Reviewer’s report

Title: Epidemiology of Ebola virus disease transmission among health care workers in Sierra Leone - May to December 2014: Implications for Disease Prevention and Control in the Health Sector

Version: 2 Date: 2 June 2015

Reviewer: KARI YACISIN

Reviewer’s report:

MAJOR COMPULSORY REVISIONS

Methods
1. Would describe the structured questionnaire and key informant interviews in much more detail. How many questions, and what were the categories of questions? Who did the interviews (a HCW’s supervisor? A student? Independent WHO staff member? etc.)? How long were the interviews? Was the questionnaire self-administered or done by interview? Were the key informant interviews semi-structured?

2. Please explain how the paragraph with lines 118-127 pertains to HCWs: are HCWs processed in case investigations like the general population? If so, would mention this. If not, are all of the case investigation details presented needed?

3. Reword “…the preliminary analysis revealed the need for supplementary data to better characterize EVD transmission among HCWs and to capture those not included…” How did the VHF analysis reveal need to capture those not included? Consider presenting these at beginning of results section (i.e., “Of a total of X patients listed in the national VHF database, X were HCWs, X were non-HCWs, and X had no information about whether they were HCWs or not.”)

4. Line 158: what were the “detailed analyses” performed?

5. How was IPC defined? How was hand hygiene defined? How did you ensure that all survey respondents understood the questions in the same way?

Results
6. How many persons in the VHF database did not have HCW status associated with them?

7. Please explain the breakdown of numbers: for example, it says there were 293 HCWs identified, then line 195 refers to (120, 47.4%)—120/293 is 41% so what is the most appropriate denominator and why is it not 293?

8. Ensure denominators explained when reporting percentages and raw numbers; would explain why denominators change.

Conclusions
9. Although recommendations listed on their own are understandable, these
should be better linked to the results of the study. Would report the qualitative key informant interview findings in the results section in a more systematic (and quantitative) way to support the recommendations. 10. Recommendation #4 is also understandable but would better explain what from the current study leads to this recommendation---was it the overall general experience of the study team? If so, then would describe this in the conclusions section so that recommendation #4 is unified with the paper.

11. Recommendation #5 is understandable, too, but needs better linkage to the current study.

MINOR ESSENTIAL REVISIONS

General
12. Recommend consistency with number presentation (number of decimal points, reporting raw numbers and percentages rather than sometimes both raw numbers and percentages or sometimes just percentages or sometimes just raw numbers)
13. Recommend copy editing (spelling, subject-verb agreement, hyphen use)

Background Section
14. Consider describing outbreak in Sierra Leone (when was outbreak identified)
15. Define “strict IPC”
16. Genus should be italicized
17. Before introducing “The high EVD infection rate among HCW during this outbreak…” it would be helpful to introduce the EVD rates for HCWs and comment on how these compare to the general population.
18. Would elaborate on the sentence, “In contrast to previous outbreaks, HCW infections have continued into the late stages of the current outbreak.”
19. Add reference to “Transmission appears most likely to occur in advanced disease when viral load is high”

Results Section
20. Line 199: based on percentages, 30% reported contact other than family/HCW/friend---what contacts were these 30% reporting?
21. Line 200: clarify “prior to the onset of symptoms”---does this refer to the HCW or to the HCW’s contact?
22. Consider revising figures 1 and 3 because it is not clear why the doughnut-shape pie chart was used; if there is a particular reason for using this shape, would mention in the results section
23. Reword lines 210-212; current structure is confusing (lists the numbers and then later the corresponding modes of exposure)
24. Line 210 mentions “general nursing care” but table has “general medical and nursing care;” would clarify.
25. What is the difference between “direct body contact” and “general nursing care”?

26. Would explain (perhaps in the methods section) what the different exposure categories were: for parenteral, cut is listed in the table---was this an in situ cut, i.e., the HCW accidentally cutting self with a scalpel or scissors or other object while caring for the patient?

27. How were “IPC policy” and “hand hygiene facility” defined?

28. Line 219 says “significant percentage”—if statistical test performed that showed 43% was significantly different, would state this explicitly and add type of statistical test performed in methods section; if no statistical test performed, would avoid use of the word “significant”

29. Lines 220-221: please describe the descriptive analyses performed (chi-square test?)

30. Table 5 is referenced on line 236 but not in this draft

31. Would quantify some of the key informant interviews---how many were done? How many had complete responses?

32. Line 244—what did the interviewees perceive as “negligence” or “overconfidence”? Can you quantify some of these responses, i.e., “of X key informant interviews, X reported having inadequate supervision....”

33. In figures, avoid showing red next to green because persons who have colorblindness cannot detect the difference.

Discussion

34. Results also highlighted that hospitals and other health centers (i.e., not Ebola treatment units) were risk areas for HCWs; could you look at the interviews of HCWs who reported exposure in hospital or health center and expand on what their risk factors were?

35. Line 267 contains “more than 35%” but in the results section this number was 34% (line 230); please reconcile these numbers or explain difference in the numbers.

36. Line 270: why would IPC training during general medical education be rudimentary?

37. Lines 279-281: does “observation of practice” refer to a different study and need a reference? Would provide a reference or data in the results section to support this sentence.

38. Lines 285-286: could you support the listed factors based on findings in the questionnaires or key informant interviews?

39. Can you provide any insight into how HCWs were infected at home?

40. Line 293 mentions supplemental personal income; was this asked in the questionnaires?

41. Draft mentions HCWs presented days after symptoms began; this is a concerning fact. In the discussion, potential fear of being admitted to an Ebola
treatment unit is mentioned as a potential factor in HCWs delaying care. Did the
questionnaire ask HCWs why they sought care or delayed seeking care? If yes,
would add to results. If no, would discuss in limitations.

Limitations
42. Please comment on potential data quality limitations—how did study try to
ensure participants could answer truthfully?
43. How confident were HCWs in their answers?
44. Would expect limitations with wording of questionnaires so would comment
on these.

Conclusions
45. Line 343: can you say that nursing staff were the “most at risk” group?
Statistical measures of risk (risk ratios or odds) are not presented in current
paper.
46. Lines 351-355: would be helpful if you presented in the results an analysis of
the subset of HCWs infected who had just received training---if this number is
high, then the conclusion that training is needed is not so simple and would need
further qualification (i.e., why were HCWs who just received training contracting
EVD?)
47. Please further comment on any insight survey gave into why some HCWs
sought care days after symptoms started; if no insight into this from the survey,
would add this as a limitation

DISCRETIONARY REVISIONS
General
48. Consider explaining why Sierra Leone was chosen for this study (why not
Guinea or Liberia?)

Background Section
49. Would coma not be a form of “central nervous involvement”? Consider
rewording or be explicit about other CNS involvement
50. Consider adding median days in incubation period

Methods
51. Consider avoidance of term “prevention dynamics”; “dynamics” makes me
think of mathematical modeling which this paper does not present. If there is a
specific reason to use the term, would add citation.

Results
52. Consider adding a column to table 1 that shows number of non-HCW cases
(paper mentions comparison to number of HCW cases vs. number of non-HCW
cases; would be informative to add that information to the table for all districts for
good comparison)
53. Consider adding arrow to epi curve that shows when IPC training intensified
54. Consider using “percutaneous” rather than “parenteral”

55. Lines 233-235, consider separating comments on IPC policy and hand hygiene; current sentences include both and are a bit confusing.

56. A map showing the districts in Sierra Leone would be a nice addition.

57. Consider not using pie chart format for figures and showing table or bar chart instead.

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.