Reviewer's report

Title: A large-scale assessment of hand hygiene quality and the effectiveness of the "WHO 6-steps"

Version: 1 Date: 2 August 2012

Reviewer: Timothy Landers

Reviewer's report:

Szilagyi and colleagues report the results of a hand hygiene program among 4462 health care workers at a hospital in Singapore. They conducted an in-service training program on proper hand hygiene timing and technique followed by assessment of the technique using a fluorescent-labeled hand sanitizer and photo documentation. Unlike prior studies which emphasize adherence to recommendations for the timing of hand hygiene, this study presents the results of an objective measurement of hand hygiene technique. This is a valuable contribution to the field which could be made more relevant with some changes.

Major Compulsory Revisions

1. Describe the system used to obtain photos more thoroughly. If the specific methods have been reported elsewhere, reference the source. If not, include information so that the reader has an idea what was required to obtain these images (for example, camera type – f-stop, ISO, etc, size of box, lighting source, type of sanitizer and fluorescent agent added). Were these commercially available products or were they manufactured just for the study? This will help others who wish to replicate the study’s methods.

2. It would be valuable to draw attention to the literature about compliance with timing of hand hygiene and contrast this with the relatively few studies about technique of hand hygiene. (Middle of page 2). Highlight that if technique is poor, compliance with satisfactory HH practice can only be lower than what is generally reported.

3. Consider adding information about the technological advances that make real-time monitoring of timing of hand hygiene more commonplace (see Pincock, et. al AJIC, 2012).

4. More detail is required on how participants were provided their own results – did they get to see the actual images, or were they just described to them? One strength of this study as a means to increase hand hygiene compliance was that subjects were provided personalized, near-real-time feedback on their HH technique. Should the authors wish to focus on the technique monitoring technology, this alone is interesting, but including it with the education and feedback gives the study more practical importance.
5. In Table 1, the headings for “percentage of total” does not seem correct because for each gender, the percentage adds to 100%. Thus, it is percentage of that age range by gender. I think it would be more useful to report percentage of the entire sample.

6. The statistical methods section was not clear to me. What were the comparison groups for the two-sample t-tests? What were the major comparisons the authors wished to make in the study and how were those tested? Throughout the manuscript, but particularly at page 5, statistical significance should be reported.

7. I found Figures 1 and difficult to follow. It was not clear the major points the authors were trying to convey as the inclusion as numbers of individuals was different between groups. It might be more helpful to include percentages of each group that had no, small, or big mistakes (Figure 1) or percentages of each group that missed a certain surface (Figure 2).

8. In the conclusion, add how this study fits in to the larger picture about compliance with HH. These results seem consistent with observations that physicians have lower overall HH rates. More discussion of the finding of “allied health” personnel and its implications for further research and education/practice needs.

9. Also, in the conclusion, discuss the relatively low rates of satisfactory technique even immediately after instruction and demonstration. This implies that demonstration alone is not enough and further validates the authors’ argument that objective measures of HH technique need to be included in efforts to increase compliance.

10. The paper should be more thoroughly referenced with the major studies on HH compliance.

Minor Essential Revisions

11. At page 1, present the results more succinctly instead of “saw 24%”

12. At page 2, please consider the use of the term “neglected.” HH technique is more difficult/challenging to study, few standardized techniques have been developed, less attention has been paid to this area, etc.

13. At page 4, line 2, this does not appear to be an “anonymous” system – consider other terms.

14. At page 5, check wording on “worst” (line 5) and “bad examples (line 22). Similarly, at page 5, line 2, “performed well.”

15. Throughout the paper, please reconsider the use of the term “pass” and “fail.” Perhaps “satisfactory” and “not satisfactory” would be more appropriate.

Discretionary Revisions
16. The photographs of hand hygiene compliance were informative and are a useful way to highlight the measurement technique. It would be more helpful to give and examples of 1-2 passing images, 1-2 “small” mistakes and 1-2 “big mistakes.” Supplemental information on the occupation and age of the subject could be included parenthetically.

17. Since the authors argue that “precise assessment” is possible with this tool, it might be helpful to demonstrate this by providing additional information such as the distribution of surface area missed either in a graph or in narrative form. It would be helpful to know if there are large vs. small areas that are missed.

**Level of interest:** An article of importance in its field

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

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have not competing interests.