Author’s response to reviews

Title: Mapping infectious disease hospital surge threats to lessons learnt in Singapore: A systems analysis and development of a framework to inform how to DECIDE on planning and response strategies

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Version: 1 Date: 16 Jul 2017

Author’s response to reviews:

We thank the reviewers for their positive comments and helpful critical feedback and endeavor to address these carefully. To avoid confusing track changes, we track using this mode while excluding deletions and format changes and index the changes using comments linking to the numbered (reviewer 1a-i and reviewer 2a-o) points below.

NB: Please note my Primary Affiliation has changed to: Johns Hopkins University, Center for Communication Programs. I am both joint first author and corresponding author as well as last author on this paper.

COMMENTS FROM REVIEWER (1) Susan E. Coffin:

Overall: In this manuscript, health services researchers from Singapore present the process and results of their efforts to derive a multi-dimensional model of public health and hospital responses to surges related to outbreaks of infectious diseases (ID surges). Using qualitative data extracted from semi-structured interviews and narrative accounts, the authors derived elements
of a response model and reconciled redundancies of processes embedded in current response protocols due to disparate terminology and decision-making processes. I found both the process used by these investigators, as well as their findings, to be very interesting. I suspect readers of BMC Health Service Research would feel the same.

a. In the methods, the authors specify the gender of the researchers who performed the stakeholder interviews. This seems both unnecessary and inappropriate.

- We have followed the Consolidated criteria for reporting qualitative research COREQ guidelines and checklist, which we omitted to cite, to help guide our methods content. This checklist of 32 items was determined from the criteria extracted from a systematic review of qualitative methods, and the gender transparency is an explicit reporting criteria in order to increase reflexivity and provide the context of the data collection. See item 4 of the checklist below. [http://cdn.elsevier.com/promis_misc/ISSM_COREQ_Checklist.pdf](http://cdn.elsevier.com/promis_misc/ISSM_COREQ_Checklist.pdf)

We agree that gender information may seem overly detailed. However, given the robust nature of the COREQ and its growing presence as a quality yard stick for qualitative reporting, much like the CONSORT is to clinical trials, we propose we clarify that we are followed it, rather than remove the detail. This has been added on p. 7 and in the refs #18, p. 36.

b. Please explain how individuals (particularly clinicians and nurses) were selected for participation. Was invitation to participate extended to specific individuals based on a particular facet of their professional responsibilities?

- We have expanded our explanation of recruitment strategies for sampling, p. 8.

c. The term "snowballed" seems like jargon.

- We have defined and referenced ‘snowball’ sampling to help orient the reader on this technical term, p. 8.

d. The Methods section includes some information that should be in the Results such as the age of the interviewees (and it is unnecessary to state the standard deviation around this number in the prose since it is presented in Table 1).

- We followed the COREQ which places the sample description in the methods (item 16). Since we now cited that we are following this approach, we hope that leaving the sample description as is, is acceptable.

- We have removed the SD from the text, p. 9.

e. To make this report more valuable to the reader, I suggest the authors make their interview guide available as an appendix. This could be done electronically so as not to take up pages of the print journal.
The topic guide has been cited in text, p. 8 and added as an Appendix/Supplementary file.

The Abstract says that "key policy literature" was used in the iterative design of this model. There is no mention of how this literature was identified and exactly how it was introduced.

This literature was identified by using a known systematic review (published by one of our co-authors, Prof Richard Coker), which gave us the core conceptual elements; this was supplemented and verified against policy documents that were identified by scoping searches on WHO and MoH Singapore websites. Details of this are added p. 6.

g. The Results section does not seem clearly organized and it is difficult to extract the real "findings" or "results". For example, the first part has the subtitle "Elaboration of hospital surge events" and presents summaries with illustrative quotes for 4 different ID surge events the system experience. It is not clear what the investigators captured from these descriptions and how these findings (whatever they were) contribute to their model building. Overall, the Results section is too long and the investigators do not seem to have done enough summarizing of their findings so a reader can understand exactly what they got out of these interviews and how they applied it to their stated process of model building with iterative refinement of design.

We agree that the results needed better structure and that Figure 1 was not properly elaborated. We have clarified the objectives which are now more explicitly framing the results, and cut/restructured the results, as well as introduced corresponding sub-heading throughout the results. We have clarified our methods of analysis and we restate that the white boxed elements in figure 1 emerged from the data, this is also added as a footnote to figure 1. Figures 2 and 3 are also more explicitly linked to the results in the text by corresponding subsections.

We agree that the results are long and dense. There was a lot of inductively generated data to wade through. I have tried to remain true to the interpretive descriptive methods of reporting. The IntD method does not seek to pare down the analysis, but to report the synthesis of the description of participants as a story, rather than with explicit themes and sub-themes. This may be why the results seems different to other qualitative research. We have retained this approach, but hope that the restructuring of the narratives help clarifying the original findings.

Overall: We have also edited and condensed results in this process. Updates for 1g begin with the objectives, p. 6; and clarification of the methods of analysis, p. 10; better signposting of results, starting on p. 11, ending p. 12 and added to structure throughout the results section, as linked to the figures that summarize our findings.

The 1st sentence of the paragraph on pg 11, line 137 is not clear.

This sentence was clarified, p. 13.
i. Although I do have some concerns about the generalizability of their findings, I believe the process these investigators used could be of great value to other public health agencies seeking to examine and improve their current ID surge response plans.

• We agree that the findings are not generalizable, but contend that the process and steps in the model we propose are transferable to different contexts, and we have clarified this in the discussion section, p. 35.

COMMENTS FROM REVIEWER (2) Anat Gesser-Edelsburg:

a) P.1 line 24 - Spell out GP in first appearance.

• This was updated, p. 3 and p. 9.

b) P.5 line 11 (4) - East instead of east.

• Updated, p. 5.

c) P.6 lines 53-55 (44-45) - Usually the authors personal contribution (meaning including their initials) should be detailed only at the end of the paper. I think that there is no need to have them here.

• According to the COREQ we must state the team/credentials, items 1&2 in their list of the data collectors, to be true to this referenced reporting style we suggest leaving this detail in.

d) P.7 line 11 (49) - Can you please provide information about the spread of the participants according to the different hospitals.

• Yes, we can. TTSH is the main infection disease hospital in Singapore, so ID clinicians cluster there. We realize that the bulk of interviews are at TTSH. This reflects the reality of the ID expertise in Singapore; also nurses and junior doctors that are likely to deal with ID cases will be at TTSH. The spread of interview was as follows: TTSH- 19 (including junior level Doctors, managers, and nurses); NUH- 5; CGH- 3; KTPH-1; MOH-2 full-time (many of our senior ID clinician interviewees had split MOH roles); GP (from ASEAN Dengue day) – 5.

We were only able to identify one ID clinician at the pediatric hospital, KTPH.

Singapore is a very small country, and people are very connected. The six degrees of separation rule that normally applies is more like 1 degree in this setting and high level of expertise: everybody knows one another. In order to preserve anonymity of our participants we report the percentage of interviews at TTSH as 53% of interviews, and hope this will satisfy both the need for transparency while keeping our promise of confidentiality. This is added in on pp. 8-9.

e) P.7 line 32 (52) - Please provide the semi-structures questionnaire as an appendix.
The topic guide has been added as an Appendix/Supplementary file, this is stated p. 8.

f) p. 8 lines 11-35 (66-76) - Please provide more information regarding the participants' inclusion criteria, response rates, and the criteria by which the authors have decided to stop the recruitment of more participants.

- Thank you for reminding us of these details. Respondents were invited if they had working in Singapore health system from 2003 onwards and had ID expertise. We stopped recruitments once saturation from referrals was reached; 81% of invited interviewees agreed to take part, see p. 9.

g) P. 9 lines 13-16 (90-91) - Please explain why or according to which criteria there was no need for repeat interviews or interviewing more participants.

- Given the in-depth narrative nature of the interviews in which the participant was able to drive the discussion according to what was most important to them, we found participants had clear memories of acute surge events. They were eager to share these experiences, in confidence. In fact, although at first conscious of anonymity, once reassured, most were very keen to unburden their stories, which came pouring out, sometimes in vivid detail, particularly in relation to SARS. Also, the recurring theme that decisions were ‘top down’, had led to many people (even very senior ones) feeling ignored and undermined. These interviews were their chance to talk about what needed changing, including flatter communication and decision making mechanisms. We have added in that rapport was easily established and thus we gleaned rich/complete narratives, and there was no need for repeat interviews. Although we did ask for permission for these during consent taking, it was simply that none were judged necessary, p. 10.

h) P. 9 - lines 25-22 (95-98) - See above comment regarding P.6 lines 53-55 (44-45).

- We addressed this comment in relation to justifying details according to the COREQ reporting standards.

i) P.9- This is a general comment regarding the results section as a whole. There are many sentences where it is not clear to the reader whether the text is being said by the research participants or as a conclusion by the authors.

- We have clarified our methods of analysis throughout. Our narrative reflects the bringing together of the accounts by the interviewees, as such we have added clarifications that findings ‘emerged’ or were ‘described’ by interviewees to highlight that the reported analysis is anchored in the data narrative, not in disconnected conclusions from the authors.

j) P. 13 lines 11-14 (179-180) - Please explain how coordination will vary according to the threat scenario.

- Specifically, the threat level as determined by the combination of crowding and complexity, added p. 17.
k) P. 17 line 52 (288) - Who are the senior participants.

- They were Chairman Medical Board, Head of departments (Infectious Disease, Microbiology, Emergency department), Senior operation managers, Director of Communicable disease division in MOH and so on. However, we feel giving specific job titles in the published text would threaten the anonymity of the participants, and hope the inclusion criteria added on p. 9 is enough to situate our findings.

l) P. 18 line 13 (295) - Please delete repeated punctuation.

- Deleted, p. 20.

m) P. 19 line 6 (315) - Please spell out PPE on first appearance.

- Added, p. 21.

n) P. 21 Line 37 (373) - Please spell out ICU on first appearance.


o) P. 28 the DECIDE steps - Please consider moving the DECIDE steps to the discussion section. Please explain what is there that is new comparing to other known existing hospital emergency preparedness/response models and what is unique about it when it comes to ID.P. 30 Discussion - Please explain/provide evidence to the uniqueness of the research findings and the proposed DECIDE steps in relation/comparison to existing scientific knowledge regarding hospitals preparedness/response and practice models/techniques/protocols addressing other events such as mass casualties events (terror attack, road accident etc)or ID surges.

- We agree about moving the DECIDE to the discussion, and restructure the paper accordingly, from p. 31.

- Our model builds on the frameworks that exist and the key incident management literature we identified, yet it is unique because it draws on evidenced based narrative accounts to collate a conceptual overview. The WHO and MoH guidelines we identified for surge response and planning likely draw on institutional memory, although our knowledge, no other study has been published systematically assessing ID surge events. At the outset of this study a systematic scoping review was carried out to compile literature on lessons learnt during ID surge events, we did find many evaluations of specific surge response strategies. However, no study was found that undertook a historical documentation of the nature of threats and sought to align strategies accordingly. Although the scoping review is as yet unpublished, the literature searching process gives us assurance of the uniqueness of our current proposed work. We have added a section on ‘strengths of weaknesses’ of the study and elaborate this point within, p. 34. We also conclude by addressing the transferability of the concepts and DECIDE model, while acknowledging that the specific strategies will not be generalizable to all contexts, as initially suggested by reviewer 1.
• We do not claim our work relates to terror attacks, road accidents, and other such mass casualties. Getting through the data on our ID hospital surge topic was a dense and focused activity, and other forms of surging are outside of the scope of our work.