured utility.

Data Collection. As above, without understanding the explicit question asked, it is not possible to assess how the scales were measured.

The authors discuss the role of MAUT in different fields, but after referencing the work by Keeney and Raifa they could perhaps use other examples of MAUT used extensively in health economics to assess health outcome utilities that would resonate more with readers than the rectal cancer references given.

I think this section needs to be better explained in terms of what is being done to the data in the study, it was difficult to follow.

Similarly for the AHP - Was was a separate analysis done for soap and alcohol?. Have the criteria questions been structured so that utility increases with importance?
Perhaps the statistical analysis could be given separately and a more comprehensive generalist description given here, for example in L176 the authors give the equation for utility but it would be much easier to describe that they allocated a utility value of 1 to the highest value and 0 to the lowest.

Results

L252 This section is a bit repetitive and contains description of the methods that would be more appropriate in that section.

L264 Table 4. One comment for all the figures and tables is that the label is enough, the descriptions just repeats existing text. As noted, I found it difficult to analyse the results without having more clarity on the criteria.

L277 Figure seems redundant

L294 Results of AHP method - this also contains method that needs to be delineated and moved.

L329 Table 7 - how do these results differ between soap and alcohol?

L336 As noted earlier it is difficult to put these results in context without knowing the question asked.

L353 -356 not sure the self-referencing is helpful here.

L359 The statement that "we statistically predicted the most favorable way to prevent nosocomial infection among NCWs" is just not proved by these results which, instead, asked 15 IDCMs to preferentially weight 7 pre-selected criteria.
The discussion section also reviews the use of these tools, but perhaps this would be better in the introduction section. The discussion could then focus on the applicability of the results and specific issues that arose using these techniques in this context.

I think the authors are missing an opportunity to present these results as an additional tool to understand the possible differences between what the IDCMS's preferences are and how that translates into practice. HCWs, ie those who undertake hand hygiene, perhaps need to be involved in the preference assessment in order to understand compliance. The questions around ease of use etc would help illuminate what prevents HCWs washing their hands. For instance, the IDMCs indicated that effectiveness was four times more important than application time, but five times less important than dry skin (assuming this is how the criteria is scaled), this is an interesting finding which could be expanded on.

**Are the methods appropriate and well described?**  
If not, please specify what is required in your comments to the authors.  

No

**Does the work include the necessary controls?**  
If not, please specify which controls are required in your comments to the authors.  

Yes

**Are the conclusions drawn adequately supported by the data shown?**  
If not, please explain in your comments to the authors.  

No

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**  
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I recommend additional statistical review

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