PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Exploring the components of physician volunteer engagement: a qualitative investigation of a national Canadian simulation based training program
AUTHORS	Sarti, Aimee J.; Sutherland, Stephanie; Landriault, Angele; DesRosier, Kirk; Brien, Susan; Cardinal, Pierre

VERSION 1 - REVIEW

REVIEWER	Amanda Roze des Ordons University of Calgary, Canada I personally know 3 of the authors and have worked with them on other projects. I had indicated this to BMJ Open and was informed I could proceed with reviewing the paper.
REVIEW RETURNED	08-Oct-2016

GENERAL COMMENTS	Overall, this was an interesting paper that fills a gap in helping us to better understand factors that motivate physicians to volunteer, with implications for future recruitment and retention of physician volunteers. Revisions for the authors to consider are described below. Abstract - Line 19 – Use of the term 'participants' is somewhat confusing to the reader – it might be misinterpreted as course participants. Consider replacing this term with 'physician volunteers'. Article summary – strengths and limitations - Bullet point 2 – suggest rewording 'covers an issue little investigated' to 'covers an under-investigated issue' - Bullet point 3 – 'practically improving' may be misinterpreted; consider rewording (eg: 'which may offer practical ideas to improve volunteer engagement strategies') Introduction - P.4 Line 9 – Change 'needs' to 'need' - P.4 Line 47 – Change 'located' to 'identified' - P.6 Line 46 – A richer description of the context would be helpful to readers. How does ACES recruit volunteers? Was it

	intentional that the majority of volunteers were physicians? Was ACES intentionally seeking physician volunteers or was this the group most likely to volunteer? How many invitations to volunteer were sent out (what is the denominator for the 73 volunteers)? Are volunteers compensated in any way? - P.6 Line 51 – Change 'increasing demand' to 'greater demand' - P.6 Line 53 – 'Curriculum' should be plural (ie: 'curricula') Methods – Conceptual framework - How was this conceptual framework constructed? Based on what? Was there discussion between research team members, discussion with key informants, informed by previous literature? - P.7 Lines 30 + 32 – Use of the terms 'dependent variable' and 'independent variable' is somewhat confusing in a qualitative study; could these terms be changed? - P.7 Lines 37 + 39 – Please reference the definition of 'leader' and 'engagement', or clarify that these were defined by the authors - P.8 Line 29 – 'engagement of each other' is somewhat confusing, maybe 'one another's engagement'? Methods – Data content and analysis - P.9 Line 46 – Please indicate the qualitative analysis technique used (eg: thematic content, grounded theory) Results - Table 2.Summary of qualitative findings o Are Volunteer Exchange, Volunteer Recognition, Educator Network and Quasi Volunteerism separate themes or might they be elements contributing to Volunteer Recruitment and Volunteer Retention? o I noted overlap between the subthemes listed under Volunteer Exchange, Volunteer Recognition and Quasi Volunteerism; I would encourage the authors to consider whether these are distinct themes - P.10 Line 40 – 47 – From 'Upon analysis' to '(interview guide 2)' – this section might be more appropriate within the Methods section - P.10 Line 54 – For the phrase 'clinicians and members part of', is there perhaps an extra word in this phrase or a missing word? - P.11 – The term "snowball approach" is used in describing the subtheme "snowball approach". Some readers may not be familiar with this term; could the term be described rather than simply naming it?

	Discussion - P.18 Lines 36 – 41 – Could be simplified to “leads to behavioural engagement in volunteer activities and contributions to the ACES program.” - P.19 Line 22 – The term “feel out” has colloquial connotations; recommend rewording this. - P.20 Line 13 – “Embededness” is not a word; recommend substituting with another term and rewording this sentence as it is somewhat awkward. - P.21 Paragraph 1 – This paragraph presents several findings from the study and at the end of the paragraph connects them to personal satisfaction. The authors could present the idea of personal satisfaction as the common thread in the first sentence to better orient readers. - The authors discuss only the positive aspect of their findings in the Discussion. I would encourage them to reflexively consider what challenges these findings might introduce, and whether there might be anything problematic about these findings. Full manuscript - The authors briefly introduce a number of established theories throughout the paper without discussing any in detail; for example, a new theory is introduced into nearly every paragraph of the discussion. This is somewhat overwhelming to the reader. Also, in introducing so many theories, the paper reads as though the authors are attempting to ‘prove’ that their qualitative results and framework are valid. Perhaps the authors could consider presenting the significance and implications of their findings without the linkages to so many other theories.

REVIEWER	Professor Jens Christian Kubitz Department of Anaesthesiology, University Medical Center Hamburg-Eppendorf, Germany
REVIEW RETURNED	26-Oct-2016

GENERAL COMMENTS	Sarti A and colleagues: “Volunteer physician engagement: an investigation of a national simulation based program” Manuscript ID: bmjopen-2016-014303 This study provides a good framework for volunteer recruitment and motivation for a national educational program. Based on 30 interviews performed during a period of three years, the authors describe many aspects of volunteer recruitment, exchange and retention and on networking and motivation. With their conceptual framework they want to give an impulse for further research to engage yolunteers in educational programs, and this is worth to be added to the current medical literature. General Comment:

	All the sections of the manuscript are well written, however, I feel the manuscript would be more focused, if less citations were presented. Think of adding only a few, where they might be necessary for understanding your point. However, in the discussion some of those points could be addressed in more detail, for example what should program leaders do to retain volunteers. Do you absolutely have no data on why volunteers were not retained? This and the frequency of courses held by the volunteers would indeed be very important, and maybe there is a link. Further, I wonder, why it took you three years to perform those interviews. Were they difficult? Did anything change over time? Minor remarks: • Page 6: early recognition – you should add the "quick SOFA" and citation from the February of this year (JAMA Feb 2016) • ACES program: what does simulation mean (online or face-to-face) – is it the final module as mentioned on the homepage? Do instructors get a training in medical teaching before giving the first ACES course? • For me, figure 1 does not add further information to the text and could be omitted • Individuals participating in the interview: in which year after graduation from medical school were they? • Results: As mentioned above – you raise a lot of good points, but you may reconsider their presentation (less citations). I am interested in the point careers: did the participants have the impression that their participation has really changed their career? Did you ask? Does participation change their clinical practice (if not evaluated, you may consider for future studies)

REVIEWER	Larry Hearld University of Alabama at Birmingham
REVIEW RETURNED	03-Feb-2017

GENERAL COMMENTS	The purpose of this study was to develop/present a conceptual framework for understanding physician volunteer engagement and qualitatively assess the components of this framework. The paper was well written and the topic is an interesting one; however, there are a few opportunities to either better integrate the different parts of the paper or remove material to streamline the findings. The comments below elaborate on these issues. 1. In some ways, the paper reads as if it is two different studies with only loose connections between them. More specifically, the conceptual framework is not all that well integrated with the findings of the qualitative analysis. There are selective references to the different categories of the conceptual framework in the results section, but they aren't consistent. I think the paper would be strengthened if there were more explicit linkages to the framework. Even expanding Table 2 to list the domains/themes (e.g., cognitive, emotional, behavioural) that the findings belong to would help. 2. Along similar lines, it wasn't entirely clear how the conceptual framework was derived. Readers are informed that "an extensive literature review along with expert consultation informed the development" but that is pretty much all that is mentioned above the process of deriving the framework. Consequently, it is difficult to

	know how much confidence to have in the framework. Some reassurances are provided by the fact that the framework seems to mirror that of Fredricks et al. mentioned on p. 5, but that raises a different question – is this framework different? It made me wonder whether the presentation of a conceptual framework was really a contribution of the study, or if so, how much of one? At the very least, if one of the objectives was to develop a framework to describe the elements that influence physician volunteer engagement, I think the process used to develop that framework should be made more explicit for readers to understand how it was derived. 3. P. 9, lines 17-23: Were the informants all participants of the ACES program? Some of the questions from Interview Protocol 1 suggest that they weren't, but the description in the paper suggests they were. 4. P. 12, lines 32-37: "The main barriers to recruitment included career trajectory and individual time constraints…As volunteer physicians continue along their career they may choose different pursuits (e.g., research) and then do not have time to remain an ACES volunteer." This sounds more like retention than recruitment. 5. The themes/factors included in the Educator Network sounded a lot like reciprocal engagement. Can you expand on/explain how they differ? Similarly, the "Curriculum Vitae" theme in the Quasi Volunteerism category (p. 18) sounds very similar to "Academic Currency". Can you expand on/explain how they differ? More generally, this may point to the need to better define and differentiate these themes.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name: Amanda Roze des Ordons

Overall, this was an interesting paper that fills a gap in helping us to better understand factors that motivate physicians to volunteer, with implications for future recruitment and retention of physician volunteers. Revisions for the authors to consider are described below.

Abstract
1. Line 19 – Use of the term 'participants' is somewhat confusing to the reader – it might be misinterpreted as course participants. Consider replacing this term with 'physician volunteers'.

Response - Thank you for your feedback. We have now removed the term participants and added the term 'physician volunteers.'

Article summary
2. Bullet point 2 – suggest rewording 'covers an issue little investigated' to 'covers an under-investigated issue'

Response – Thank you for this suggestion. We have made this edit.

3. Bullet point 3 – 'practically improving' may be misinterpreted; consider rewording (e.g.: 'which may offer practical ideas to improve volunteer engagement strategies')

Response – Thank you for this suggestion. We have made this edit.

Introduction

4. P.4 Line 9 – Change ‘needs’ to ‘need’

Response – Thank you for this suggestion. We have made this edit.

5. P.4 Line 47 – Change ‘located’ to ‘identified’

Response – Thank you for this suggestion. We have made this edit.

6. P.6 Line 46 – A richer description of the context would be helpful to readers. How does ACES recruit volunteers?
Was it intentional that the majority of volunteers were physicians? Was ACES intentionally seeking physician volunteers or was this the group most likely to volunteer? How many invitations to volunteer were sent out (what is the denominator for the 73 volunteers)? Are volunteers compensated in any way?

Response – Good questions. Recall that this paper is based on secondary analysis of ACES programmatic assessment done for the purpose of quality assurance. The novel theme of physician engagement was not foreseen prior to the inception of the interview guide 1. Thus, we undertook additional data collection to better understand the construct of physician engagement, as well as how these physicians were recruited. The recruitment processes are described in the results section (i.e., word of mouth & snowball approach). Given the nature of the ACES course, the majority of the instructors are physicians though there are some other health care professionals. Again, given that the ACES course is designed specifically for fellows in their first year of training, the majority of instructors are indeed staff physicians as they are predominantly the experts. Regarding the secondary data collection, we had a list of 18 physicians who were current volunteers. We felt we had saturation in our data after 15 of such interviews. Volunteers are compensated for their travel and expenses.

7. P.6 Line 51 – Change ‘increasing demand’ to ‘greater demand’

Response – Thank you for this suggestion. We have made this edit.

8. P.6 Line 53 – ‘Curriculum’ should be plural (ie: ‘curricula’)

Response – Thank you for this suggestion. We have made this edit.

Methods – Conceptual framework

9. How was this conceptual framework constructed? Based on what? Was there discussion between research team members, discussion with key informants, informed by previous literature?

Response - We opted for a more pre-structured qualitative research design as we wanted to bound the study within a set of engagement variables, yet at the same time we needed to maintain enough flexibility to allow for emergent findings so as to better understand the construct of physician engagement. We adapted a student engagement conceptual framework (Fredericks et al 2004). We found Fredericks et al.’s theory of engagement to be useful in our medical context. In further modifying the conceptual framework we used the ‘bins approach’ (Miles & Huberman, 1994), whereby the framework is mostly a visual catalogue of roles to be studied (e.g., physician leaders and

physicians), and within each role, how the variables of engagement influence their actions.

10. P.7 Lines 30 + 32 – Use of the terms ‘dependent variable’ and ‘independent variable’ is somewhat confusing in a qualitative study; could these terms be changed?

Response – We agree and have removed these terms and modified the text.

11. P.7 Lines 37 + 39 – Please reference the definition of ‘leader’ and ‘engagement’, or clarify that these were defined by the authors

Response – Thank you for your comment. We have added references to both these definitions.

12. P.8 Line 29 – ‘engagement of each other’ is somewhat confusing, maybe ‘one another’s engagement’?

Response – Thank you for this suggestion. We have made this edit.

Methods – Data content and analysis
13. P.9 Line 46 – Please indicate the qualitative analysis technique used (eg: thematic content, grounded theory)

Response – Thank you for picking this up. We employed a thematic content analysis whereby the data is first explored to gain a general sense of the data then coded iteratively (Creswell, 2012). We have clarified the analysis technique in the manuscript.

Results

14. Table 2. Summary of qualitative findings

- Are Volunteer Exchange, Volunteer Recognition, Educator Network and Quasi Volunteerism separate themes or might they be elements contributing to Volunteer Recruitment and Volunteer Retention?
- I noted overlap between the subthemes listed under Volunteer Exchange, Volunteer Recognition and Quasi Volunteerism; I would encourage the authors to consider whether these are distinct themes

Response – Thank you for your thoughtful comments. We agree that the ‘volunteer exchange,’ ‘volunteer recognition,’ ‘educator network,’ and ‘quasi volunteerism’ are elements contributing to volunteer recruitment and volunteer retention. Further, we agree there exists overlap among the aforementioned four themes as with many complex social phenomenon it is often difficult to precisely pull apart overlapping findings. Overall, we do feel that there is sufficient distinction between themes to list separately. For example, volunteer exchange was predominantly concerned with behavioral actions of “I will do X for you, and you will do Y for me”. Volunteer recognition was seen as a means to academic achievement, for example, meeting criteria for employment. For the most part, educator network centered around the emotional element of engagement in providing personal satisfaction regarding relationships. Quasi volunteerism was a cognitive reaction in that some physicians felt they really didn’t have a choice to volunteer as they had to do “something” to meet hospital service requirements. We agree the two most similar themes are volunteer recognition and quasi volunteerism, however we still feel there is enough nuanced difference to separate them.

15. P.10 Line 40 – 47 – From ‘Upon analysis’ to ‘(interview guide 2)’ – this section might be more appropriate within the Methods section

Response – Thanks for your insight here. We agree that this sentence does not belong in the results and hence have removed. Upon reviewing the methods section, this has already been stated.

16. P.10 Line 54 – For the phrase ‘clinicians and members part of’, is there perhaps an extra word in this phrase or a missing word?

Response – Thank you for picking this up. The word ‘part’ should not be included in this sentence and has been removed.

17. P.11 – The term “snowball approach” is used in describing the subtheme “snowball approach”. Some readers may not be familiar with this term; could the term be described rather than simply naming it?

Response – Thank you for your comment. We have added the following sentence to add clarity: “With this approach, leaders would contact volunteers within the group, who in turn would reach out to contacts in their social networks to identify potential new recruits who have the qualities required to contribute to the group.”

Discussion

18. P.18 Lines 36 – 41 – Could be simplified to “leads to behavioral engagement in volunteer activities and contributions to the ACES program.”

Response – Thank you for this suggestion. We have made this edit.

19. P.19 Line 22 – The term “feel out” has colloquial connotations; recommend rewording this.

Response – Thank you for your comment. We have reworded this sentence to now state “gain an initial impression of potential new members.”

20. P.20 Line 13 – “Embeddedness” is not a word; recommend substituting with another term and rewording this sentence as it is somewhat awkward.

Response – We thank you for drawing attention to this point. Embeddedness is a word utilized in management, economic and social sciences, however we recognize that this term may be confusing to the reader and have edited to state “strength of the social networks.”

21. P.21 Paragraph 1 – This paragraph presents several findings from the study and at the end of the paragraph connects them to personal satisfaction. The authors could present the idea of personal satisfaction as the common thread in the first sentence to better orient readers.

Response – Thank you for picking up this important point. We have now reworked the first sentence of the paragraph to better orient the reader to the personal satisfaction thread.

22. The authors discuss only the positive aspect of their findings in the Discussion. I would encourage them to reflexively consider what challenges these findings might introduce, and whether there might be anything problematic about these findings.

Response - Thank you for this comment. We agree that it is important to understand the barriers to recruitment and retention. We have provided some information under the ‘barriers’ section (please see page 11), however this was not the main thrust of the paper as we wanted to first understand the construct of engagement prior embarking on an investigation of disengagement. To acknowledge this

point, we have noted this in the limitation section.

Full manuscript

23. The authors briefly introduce a number of established theories throughout the paper without discussing any in detail; for example, a new theory is introduced into nearly every paragraph of the discussion. This is somewhat overwhelming to the reader. Also, in introducing so many theories, the paper reads as though the authors are attempting to 'prove' that their qualitative results and framework are valid. Perhaps the authors could consider presenting the significance and implications of their findings without the linkages to so many other theories.

Response – We appreciate this thought provoking comment as it has prompted us to revisit each theory presented in the paper. After a careful review, and putting our primary purpose of the study at the forefront, we felt that it was important for this emergent study to posit different theoretical lenses that supported our findings. In this way, we sought to encourage as many avenues for future research as possible.

Reviewer: 2
Reviewer Name: Professor Jens Christian Kubitz

This study provides a good framework for volunteer recruitment and motivation for a national educational program. Based on 30 interviews performed during a period of three years, the authors describe many aspects of volunteer recruitment, exchange and retention and on networking and motivation. With their conceptual framework they want to give an impulse for further research to engage volunteers in educational programs, and this is worth to be added to the current medical literature.

General Comment:
All the sections of the manuscript are well written, however, I feel the manuscript would be more focused, if less citations were presented. Think of adding only a few, where they might be necessary for understanding your point. However, in the discussion some of those points could be addressed in more detail, for example what should program leaders do to retain volunteers. Do you absolutely have no data on why volunteers were not retained? This and the frequency of courses held by the volunteers would indeed be very important, and maybe there is a link.
Further, I wonder, why it took you three years to perform those interviews. Were they difficult? Did anything change over time?

Response – Thank you for your encouraging comments and your questions. Indeed, the conceptual framework and thematic analysis is meant to provide a preliminary framework and impetus for future investigations. For our responses, we have divided your questions into the following sections.

a. Citations (Quotes)

Given the comment in point number 5, we understand this point to be referring to the quotes provided in the results sections. Based on this feedback we have cut down on the number of quotes and now only provide one prototypical quote for each theme text. We agree that this helps to focus the results section. For qualitative studies, it is standard practice to provide 1-2 prototypical quotes per theme to highlight for the reader, as such we have maintained this standard in the manuscript.

b. However, in the discussion some of those points could be addressed in more detail, for example

What should program leaders do to retain volunteers

This is an excellent question. We'd like to draw your attention again to the future research section where we have outlined what possible interventions may be implemented to enhance physician volunteerism:
• enhancing reciprocal engagement and interpersonal relationships through collaborative meetings;
• deepening emotional engagement by connecting with individuals on a deeper level with respect to the meaning and potential outcomes of their work;
• promoting cognitive engagement by including intellectually challenging tasks, and recognition of the volunteers work through faculty appointment, newsletters among their peers, awards and scholarly acknowledgement.
We felt this information was best situated within the future research section rather than in the discussion, however we are open to adding additional detail if needed.

c. Do you absolutely have no data on why volunteers were not retained? This and the frequency of courses held by the volunteers would indeed be very important, and maybe there is a link.

Response - Regarding volunteer retention, the focus of our investigation was to better understand the construct of physician volunteer engagement before investigating the facets of disengagement. As such, we did not purposefully seek out individuals who left the ACEs program. In addition, during our data collection time period very few volunteers left the ACES program. We agree this is an important area and have acknowledged this limitation of our study (see limitations section). We have also highlighted the importance of exploring disengagement in future studies (see future research).

d. Further, I wonder, why it took you three years to perform those interviews. Were they difficult? Did anything change over time?

Response – Thank you for asking us to clarify. We have provided information on the total number of volunteers in the program to provide context for the study. Review of National ACES database for the time period of 2010 – 2014 revealed that the program had recruited 73 volunteers. This information was provided in the context section of the manuscript, but in the abstract was under the results. We have moved this sentence in the abstract up to the context section.

For the study, the sequencing of interviews is as follows:
1. Conducted first 15 interviews as part of a quality improvement initiative of the ACES program (2012-2013)
2. Published quality improvement initiative (2013)
3. Developed conceptual framework (2013-2014)
4. Secondary analysis was performed (2014)
5. Conduct additional 15 interviews (2015)

Your comment has helped us to recognize that this sequence was not entirely clear in the manuscript. As such, we have edited the first sentence of the methods section to better outline the sequence of events. Also, we have added more detail on the timing of interviews in the data collection and analysis section. Incidentally, the interviews were not difficult to do. On the contrary, the interviewees were enthusiastic in discussing their involvement with the national ACES program. Most of the interviewees offered themselves for further discussion if required.

Minor remarks:

1. Page 6: early recognition – you should add the "quick SOFA" and citation from the February of this year (JAMA Feb 2016)

Response – Thank you for this suggestion. We have added this reference to page 6.

2. ACES program: what does simulation mean (online or face-to-face) – is it the final module as mentioned on the homepage? Do instructors get a training in medical teaching before giving the first ACES course?

Response – Simulation immerses learners in situations that are recreated with different degree of realism in order to help attain different learning objectives. The online simulations used in the ACES program recreate situations using videos of actors playing the roles of health care professionals, family members and patients and also offers the option of obtaining additional information (history and physical examination, laboratory tests, imaging, etc). The information provided enables learners to develop a mental model of the situation, and practice both their decision-making and task management skills. The face-to-face simulations use different types of mannequins depending on the learning objectives (i.e., crisis and resource management or technical skills). To develop crisis/resource management skills, an emergency or intensive care room is recreated using mannequins (who breathe, talk, have a pulse, etc) as patients. Standard monitoring and procedural equipment are available. The roles of nurses and respiratory therapists are played by health care professionals (e.g., Critical Care nurses). To develop technical skills such as central line insertion or tracheal intubation, lower-fidelity mannequins (e.g. patient torso or head and neck) are used.

The ACES program offers a three-days instructor training program - one day to review the scenarios and understands the principles of debriefing and two days of practice in the presence of a master instructor to improve debriefing skills. New faculty recruits will usually first take the instructor course before becoming faculty. In some instances, new recruits are exempted of taking the instructor course if considered by the master faculty as being already proficient as an instructor (e.g., someone who has already completed a fellowship in simulation).

3. For me, figure 1 does not add further information to the text and could be omitted

Response – Thank you for your comment. We are pleased to know that the text sufficiently describes the conceptual framework. However, salient literature describing conceptual framework development, highlight that these frameworks are often best done graphically so as to visually depict the variables, and specifically to map the hypothesized interrelationships (Miles and Huberman, 1994).

4. Individuals participating in the interview: in which year after graduation from medical school were they?

Response – We did not specifically capture how many years after graduation from medical school. The sample did include volunteers at both early and later stages in their careers. In the results we have noted that “All physician volunteers that were interviewed were full time clinicians and members of the ACES faculty.” But are not able to comment precisely on years in practice.

5. Results: As mentioned above – you raise a lot of good points, but you may reconsider their presentation (less citations). I am interested in the point careers: did the participants have the impression that their participation has really changed their career? Did you ask? Does participation change their clinical practice (if not evaluated, you may consider for future studies)

Response – As above, we have removed quotes to now only include one quote for each theme. You raise an important point about participation and impact on clinical practice. In this first, exploratory investigation we did not directly ask if participation changed their career path and/or if it changed their clinical practice. This area would be important to explore in future studies and have alluded to this

important observation.

Reviewer: 3
Reviewer Name: Larry Hearld

The purpose of this study was to develop/present a conceptual framework for understanding physician volunteer engagement and qualitatively assess the components of this framework. The paper was well written and the topic is an interesting one; however, there are a few opportunities to either better integrate the different parts of the paper or remove material to streamline the findings. The comments below elaborate on these issues.

1. In some ways, the paper reads as if it is two different studies with only loose connections between them. More specifically, the conceptual framework is not all that well integrated with the findings of the qualitative analysis. There are selective references to the different categories of the conceptual framework in the results section, but they aren't consistent. I think the paper would be strengthened if there were more explicit linkages to the framework. Even expanding Table 2 to list the domains/themes (e.g., cognitive, emotional, behavioural) that the findings belong to would help.

Response – We appreciate this insightful comment. Initially, our analysis included attempts to directly link the elements of the conceptual framework to the findings in Table 2. In this first exploratory study, some of the findings were easily linked by volunteers, whereas others proved difficult to separate out as with the "barriers" and "program change and evolution/innovation". This lead us back to Fredericks et al (2004), who notes that conceptualizations of social phenomenon are often messy. In particular, many conceptualizations of engagement include only one or two of the three components listed in the framework (Fredericks et al., 2004). We feel that our findings (and the difficulty in listing out the specific element of the framework) call for richer characterizations of how physicians behave, feel, and think. We have now added to the first paragraph of the discussion to acknowledge both the importance of the conceptual framework to underpin and bound the study as well as the difficulty in separating out the various elements from the descriptive data obtained from interviewing the participants.

Throughout the discussion we made linkages from the data to the conceptual framework. In one example, under Volunteer Retention "comfort zone" was seen primarily as an element of cognitive engagement. Where we have specifically stated in the discussion, "in particular, physicians felt a strong sense of cognitive engagement with regard to being 'pushed' out of their comfort zone so as to reach a new and expanded state of performance." We have now also made additional efforts to link the framework with our findings within the discussion section. Under Volunteer Recruitment, "word of mouth," we have clarified this in the discussion where we state, "With respect to recruitment, we found that word-of-mouth recruitment was the primary behavioural vehicle to engage new members. We have also added the sentence: "Personal satisfaction was an overarching finding that mapped directly to the emotional and cognitive elements of engagement within the conceptual framework."

2. Along similar lines, it wasn't entirely clear how the conceptual framework was derived. Readers are informed that "an extensive literature review along with expert consultation informed the development" but that is pretty much all that is mentioned above the process of deriving the framework. Consequently, it is difficult to know how much confidence to have in the framework. Some reassurances are provided by the fact that the framework seems to mirror that of Fredrick's et al. mentioned on p. 5, but that raises a different question – is this framework different? It made me wonder whether the presentation of a conceptual framework was really a contribution of the study, or if so, how much of one? At the very least, if one of the objectives was to develop a framework to

describe the elements that influence physician volunteer engagement, I think the process used to develop that framework should be made more explicit for readers to understand how it was derived.

Response – The inclusion of a conceptual framework stemmed from our pre-structured qualitative research design. It was important for us to bound the study within a set of engagement variables, yet at the same time we needed to permit some flexibility to allow for emergent findings so as to better understand the construct of physician engagement. We adapted an engagement framework (Fredericks et al 2004) set within the domain of education, and situated to our medical education context. In modifying the conceptual framework, we used the 'bins approach' (Miles & Huberman, 1994), whereby the framework is mostly a visual catalogue of roles to be studied (e.g., physician leaders and physicians), and within each role, how the variables of engagement influence their actions. Further, a multidisciplinary panel of experts iteratively collaborated on the modifications to the conceptual framework included critical care physicians and leaders, administrators, system-level policymakers and a sociologist.

3. P. 9, lines 17-23: Were the informants all participants of the ACES program? Some of the questions from Interview Protocol 1 suggest that they weren't, but the description in the paper suggests they were.

Response - The present study grew out of a larger comprehensive needs assessment (NA) for quality improvement of the national ACES educational program. In response to one of Reviewer 2's questions we provided the following sequence of interviews as follows:

1. Conducted first 15 interviews as part of a quality improvement initiative of the ACES program (2012-2013)
2. Published quality improvement initiative (2013)
3. Developed conceptual framework (2013-2014)
4. Secondary analysis was performed (2014)
5. Conduct additional 15 interviews (2015)

For the quality improvement initiative, 15 participants were selected for interviews based on a purposive sampling method to identify individuals that would provide a balanced representation across a variety of characteristics (e.g., program directors from different specialties, and health care professionals from different backgrounds with representation from across the country). Subsequently an additional 15 interviews were performed with physician volunteers. Your comments (along with Reviewer 2) have helped us to recognize that this sequence was not entirely clear in the manuscript. As such, we have edited the first sentence of the methods section to better outline the sequence of events. Also, we have added more detail on the timing of interviews in the data collection and analysis section.

4. P. 12, lines 32-37: "The main barriers to recruitment included career trajectory and individual time constraints…As volunteer physicians continue along their career they may choose different pursuits (e.g., research) and then do not have time to remain an ACES volunteer." This sounds more like retention than recruitment.

Response – We agree and thank you for catching this error. We have now revised this section to read, "the main barriers to retention…" and have moved this to the Retention section as well as modified Table 2.

5. The themes/factors included in the Educator Network sounded a lot like reciprocal engagement. Can you expand on/explain how they differ? Similarly, the "Curriculum Vitae" theme in the Quasi Volunteerism category (p. 18) sounds very similar to "Academic Currency". Can you expand

on/explain how they differ? More generally, this may point to the need to better define and differentiate these themes.

Response – After careful consideration of the themes within the Educator Network category, we feel that the reciprocal engagement is nuanced enough to remain distinct. Perhaps, it may be that the themes within Educator Network contribute to reciprocal engagement. Unfortunately, we did not probe on this dimension and have no data to empirically report on. As we noted above, future work to further understand the many dimensions of volunteer physician engagement should include richer characterizations of how physicians behave, feel, and think.

We agree, on the surface “curriculum vitae” and “academic currency” appear to be similar themes, however we still feel there is enough nuanced difference to separate them. For example, “academic currency” was placed in the category of Volunteer Exchange as physicians spoke of “academic currency” as something to be traded in a behavior of exchange. That is, I do X for you (or I give you X), and you do Y for me (or you give me Y). To clarify this point in the manuscript we have added the following sentence to the Academic Currency theme: “Contributing to another’s program was further described as a method of building up ones currency in that there was an expectation that, in turn, volunteer peers would “pay back” the favor at a later date.”

VERSION 2 – REVIEW

REVIEWER	Amanda Roze des Ordons University of Calgary, Canada I have previously worked clinically and academically with several authors of this manuscript
REVIEW RETURNED	26-Mar-2017

GENERAL COMMENTS	Overall the authors present an interesting study on factors that impact volunteer engagement; the results are broadly applicable and could help guide other programs. Recommended revisions are as follows: 1. Within Methods, the sentence in Lines 35-45 p. 7 could be modified to improve clarity. 2. In the Results section, I'm not sure that the phrase in Lines 23-25 p. 12 conveys the intended concept; consider rewording (e.g.: 'Representative quotes are provided to illustrate each theme.') 3. The authors include explanations and references to others' work within the Results section; these elements might be best situated in the Introduction/Methods/Discussion sections as the Results section is usually reserved for presentation of results from the current study. 4. In the Discussion, Lines 44-49 on p. 22 the authors write "Our study has shown that financial incentives are of low to absent value to physician volunteer engagement in all activities within the ACES program" however I'm not sure that data to support this statement was not presented in the Results section. 5. In the Discussion, Lines 25-27 on p. 23 the authors indicate "most volunteers in this program would contribute further if called upon", however the qualitative nature of this study and that it only included a small number of all volunteers does not allow for such a claim.

	6. The last sentence of the conclusion is somewhat contradictory, considering that volunteerism suggests that the individuals are not compensated financially - please revise for clarity. 7. Within the abstract and manuscript there are linking words that are missing leading to incomplete sentences. I would encourage the authors to read through carefully and modify accordingly.

REVIEWER	Larry Hearld University of Alabama at Birmingham, United States of America
REVIEW RETURNED	16-Mar-2017

GENERAL COMMENTS	I think the authors have done a commendable job of responding to a thorough set of reviews. The revised version of the manuscript addresses my initial concerns and I think it reads more clearly as a result. No additional suggestions from me.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 3
Reviewer Name: Larry Hearld

I think the authors have done a commendable job of responding to a thorough set of reviews. The revised version of the manuscript addresses my initial concerns and I think it reads more clearly as a result. No additional suggestions from me.

Reviewer: 1
Reviewer Name: Amanda Roze des Ordons

Overall, the authors present an interesting study on factors that impact volunteer engagement; the results are broadly applicable and could help guide other programs. Recommended revisions are as follows:

1. Within Methods, the sentence in Lines 35-45 p.7 could be modified to improve clarity.

Response - Thank you for your feedback. This section was modified based on yours and the other reviewers' comments. As noted, we opted for a more pre-structured qualitative research design as we wanted to bound the study within a set of engagement variables, yet at the same time we needed to maintain enough flexibility to allow for emergent findings so as to better understand the construct of physician engagement. We adapted a student engagement conceptual framework (Fredericks et al 2004). In further modifying the conceptual framework we used the 'bins approach' (Miles & Huberman, 1994), whereby the framework is mostly a visual catalogue of roles to be studied (e.g., physician leaders and physicians), and within each role, how the variables of engagement influence their actions. We have read over the section several times and feel that our approach is now well laid out in this section. We have provided the reference for any reader interested in learning more about this approach.

2. In the Results section, I'm not sure the phrase in Lines 23-25 p.12 conveys the intended concept; consider rewording (e.g., 'Representative quotes are provided to illustrate each theme').

Response – Thank you for this suggestion. We have edited the lines to now state that "representative

quotes are provided to illustrate each theme."

3. The authors include explanations and references to others' work within the Results section; these elements might be best situated in the Introduction/Methods/Discussion sections as the Results section is usually reserved for presentation of the results from the current study.

Response – Thank you for this suggestion, we agree and have moved reference numbers 28, 29, 30 & 31 to the discussion section. We however, left reference 32 as it served to address a prior reviewer's comment.

4. In the Discussion, Lines 44-49 on p.22 the authors write, "our study has shown that financial incentives are of low to absent value to physician volunteer engagement in all activities within the ACES program" however I'm not sure that data to support this statement was not presented in the Results section.

Response – Thank you for your comment. This is an important point. During our revisions of the manuscript the following sentence had been removed when cutting the word count down. We have now added this sentence back to the results section: "Interestingly, participants spoke of a willingness to give more of their time, noting that financial incentives were of low to absent value in their activities with the ACES program." Given the previous reviewers comments to keep the results section streamlined and remove quotes we have not added additional quotes here, however if the Editor would like a quote to be reinserted here we are happy to do so.

5. In the Discussion, Lines 25-27 on p.3 the authors indicate "most volunteers in this program would contribute further if called upon", however the qualitative nature of this study and that it only included a small number of volunteers does not allow for such a claim.

Response – Thank you for this comment. Interestingly, the majority of participants interviewed did indicate that they would like to do more work with the national ACES program. We have clarified this point in the discussion to now state that most volunteers "interviewed" would contribute further if called upon.

6. The last sentence of the conclusion is somewhat contradictory, considering that volunteerism suggests that the individuals are not compensated financially – please revise for clarity.

Response – Thanks for asking for clarification. We have now edited the sentence to state that providing financial compensation "to physicians for additional education related activities" may not be feasible or sustainable so alternative approaches must be explored to engage volunteer physicians.

7. Within the abstract and manuscript there are linking words that are missing leading to incomplete sentences. I would encourage the authors to read through carefully and modify accordingly.

Response – Thanks for catching these textual errors. We have now removed the first (partial) sentence from the Results section of the abstract and have carefully read through the manuscript.

VERSION 3 – REVIEW

REVIEWER	Amanda Roze des Ordons University of Calgary, Canada I have worked professionally with several of the authors of this manuscript.
REVIEW RETURNED	02-May-2017

GENERAL COMMENTS	Thank you for your revisions to the manuscript. The points I had raised in my previous 2 reviews have now been addressed and I have no additional suggestions at this time.