Author's response to reviews

Title: Network Analysis of Team Communication in a Busy Emergency Department

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Network Analysis of Team Communication in a Busy Emergency Department

Responses to Reviewer Comments:

Reviewer 1 Comments and Author Response:

Reviewer 1 - 6.1: In the results, comment is provided on several demographic variables of the study participants – ‘age’, ‘years of ED experience’ and ‘years in healthcare’. Did the authors also collect data on ‘gender’, as gender can be an important variable in communication relations? To assist the reader, could the authors indicate how many of the unique respondents were in day shifts or in night shifts? The response rates are provided, but not actual numbers.

Authors Reply 6.1: We agree with the reviewer that gender(sex) as well as other variables may affect communication. Unfortunately, we did not collect sex. We have included the following statement in the limitations section to acknowledge this as a limitation: “The operational and demographic characteristics of our selected study environment may not generalize other settings. Sex differences may impact communication between clinician-patient and clinician-clinician communication. We did not capture sex and can not assess its impact.” We have replaced Figure 2 (the line graph of response rates) with the newly added Table 2 to address the question of unique respondents per shift.

Reviewer 1 - 6.2: One limitation of the study is that the authors have used a single method in their case study to examine communication in the ED network. Multi-methods, combining qualitative approaches with participant interviews can shed further light on network structure, and can assist with interpretation of the network results. Also, greater rigour would have been achieved if it had been possible to link network structure with network outcomes – incident reporting, or quality and safety data, however this may not have been possible in this study. The authors could refer to such limitations of the study in their discussion of the study results.

Authors Reply 6.2: We added the following paragraph/sentences to the limitations section: “We demonstrate the potential value of SNA as a tool for communications research in a high-risk clinical setting. Focus groups or participant interviews may provide additional insights regarding the implications of our SNA findings. The eventual value or utility of SNA requires tying measures of density and centralization to clinical process measures or outcomes such as the number of patients leaving without being seen or medical errors.”

6.3 Improvement of writing, organization, tables and figures. One point is that the paper refers to clinicians and staff throughout the paper. It is not clear if the reference should be more properly to clinicians and administrative staff? There are numerous such references, e.g., para 2, page 6: ‘The registration clerk (RC) was the only staff member.’ Should this read: ‘the only administrative staff member’? Or do the authors mean to convey that the only employed people (staff) in the ED were the administrative personnel?

Authors Reply 6.3: We clarified the terms to include clinician and non-clinician staff throughout the manuscript.

Reviewer 1 – 6.3.1 There are several sections in the paper where the authors need to attend more carefully to the drafting of the text. The following points should be attended to:
• In the Abstract, first sentence, line 2: amend ‘demand’ to ‘demands’.
• Figure 2 needs to have a title/label, as do Figures 3 and 4.
Authors Reply 6.3.1: We thank to reviewer for the detailed review and suggested edits. We edited the abstract and added labels/titles to all figures.

Reviewer 1 – 6.3.2: A legend should be provided for Figure 4 to assist the reader. What is ‘other’ in the five ‘isolates’ at the top left-hand of Diagram 4? This is not referred to in the text.

Authors Reply 6.3.2: We added a legend to the Sociogram (formerly Figure 4, now Figure 3).

Reviewer 1 – 6.3.3: In the first para, p.9, in the second sentence, insert ‘for the day shift’ after ‘greatest’. Similarly, in sentence 3, insert ‘for the day shift’ following ‘on week 8’.

Authors Reply 6.3.3: We edited as requested.

Reviewer 1 – 6.3.4: In the first para. p.9, sentence 5, insert ‘whereas this was not the case for social issues or general problem-solving’.

Authors Reply 6.3.4: We edited as requested.

Reviewer 1 – 6.3.5: In the second paragraph on p.10, in the third sentence, the reference should be to ‘Figure 4’, and not to ‘Figure 3’. The sociogram in Figure 4 shows 5 isolates and not 4.

Authors Reply 6.3.5: We corrected. We removed the “other” isolate shown in the original sociogram after determining that this respondent was an “off-service resident” that was ineligible to participate and did not provide actual SNA survey data. Our reference to four isolates is accurate.

Reviewer 1 – 6.3.6: In the second paragraph on p.10, in the seventh sentence, the sentence should read: “In this study, in the context of communication ...”.

Authors Reply 6.3.6: We edited as requested.

Reviewer 1 – 6.3.7: In para 1, p. 11, sentence 6, amend ‘finding’ to ‘findings’.

Authors Reply 6.3.7: We edited as requested.

Reviewer 1 – 6.3.8: In paragraph 2, p.12, the authors compare network density in their study, with findings in the Creswick et al. study. Could the authors provide their network density result (or range) as well as the Creswick et al. density result – for all the network relations discussed in this section? It is not possible to read the density axis in Figure 3.

Authors Reply 6.3.8: We edited as requested.

Reviewer 1 – 6.3.9: In paragraph 2, p.12, in sentence 5, insert ‘in’ following ‘differences’.

Authors Reply 6.3.9: We edited as requested.

Reviewer 1 – 6.3.10: In paragraph 3, p.12, should the references be: [2,4,40,41]? The referencing needs to be checked here.

Authors Reply 6.3.10: We edited as requested.

Reviewer 1 – 6.3.11: In the Discussion section, in the sixth sentence, the sentence should read: ‘These findings ...’.
Authors Reply 6.3.11: We edited as requested.

Reviewer 1 – 6.3.12: In paragraph 1, p. 13, the second last sentence needs to be amended – the subject and object of the sentence do not follow logically.

Authors Reply 6.3.12: We edited as requested.

Reviewer 1 – 6.3.13: In the last sentence in para 2, p.13, insert ‘with’ after ‘associated’.

Authors Reply 6.3.13: We edited as requested.

Reviewer 1 – 6.3.14: In Table 1, insert ‘MD’ following ‘Attending’ in Column 1, row 2; insert ‘MD’ following ‘EM Resident’ in Column 1, row 3.

Authors Reply 6.3.14: We edited as requested.

Reviewer 1 – 6.3.15: Figures 1, 2 and 3 appear to be fuzzy, and of very low resolution – could clearer figures, with higher resolution be provided?

Authors Reply 6.3.15: We edited the figures to improve clarity.

Reviewer 1 – 7.1 Discussion of sociogram--In the description of the sociogram (p.10), the authors do not refer to the depictions of the connectors in the sociogram – for example, some connections are represented with ‘heavy’ lines, some with ‘light’. Do these reflect the frequency of communication between the actors, and if so, could the authors please provide some comment on this in the paper? Also there are different node sizes, for example for MDs and for RNs. Could the authors please provide detail on what these different node sizes represent, to assist the reader?

Authors Reply 7.1: We edited as requested and added text describing the meaning behind the line thickness and node size.

Reviewer 1 - 8. Do the title and abstract accurately reflect the study? The title could be strengthened by referring to the methodology used – network analysis. The abstract accurately reflects the study.

Authors Reply 8: We edited the Title to include mention of Network Analysis.

Reviewer 2.1 – Introduction & Positioning: The authors need to spend more time explaining why it is important to understand the differences in the structure of communication patterns between day and night shift and over time.

Authors Reply Reviewer 2.1: We added an explanation and justification for our approach.

Reviewer 2.2 – Results – I think it is essential that the different types of communications (general problems, medical advice and social interaction) be compared to determine whether the social interactions have much if anything to do with the medical communications. On viewing the graphs the patterns for general problem solving and socialising look similar but both look to differ from medical advice, but some analyses (like QAP) need to be performed to determine if this is the case. I also think it is essential that the authors obtain statistics on the number of patients seen for each
survey period in order to try and explain why centralization appears to drop when density rises for general problem solving, but tend to follow a similar pattern for medical advice seeking.

Authors Reply Reviewer 2.2: We performed QAP analyses and added text to the methods, results, and discussion sections. We added a new Figure 4 to illustrate the findings.

Reviewer 2.3 — Minor Essential Revisions - Method Section P5 – insert “in” this ED

Authors Reply 2.3: We edited as requested.

Reviewer 2.4 - P6 – The following is misleading as the authors do not state the actual hours for the day & night shifts: “positioned a co-investigator in the ED from 0500-0900 hours for night shift data collection and 1500-1900 hours for day”. I’m not familiar with ED shifts in PA but in CA many hospital shifts run from 0700-19:00 and then 19:00-07:00 – given this context the interview times do not make sense. Need to first state the actual hours the day & night shifts occur then state surveys were administered during four-hour time blocks.

Authors Reply 2.4: We edited the Study Protocol section to improve clarity.

Reviewer 2.5 - P6 – Authors state “ED clinicians included attending physicians (AMD), emergency medicine residents (RMD), staff nurses (SRN), triage nurses (TRN), trauma nurses, (TRAMRN), charge nurses (CRN), patient care technicians (PCT), and health unit coordinators (HUC). The registration clerk (RC) was the only staff member.” I recommend that the MDs are differentiated in the graph (at least by label) as they are in the description and in Table 1. I also suggest the RNs be differentiated in both. The authors can keep the symbols as they currently are to indicate all MDs or all RNs and simply differentiate by label.

Authors Reply 2.5: We edited as requested.

Reviewer 2.6 - Analysis of Data - The authors spend a lot of time explaining how to calculate density and degree centralization – this can be deleted if the authors need to conserve word count as they also outline the calculations in Figure 1.

Authors Reply 2.6: We removed our description of the calculations in Figure 1 and preserved the description that appears in the analysis section.

Reviewer 2.7 - Network Density P7 - The authors’ statement: “Network density measures how close-knit the members of the network are and is often referred to as an overall measure of interaction” is perhaps true for social interaction but misleading for communication – 100% density does not imply effective communication – in fact a situation where everyone talks to everyone else maybe very inefficient.

Authors Reply 2.7: We edited the text to clarify.

Reviewer 2.8 - Network centralization– P7 – As there are a number of network centralization measures, the authors need to refer to the specific centralization measure they calculate – namely, degree centralization. Degree centrality P8 – The authors cite Freeman (1979) so I am surprised by the following statement: “An individual is considered prominent, important, or powerful when he/she
has a high level of in-degree centrality.” According to Freeman degree centrality is a measure of activity level and popularity as it measures all direct relations for each actor in a network. If the authors wish to measure power, Freeman suggests using betweenness centrality not degree centrality.

Authors Reply 2.8: We corrected the citation by referencing Wasserman and Faust description from Chapter 5, pages 175-177.