Reviewer’s report

Title: Hand disinfection in a neonatal intensive care unit: Continuous electronic monitoring over a one-year period.

Version: 2 Date: 25 March 2012

Reviewer: Hugo Sax

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Summary
1. Report on assessing hand hygiene compliance through electronically counting hand hygiene actions and simultaneous direct observations during one year in a neonatal intensive care unit.

Major strengths:
2. The authors apparently possess parallel data on observations on one hand and hand hygiene actions measured by dispensers on the other. This could be interesting data to compare the two methods.

Major challenges
3. Some questions remain regarding the objective, the setting, the study method, and the figure (see detailed comments).
4. Unclear relation between direct hand hygiene observations and electronically counted hand hygiene actions.
5. The conclusions are not really supported by the results.

Detailed comments; compulsory:
6. Pages and lines are not numbered, which makes references more difficult.
7. Page 1, Abstract: The study question is not entirely clear. Because the two methods of assessment are set in parallel, one could assume that the scope was to compare the results. Else, what do authors imply with the term ‘complementary’?
8. Page 1: The conclusions are not really supported by the results in this abstract. In what way is the information produced by the electronic devices appropriate in detail? In what way do direct observations supplement electronic devices? In what way do they play together to evaluate the effectiveness of a promotional campaign?
9. Page 2: How does the incidence of bloodstream infections relate to hand hygiene reported in the first paragraph?
10. Page 2: Are there not more studies on the topic of comparison between direct observations and electronically counted hand hygiene actions?
11. Page 2: The listing of the objectives of this study lets one wonder why the two methods were done in parallel without comparing their results, especially after
citing the literature on this question and declaring direct observations as expensive.

12. Page 4: “Electronic dispensers provided suitable data on the frequency of hand disinfection events in a clinical setting over an extended period of time.” On what basis do the authors conclude that data provided by dispensers were suitable?

13. Page 4: “This likely reflects the fact that the patient comes into contact with twice as many healthcare workers during day shifts compared to evening shifts.” How has this been assessed?

14. Page 5: “Hence, direct observations as recommended by the World Health Organization are still needed [9].” In the argumentation for or against electronic hand hygiene monitoring—and central to the scope of this article—the question arises on why to use electronic monitoring if direct observations have still to be undertaken?

15. Page 5: “We conclude that the tested dispenser provides detailed information and can be complementary used to evaluate hand hygiene promotion campaigns over an extended period of time.” Was there only one dispenser or are the authors referring to a specific dispenser type? I don’t think that this statement is really supported by the results. No promotion campaign is tested in this work, nor was the detail of information a subject of scrutiny, nor quality of hand hygiene.

16. Page 5: The Methods section is usually placed between the Introduction/Background and the Results section.

17. Page 5: “This prospective observational study was performed in a 27-bed level III NICU at a university hospital in The Netherlands.” The paragraph on the setting should provide more details on hand hygiene culture and history, promotion, dispenser location, and the established hand hygiene protocol (hand hygiene indications) that healthcare workers in this institution are meant to apply, etc. This is important to be able to read the results in comparison to other reports.

18. Page 6: “The median interquartile range daily number of healthcare workers who provided patient care was 44 (42-45). …” These are probably results from this study. If this is the case, they should be report in the Results section.

19. Page 6: “The median numbers of nurses vs. physicians (including nurse practitioners)…”. Probably nurse practitioners were included with nurses not physicians.

20. Page 6: “Additionally, we randomly observed healthcare workers’ hand hygiene practises by direct observations to determine compliance, the observation tool was described in a previous study [2].” When exactly did these observations take place during the entire study period?

21. Page 6: “Indications for hand disinfection were before, and after patient contact. Failure to disinfect hands was recorded as non-compliance. Interventions which needed immediate life saving action were excluded from analysis [2].” Do these indications correspond to all indications that healthcare workers are meant to respect? Usually, additional hand hygiene action is needed
immediately before an invasive task and after body fluid exposure even after initial hand hygiene when approaching the patient. If this is the case it should be explained. In that case observations included only a fraction of all hand hygiene opportunities.

22. Page 6: “Trained researchers performed observations of hand hygiene events after showing sufficient high interobserver reliability (Kappa > 0.70).” In what way was inter-observer reliability determined?

23. Page 6: IQR probably means inter-quartile range.

24. Page 11: I am not sure to understand the legend to this figure, since healthcare workers do not work over 24 hours. How was this median exactly calculated?

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

**Quality of written English:** Acceptable

**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