PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Qualitative accounts from Syrian health professionals regarding violations of the right to health, including the use of chemical weapons, in opposition-held Syria
AUTHORS	Footer, Katherine; Clouse, Emily; Rayes, Diana; Zaher Sahloul, Mohanned; Rubenstein, Leonard

VERSION 1 - REVIEW

REVIEWER	Reviewer's identity confidential
REVIEW RETURNED	09-Feb-2018

GENERAL COMMENTS	Health providers' professional accounts of violations of the right to health in Syria-a right denied Reviewer comments Comments The paper adds to the increasing evidence on the violations of the right to health in in Syria. I think the manuscript would benefit from a major review to address some key comments and clarifications, especially regarding the methods. Given the number of times references to chemical attacks or similar terms were referred to in the paper and the quotes from healthcare providers, I wonder whether this focus should

	have been made more explicit in the way the paper is presented. Below are my comments in relation to each section: Title I think the title needs to change to reflect that the health providers in this study work with SAMS (so are affiliated with only one organisation). Also the title has to reflect the geographical area as opposition held territory in North West Syria. Abstract The same comments above regarding the title should be reflected in modifications to the abstract. It would be useful to note in the 'design' the type of interviews undertaken (i.e. in person; audio, a mix?) Qualified health professionals: in the abstract and in the text. What do the authors mean by qualified as this can mean different things to different people. A brief definition in the text as to what this means will do. In the conclusions in the abstract (line 40), I recommend the authors use the word 'sample' of Syrian health professionals. Strength and limitations of the study Similar to my comments above, I think it will be misleading not to be explicit about the affiliation of the health professionals interviewed in this study and which areas they worked in. Hence I suggest the authors mention explicitly that these are health providers working with SAMS in opposition controlled areas. Also in line 46-48 I suggest the authors delete 'providing healthcare' as that is an unnecessary repetition. The last bullet point (lines 3-4), instead of conflict affected regions of Syria, I suggest (for the same reasons stated above) to use opposition controlled areas. Using conflict affected areas is somehow misleading. Background 1. I suggest that the authors are consistent in the use of their terminology: Syrian government (line 13) or Assad regime (line 25)? I suggest looking at key texts and being consistent with what has been used in the Lancet Commission on Syria papers rather than terms used in news reports. 2. Could the authors find a different word to use than 'spotty (line 30)? 3. Is the finding (lines 25-27) of 75% of hospitals and primary care facilities not functioning relevant to all Syria? The areas covered by this study? Could the authors please clarify 4. Change 'public' health infrastructure (line 50) to healthcare infrastructure 5. It will be useful to have here a few lines about SAMS for readers who do not know about the organisation. For example, when it was established? What type of organisation is it? Areas of its operations? What is its political stand in relation to the Syrian conflict? And any other information that helps the reader gain a better understanding.

	Methods 1.The authors mention that the research was undertaken over approximately a three year period- October 2014-August 2017. Could the authors note the total number of interviews carried out in each of the three years? Were the same participants interviewed again over the years? This is not made clear in the paper. 2. In the 'Setting', the authors mention that fieldwork was undertaken in Gaziantep as well as by secure video link. Could the authors clarify how many participants were interviewed in person and how many by using a video link? It is not clear whether the same healthcare professionals were interviewed more than once by one method or two. This needs clarifying as it is quite obscure in the text. 3. Study population: the authors mention 'purposive sampling' was used to select the study participants. I recommend that the authors list all the criteria used in the selection of participants. Also describe briefly what they mean by 'qualified' health professional (see question above). Was a direct experience of chemical attacks one of the criteria used for selecting the participants? Chemical attack or a similar term was used more than 25 times in the text of this paper as well as abstract which implies to any reader that this issue is a key focus of this study. Yet this is not articulated well in the aims of the paper or the methods. Discussion It was disappointing to get to the discussion after reading the results sections. I think the authors can do a much better job in interpreting their findings rather than reiterating the findings again. 1. Line 17 (Page 11) use evidence instead of documentation. 2. Line 21 (page 11): the data illustrate. Delete the 's' 3. Line 22 (page 11): imposes on 'States': no need for capital letter. Do the authors mean the UN or international regulation impose on states a number of core obligations. Can the authors clarify this and if this is the Syrian state they refer to here, how would a state or a regime as mentioned in the start protect the health needs of a population in areas outside its control? What role do UN bodies have here to make sure that any violations to the right of health do not occur in all areas. 4. Line 26 (page 11): 'the attacks': can the authors clarify if they meant chemical attacks. Given the clear focus of the paper on the experiences of health care professionals of the chemical attacks, I think this sentence on lines 26 & 27 warrants more discussion and clarification. 5. Line 29 (page 11): 'As has been found in other conflicts', this is a really interesting point and pity that the authors did not specify which conflicts and what parallels does the Syrian conflict have with other conflicts. What makes the Syrian conflict different or similar to others? 6. Lines 45-52 (Page 11): sentence starting with 'Shortages' is very long and complex. Can you break it down to 2 sentences or simplify it? 7. It would be useful to state what SAMS and other organisations have done in terms of capacity building of healthcare providers and other support during the chemical attacks and other times?

	8. The authors mentioned only limitations but what about strengths if the study. What makes this study unique? How does it compare to other studies reporting on the impact of the conflict on healthcare professionals? What is the new finding that has not been reported in any previous study? 9. The authors note in the limitations that the majority of participants were in Gaziantep for SAMS training in October 2014 during a 5 day period? How many out of the total interviewed attended the training? This should have been something flagged up in the methods section. The authors refer to this resulting in respondent bias. I think this statement needs more qualifying and explaining: How? And why? 10. Can the authors comment why in their view were all the Syrian respondents male and that only two female American healthcare professionals included? What is the reason for this? Why were there no female healthcare professionals interviewed in a three year period? And what has been done (if any) to address this (or not)? Did this result in any bias? How? 11. Could the authors make a comment on the relevance of their findings to violations to healthcare in other opposition controlled areas in areas other than those in the North west of Syria? Or to ISIS controlled areas? And maybe also comment or refer to any evidence to point to how the situation differs in government controlled areas? Have the latter at all been affected in any way, especially given the size of displaced populations inside Syria? A few sentences in the discussion on this will tie really nicely with what the authors mention in the background, page 2 lines 39-46 on the presence of three healthcare systems. 12. What is the key conclusion of the study and how the findings maybe used? Could the authors pull out all the relevant points and provide a conclusion at the end of the discussion? In its present form the ending is too abrupt. I trust the authors find these comments helpful

REVIEWER	Dr Claire E Brolan Dalla Lana School of Public Health, University of Toronto, Canada
REVIEW RETURNED	25-Feb-2018

GENERAL COMMENTS	Thank you for the opportunity to review this very interesting and important study, which qualitatively examines the experiences of health care professionals working in conflict zones in Syria through a right to health lens. This manuscript has enormous potential and promise – so on that front, Well Done. However, respectfully, the content of this piece requires another layer of critical review/analysis to strengthen the piece overall. I have given suggestions below as to how to do this – I suggest begin by (i) performing a literature review and (ii) strengthening the study Methods section (which will then result in the Findings needing to be reworked, but this will in turn strengthen the Results and their coherence). Suggestions in moving this piece to the next level: 1. [Background, page 2, 15 – 18]

	"Although initiatives exist to assist health providers operate in insecure environments,2,3 little research has unpacked the operational, professional, and personal challenges health providers face when operating in such a violent setting." The above implies the important nature of this research and how it thus contributes to the scientific literature. However, the authors need to provide greater evidence to substantiate the claim that there is "little research". Hence it is strongly suggested the authors complete a rapid literature review examining the multidisciplinary literature (i.e. human rights literature, disaster and development, public health literature) on this topic. Are there any studies on the experiences of healthcare workers in conflict settings in Syria and elsewhere? How does this study add to that body of knowledge; however big or small that body of knowledge is? 2. [Background, page 3, lines 7 – 17] "Obligations under international humanitarian law include requirements not to attack or interfere with health care services.16 Obligations under the human right to health include ensuring the availability, accessibility, acceptability, and quality of health facilities, goods and services.17Drawing on the right to health as a key conceptual framework, this study explores the complex challenges health workers face in providing care when health care services and personnel are themselves subjected to violence and forced to operate in the midst of ongoing human rights violations and war crimes." The authors claim that they are utilizing the right to health "as a key conceptual framework". However, unfortunately the authors do not provide any definition of the right to health, or explanation of 'what' 'right to health framework' they are using, vis a vis the literature. This challenge flows onto and obscures the Methodology, and undermines the Results, and needs to be revised. For example, the Findings do not provide any information on the 'Acceptability' element of the RTH – and what do the authors mean by "Accessibility" as a sub-heading in the Results (for example). Please be very clear. And then why is there a separate sub-heading results "Health worker demoralization" – would this not come under Quality? Also, the authors make a very important point that "Obligations under international humanitarian law include requirements not to attack or interfere with health care services". What are those obligations? Explain them – how are they being breached in this study for the purposes of the Discussion section, for example? Is there also literature relating to these Obligations that the authors can draw on to strengthen the manuscript overall? 3. Methods In the Methods section I don't get a sense of the Domains of Inquiry. Also, the authors need to give greater explanation as to why they included 5 interviews from August 2017 – did any of the content of those interviews/health professional experiences differ to the 2014 sample?

	4. Results The first paragraph of the Results needs to coherently set out the thematic findings (that fell under the AAAQ right to health framework). Please also revise the presentation of the findings in terms of ensuring complete deidentification of participants (in light of the sensitive nature of the study content and participant sample size); for instance, rather than stating "As a general practitioner explained…" simply state "A participant explained…" Also, on Table 1 (Page 5) information is included on the Governates but nothing in the text to explain/advance why this information is important/included in the Table. 5. Other comments Background Page 2 – Line 10 "The ongoing civil war in Syria has created the direst humanitarian crisis of our time" – This a very strong opening sentence – while I don't doubt the veracity of this statement – it would be advisable to couch this claim (which appears to be a statement of fact) in the evidence. Please reference. Page 2 – Line 18. At the end of paragraph 1 there seems to be a sentence needed to explain why/what purpose this important research is indeed needed. Page 2 – Line 20/21 "Human rights organisations and UN agencies have placed a spotlight on the Syrian Government's assault on health care.[Ref 4]" – The authors have referred to multiple agencies here, including UN agencies – and it would be advisable to include additional references to the Physicians for Human Rights

VERSION 1 – AUTHOR RESPONSE

Response to Reviewer Document

Reviewer 1
Comment 1.0 [Background, page 2, 15 – 18]

"Although initiatives exist to assist health providers operate in insecure environments,2,3 little research has unpacked the operational, professional, and personal challenges health providers face when operating in such a violent setting."

The above implies the important nature of this research and how it thus contributes to the scientific literature. However, the authors need to provide greater evidence to substantiate the claim that there is "little research". Hence it is strongly suggested the authors complete a rapid literature review examining the multidisciplinary literature (i.e. human rights literature, disaster and development, public

health literature) on this topic. Are there any studies on the experiences of healthcare workers in conflict settings in Syria and elsewhere? How does this study add to that body of knowledge; however big or small that body of knowledge is?

Author response: We agree that further justification is needed to highlight what we now term the 'lack of rigorous research and analysis', which we think better delineates what we meant by 'little research'. In addition, we did conduct a rapid review and include references that better indicate the existing research. The text now reads at line 47-50:" Initiatives exist to assist health providers operating in insecure environments,2,3 including intense advocacy against increasing attacks on healthcare in conflict settings. However, only a small body of research studies[literature below added] have unpacked the operational, professional, and personal challenges health providers face, and none in Syria."

Literature added:

Abu Sa C, Duroch F. Taithe B. Attacks on medical missions: overview of a polymorphous reality: the case of Médecins Sans Frontières. International Review of the Red Cross 2013; 95 (890): 309–330.

Neuman, M. No Patients, No Problems: Exposure to risk of medical personnel working in MSF projects in Yemen's governorate of Amran. Journal of Humanitarian Assistance 2013. 104 http://sites.tufts.edu/jha/archives/2040

Sousa, C., & Hagopian, A. (2011). Conflict, health care and professional perseverance: a qualitative study in the West Bank. Global public health, 6(5), 520-533.

Dhar, S. A., Dar, T. A., Wani, S. A., Hussain, S., Dar, R. A., Wani, Z. A., ... & Ahmed, M. (2012). In the line of duty: a study of ambulance drivers during the 2010 conflict in Kashmir. Prehospital and disaster medicine, 27(4), 381.

Footer KH, Meyer S, Sherman SG, Rubenstein L. On the frontline of eastern Burma's chronic conflict--listening to the voices of local health workers. Soc Sci Med. 2014; 120:378-86

Justine Namakula, Sophie Witter; Living through conflict and post-conflict: experiences of health workers in northern Uganda and lessons for people-centred health systems, Health Policy and Planning, Volume 29, Issue suppl_2, 1 September 2014, Pages ii6–ii14, https://doi.org/10.1093/heapol/czu022

Comment 1.1 [Background, page 3, lines 7 – 17]

"Obligations under international humanitarian law include requirements not to attack or interfere with health care services.16 Obligations under the human right to health include

ensuring the availability, accessibility, acceptability, and quality of health facilities, goods and services.17 Drawing on the right to health as a key conceptual framework, this study explores the complex challenges health workers face in providing care when health care services and personnel are themselves subjected to violence and forced to operate in the midst of ongoing human rights violations and war crimes."

The authors claim that they are utilizing the right to health "as a key conceptual framework". However, unfortunately the authors do not provide any definition of the right to health, or explanation of 'what' 'right to health framework' they are using, vis a vis the literature. This challenge flows onto and obscures the Methodology, and undermines the Results, and needs to be revised. For example, the

Findings do not provide any information on the ‘Acceptability’ element of the RTH – and what do the authors mean by “Accessibility” as a sub-heading in the Results (for example). Please be very clear. And then why is there a separate sub-heading results “Health worker demoralization” – would this not come under Quality?

Author response: We agree that a better articulation of the Right to Health is required, including a definition and explanation of what parts of the framework of Comment 14 have been drawn upon to help structure the analysis and results. We have made additions the manuscript in the background and methodology to address more fully and clearly what elements of the right to health this study particularly focuses on. On reflection, we also agree that ‘Health worker demoralization’ could be construed as fitting under quality. However, in line with the analysis we have emphasized that ‘Health worker demoralization’ was an emergent theme, albeit one that is closely connected to aspects of quality of care. We still think it is worth drawing attention to the impact of the conflict on health providers at an individual level, as opposed to how health worker demoralization affected quality of care, directly addressed under the ‘Quality’ heading already.

Background Line 89–100: “Human rights obligations can be applied to health systems, including those in conflict, as an analytical tool to help better articulate and understand the responsibilities of States to respect – to refrain from directly interfering with a right; to protect – to prevent third-party interference with the enjoyment of a right; and to fulfil – to take steps to ensure the fullest possible realisation of a right.[ref added] The right to health, as defined by Article 12 of the International Covenant of Economic, Social and Cultural Rights (ICESCR) and further articulated by UN Committee on Economic, Social and Cultural Rights in its General Comment 14, presses upon states the obligations under the right to ensure the availability, accessibility, acceptability and quality of health facilities, goods and services. 17 This study explores the complex challenges health workers face in providing care when health care services and personnel are themselves subjected to violence and forced to operate in the midst of ongoing human rights violations and war crimes.”

Measurement and Analysis Line148-158: “Interviews followed a semi-structured interview guide that was developed in accordance with the aims of this study. This analysis reviews the challenges health care providers face and the constraints on patient care when approached through a right to health lens with a focus on: Availability, understood as a functioning public health and health care facilities, goods, and services, to include adequate hospitals and clinics, trained health care professionals, and essential medicines; Accessibility, the requirement that health facilities, goods, and services be within safe physical reach for all sections of the population; and Quality, the entitlement that health facilities, goods, and services must also be scientifically appropriate and of good quality, to include skilled medical personnel, scientifically approved and unexpired drugs and hospital equipment.”

Results Line 266-272: “Findings from this study highlight major gaps in the availability, accessibility and quality of care available in large areas of Syria, most effected and besieged by the ongoing conflict. An emergent theme related and connected to quality of care was the presence of acute mental health stressors and demoralizing working conditions impacting on the well-being of health providers in this setting. Despite this, results point to key ways in which health providers on the ground have taken steps to fill these gaps so that civilians can continue to receive life-saving care.”

Comment 1.2

Also, the authors make a very important point that “Obligations under international humanitarian law include requirements not to attack or interfere with health care services”. What are those obligations? Explain them – how are they being breached in this study for the purposes of the Discussion section, for example? Is there also literature relating to these Obligations that the authors can draw on to strengthen the manuscript overall?

Author response: We agree that it would be useful briefly to set out the requirements of international humanitarian law and how they are being violated. We added the following sentences, with appropriate references incorporated into the manuscript at line 80-88: “Obligations under international humanitarian law include requirements not to attack or interfere with health care services.16 According to the Geneva Conventions, parties to a conflict are obligated to “respect and protect” wounded and sick people as well as medical facilities, personnel and transports. They must not directly attack them and are required to take steps to ensure that combat operations distinguish between military and civilian objects. [ref add] Further, health professionals may neither be punished for engaging in actions incompatible with medical ethics, nor compelled to do so.[ref added] The bombing and use of chemical weapons against hospitals, use of missiles and sniper attacks on ambulances, and arrest and torture of health workers for impartial care, all violate these obligations and constitute war crimes.”[ref added]

Comment 1.3

In the Methods section I don’t get a sense of the Domains of Inquiry. Also, the authors need to give greater explanation as to why they included 5 interviews from August 2017 – did any of the content of those interviews/health professional experiences differ to the 2014 sample?

Author response: We agree that a clearer articulation of the domains of enquiry is needed in the methods section. We are now explicit about which elements of the right to health we have chosen to focus in on, as well as better defining their content.

Measurement and Analysis Line148-158: “Interviews followed a semi-structured interview guide that was developed in accordance with the aims of this study. This analysis reviews the challenges health care providers face and the constraints on patient care when approached through a right to health lens with a focus on: Availability, understood as a functioning public health and health care facilities, goods, and services, to include adequate hospitals and clinics, trained health care professionals, and essential medicines; Accessibility, the requirement that health facilities, goods, and services be within safe physical reach for all sections of the population; and Quality, the entitlement that health facilities, goods, and services must also be scientifically appropriate and of good quality, to include skilled medical personnel, scientifically approved and unexpired drugs and hospital equipment.”

Comment 1.4

The first paragraph of the Results needs to coherently set out the thematic findings (that fell under the AAAQ right to health framework). Please also revise the presentation of the findings in terms of ensuring complete de-identification of participants (in light of the sensitive nature of the study content and participant sample size); for instance, rather than stating “As a general practitioner explained…” simply state “A participant explained…”

Also, on Table 1 (Page 5) information is included on the Governates but nothing in the text to explain/advance why this information is important/included in the Table.

Author response: We have addressed the need to specifically address what elements of the AAAQ the results focus on, and provide an overarching indication of findings. Line 178-181: “Findings from this study highlight major gaps in the availability, accessibility and quality of care available in large areas of Syria, most effected and besieged by the ongoing conflict. An emergent theme related and connected to quality of care was the presence of acute mental health stressors and demoralizing working conditions impacting on the well-being of health providers in this setting. Despite this, results

point to key ways in which health providers on the ground have taken steps to fill these gaps so that civilians can continue to receive life-saving care."

We have de-identified all contributions to "participant' and on reflection and in view of Reviewer 1's feedback on small sample size and identification, removed the participants governates.

Minor comments

1.5 Background Page 2 – Line 10

"The ongoing civil war in Syria has created the direst humanitarian crisis of our time" – This a very strong opening sentence – while I don't doubt the veracity of this statement – it would be advisable to couch this claim (which appears to be a statement of fact) in the evidence. Please reference.

Author response: We agree and have modified the wording and provided a reference to the re-phrased statement. Line 40: "The ongoing civil war in Syria has created one of the direst humanitarian crises of our time." [ref added]

1.6 Page 2 – Line 18. At the end of paragraph 1 there seems to be a sentence needed to explain why/what purpose this important research is indeed needed.

Author Response: We agree and have included a sentence that better articulates the timeliness and importance of this study: Line 46-49: "In light of recent allegations of chemical weapon use throughout Syria and the intimidation of medics speaking out by the Syrian government, the perspectives of healthcare workers could not be more pressing."[ref added]

1.7 Page 2 – Line 20/21

"Human rights organisations and UN agencies have placed a spotlight on the Syrian Government's assault on health care."[Ref 4] – The authors have referred to multiple agencies here, including UN agencies – and it would be advisable to include additional references to the Physicians for Human Rights

Author Response: We agree and have now included the following references at line 51:

Human Rights Watch, https://www.hrw.org/news/2017/05/24/hospitals-health-workers-under-attack
OHCHR: https://news.un.org/en/story/2016/02/522322-syria-un-gravely-concerned-over-repeated-attacks-hospitals-school
http://www.ohchr.org/EN/NewsEvents/Pages/AttacksonhospitalshealthworkersSyria.aspx

MSF: http://www.msf.org/en/article/syria-healthcare-being-annihilated-amid-intensified-bombings-syria%E2%80%99s-north-west

WHO: http://www.who.int/hac/techguidance/attacksreport.pdf?ua=1

Reviewer 2

Comment 2.0 The paper adds to the increasing evidence on the violations of the right to health in in Syria. I think the manuscript would benefit from a major review to address some key comments and clarifications, especially regarding the methods. Given the number of times references to chemical attacks or similar terms were referred to in the paper and the quotes from healthcare providers, I

wonder whether this focus should have been made more explicit in the way the paper is presented. Below are my comments in relation to each section:

Author response: We agree with the need for more of an explicit focus on the chemical attacks. This has now been addressed in a number of overarching ways throughout the paper. This includes explicit mention within the title. We have also now included an additional sentence in the abstract and in the background, drawing attention to the most recent attacks. (See below for changes.)

Comment 2.1 I think the title needs to change to reflect that the health providers in this study work with SAMS (so are affiliated with only one organisation). Also, the title needs to reflect the geographical area as opposition held territory in North West Syria

Author response: We would prefer not to label these physicians as strictly with SAMS in the title, this could be a major identifier for those who reported chemical attacks. In addition, we cannot say northwest Syria explicitly because 2014 interviews were from HCWs working in a variety of areas. Instead we have modified the title to better reflect the content of the paper, with a clearer signpost of the paper's attention to the chemical attacks.

"Qualitative accounts from Syrian health professionals regarding violations of the right to health, including the use of chemical weapons, in opposition-held Syria."

Comment 2.3 With respect to the abstract the same comments above regarding the title should be reflected in modifications to the abstract. It would be useful to note in the 'design' the type of interviews undertaken (i.e. in person; audio, a mix?). Qualified health professionals: in the abstract and in the text. What do the authors mean by qualified as this can mean different things to different people. A brief definition in the text as to what this means will do. In the conclusions in the abstract (line 40), I recommend the authors use the word 'sample' of Syrian health professionals.

Author response: We have edited the abstract to response to the above concerns including, clearer note on the design in terms of type of interviews, type of participant and used the word 'sample'. We have removed mention of qualified health professionals in title and abstract. However, we did not remove it from eligibility criteria in the methods but instead added a sentence to describe types of health professionals included in both interviews.

Line 212-213: "Eligibility criteria required participants to be aged 18 years or older and a qualified health professional (formally-trained doctors, nurses, dentists, and laboratory, anesthesiology and surgery technicians) with current or recent work-related experience in opposition-controlled areas of Syria."

Line 1-26 Abstract:

Objectives: To explore the impact of the conflict, including the use of chemical weapons, in Syria on health care through the experiences of health care providers using a public health and human rights lens.

Design: A qualitative study using semi-structured interviews conducted in-person or over Skype using a thematic analysis approach.

Setting: Interviews were conducted with Syrian health workers operating in opposition-held Syria in cooperation with a medical relief organization in Gaziantep, Turkey.

Participants: We examined data from 29 semi-structured in-depth interviews with a sample of health professionals with current or recent work-related experience in opposition-controlled areas of Syria, including respondents to chemical attacks.

Results: Findings highlight the health worker experience of attacks on health infrastructure and services in Syria and consequences in terms of access and scarcity in availability of essential medicines and equipment. Quality of services is explored through physicians' accounts of the knock on effect of shortages of equipment, supplies, and personnel on the right to health and its ethical implications. Health workers themselves were found to be operating under extreme conditions, in particular responding to the most recent chemical attacks that occurred in 2017, with implications for their own health and mental wellbeing.

Conclusions: The study provides unique insight into the impact war has had on Syrian's right to health through the accounts of a sample of Syrian health professionals, with continuing relevance to the current conflict and professional issues facing health workers in conflict settings."

Comment 2.4 Strength and limitations of the study. Similar to my comments above, I think it will be misleading in the last bullet point (lines 3-4), instead of conflict affected regions of Syria, I suggest (for the same reasons stated above) to use opposition controlled areas. Using conflict-affected areas is somehow misleading.

Author response: We have removed conflict-affected and changed to opposition-controlled areas, as suggested at line 37.

Comment 2.5 Background

1. I suggest that the authors are consistent in the use of their terminology: Syrian government (line 13) or Assad regime (line 25)? I suggest looking at key texts and being consistent with what has been used in the Lancet Commission on Syria papers rather than terms used in news reports. 2. Could the authors find a different word to use than 'spotty (line 30)?

Author response: In response to terminology, the Lancet Commission on Syria use "Syrian government and allied forces" – this has been changed to reflect this consistently throughout the paper. In response to line 30 comment, replaced the word "spotty" with "scattered".

3. Is the finding (lines 25-27) of 75% of hospitals and primary care facilities not functioning relevant to all Syria? The areas covered by this study? Could the authors please clarify

Author response: We have clarified the numbers of attacks across Syria, and in addition the % of non-

functioning of partially functioning facilities in specific governorates. Line 53-56: "Through to December 2017 Syria has experienced 492 separate attacks on health facilities,5 while at the commencement of this research in 2014, 58% of hospitals throughout Syria were either not functioning or were restricted in their ability to provide services.[WHO HeRAMS ref] This number reflects healthcare facilities in the Aleppo, rural Damascus, Homs, Dara'a, and Deir-el Zor governorates."

4. Change 'public' health infrastructure (line 50) to healthcare infrastructure

Author response: Changed public health infrastructure to healthcare infrastructure.

5. It will be useful to have here a few lines about SAMS for readers who do not know about the organisation. For example, when it was established? What type of organisation is it? Areas of its operations? What is its political stand in relation to the Syrian conflict? And any other information that helps the reader gain a better understanding.

Author response: We appreciate this suggestion, but the organization with which this research was conducted makes clear that they do not hold a political stance and are 'non-political'. We would not therefore wish to give an indication to the reader about political stance. However, we have now added background sentences regarding SAMS and cited their website so that readers are able to access more information. Line 69-72: "One of these organizations is the diaspora Syrian American Medical Society (SAMS)[ref added], a consortium of Syrian-American health professionals founded in 1998 as a professional society for networking for physicians of Syrian descent."

Comment 2.6 Methods

1. The authors mention that the research was undertaken over approximately a three-year period-October 2014-August 2017. Could the authors note the total number of interviews carried out in each of the three years? Were the same participants interviewed again over the years? This is not made clear in the paper.

Author response: We have changed the wording to describe the number of interviews carried out in the two periods line 144 and 146. We have also made clear that the same participants were not interviewed on the second occasion, line 208 and 212.

2. In the 'Setting', the authors mention that fieldwork was undertaken in Gaziantep as well as by secure video link. Could the authors clarify how many participants were interviewed in person and how many by using a video link? It is not clear whether the same healthcare professionals were interviewed more than once by one method or two. This needs clarifying as it is quite obscure in the text.

Author response: This has now been addressed. Line 206-212: "While the majority of the data was collected in-person in Gaziantep during the medical training in 2014 (N=24), separate interviews (N=5) were conducted with different sample of health professionals inside Syria via Wire, a secure online communication tool similar to Skype, in 2017 to understand the effect of the continuing violence inside Syria on healthcare; namely, the chemical attacks that occurred in early April of 2017 in Khan Sheikhoun, a province of Idlib in northwestern Syria. as well as by secure video link with health workers inside Syria."

3. Study population: the authors mention 'purposive sampling' was used to select the study participants. I recommend that the authors list all the criteria used in the selection of participants.

Author response: Although we have retained the language 'purposive sampling' we now make clear

the criteria for selection of participants. Line 222-226: "All participants were identified through purposive sampling methods, taking account of key informants' specialized knowledge and unique perspectives. Eligibility criteria required participants to be aged 18 years or older and a qualified health professional (formally-trained doctors, nurses, dentists, and laboratory, anesthesiology and surgery technicians) with current or recent work-related experience in opposition-controlled areas of Syria."

4. Also describe briefly what they mean by 'qualified' health professional (see question above).

Author response: This has been addressed at line 22-226, see above.

5. Was a direct experience of chemical attacks one of the criteria used for selecting the participants? Chemical attack or a similar term was used more than 25 times in the text of this paper as well as abstract which implies to any reader that this issue is a key focus of this study. Yet this is not articulated well in the aims of the paper or the methods.

Author response: Direct experience was not required with respect to the selection of the participants for additional interviews, however, an ability to speak to the impact of Syria's recent chemical attacks was sought in selecting the 5 additional participants. This is now clarified at line 236-240: "An additional 5 interviews with new participants were conducted in 2017 by an Arabic speaking interviewer (DR) to address experiences of medical staff (two surgeons, one pharmacist, one anesthesiology technician, and one nurse) inside Syria following a major chemical attack in northwestern Syria. Audio-recordings were transcribed verbatim and triangulated with additional notes."

Comment 2.7 Discussion

It was disappointing to get to the discussion after reading the results sections. I think the authors can do a much better job in interpreting their findings rather than reiterating the findings again.

1. Line 17 (Page 11) use evidence instead of documentation. Author response: Changed at line 605.

2. Line 21 (page 11): the data illustrate. Delete the 's'

Author response: Change made.

3. Line 22 (page 11): imposes on 'States': no need for capital letter. Do the authors mean the UN or international regulation impose on states a number of core obligations. Can the authors clarify this and if this is the Syrian state they refer to here, how would a state or a regime as mentioned in the start protect the health needs of a population in areas outside its control? What role do UN bodies have here to make sure that any violations to the right of health do not occur in all areas.

Author response: We agree that there is a need to clarify the responsibilities of states and the role of UN bodies, and have removed the capitalization. Language and references have been added at line 610-615: "Syria has ratified the International Covenant on Economic, Social and Cultural Rights, and even though Syria does not control all areas of the country, it has obligation both to refrain from taking actions to infringe the right to health and take affirmative steps to protect health workers and individuals seeking health care in those regions.[refs added] Instead, it is attacking hospitals and health workers. UN human rights agencies have confirmed the severity of its violations of these rights."

4. Line 26 (page 11): 'the attacks': can the authors clarify if they meant chemical attacks. Given the clear focus of the paper on the experiences of health care professionals of the chemical attacks, I think this sentence on lines 26 & 27 warrants more discussion and clarification.

Author response: We agree there is ambiguity and have changed the sentence so that the point applies to both conventional and chemical attacks and added a statement about what the impacts are. Line 515-519: "This qualitative study of 29 health workers subjected to bombing and chemical attacks provides new insights into the overwhelming challenges they face, their persistence in trying to meet them, and the psychological toll of carrying on. The bombing and chemical attacks have had far reaching implications beyond the observable violence of the destruction of and damage to health care

facilities. These include the flight of health workers from Syria even as population needs increase, reluctance of patients to seek needed care in hospitals, and allocation of resources needed for care to protection and security."

5. Line 29 (page 11): 'As has been found in other conflicts', this is a really interesting point and pity that the authors did not specify which conflicts and what parallels does the Syrian conflict have with other conflicts. What makes the Syrian conflict different or similar to others?

Author response: We agree that attention to other conflict contexts and the similarities/differences in the contexts of conflicts could be articulated better. We provide additional references to other conflict contexts and now better explain the global context, particularly that Syria is not alone in experiencing attacks on hospitals in armed conflict, but that the duration and intensity of the attacks is unique. Line 522- 529: "Attacks on hospitals, ambulances, health workers, and the wounded and sick are not uncommon in armed conflict. In 2016, for example, such attacks took place in 23 countries, and bombing and shelling took place in ten of them,[refs added] Syria is unique in part because of the number of sustained attacks on hospitals, now numbering over 500 over a period of seven years, and the rising number of chemical attacks.[refs added] As has been found in other conflicts,16,21-23 our findings show that in Syria violence against health care has bred a climate of fear and insecurity, with devastating impacts on health-seeking behaviors and access including, civilian difficulties in reaching or avoidance of health facilities.

6. Lines 45-52 (Page 11): sentence starting with 'Shortages' is very long and complex. Can you break it down to 2 sentences or simplify it?

Author response: We have broken up the sentence into two, adding language as needed for proper syntax. Line 536- 578: "The medical staffs had to cope with shortages in staff and equipment and overwhelming numbers of patients, rendering triage decisions impossibly hard. They were also overwhelmed by the large scale of chemical weapons attacks in facilities already compromised by violence against them."

7. It would be useful to state what SAMS and other organisations have done in terms of capacity building of healthcare providers and other support during the chemical attacks and other times?

Author response: We agree that there is value in highlighting in terms of capacity building, and have added language to this effect. In addition, we believe it is also important to explain that the actions taken, though generous and valuable, are not a solution to the problem, which is the violence committed against hospitals and health workers. Accordingly, we added the following line 585-593: "Organizations supporting medical care in Syria, such as SAMS, have responded to the crisis by providing training to health professionals on trauma care and response to chemical weapons attacks, offering protective equipment and antidotes for chemical attacks, and constructing health facilities underground to protect them from bombs. These efforts, however, inevitably have limited impact in the face of the level of violence inflicted on health facilities and health workers. As one 2014 respondent said when asked what could be done to offer health workers in Syria support, he replied, "Stop the bombing." Only concerted action by the international community through the UN Security Council or otherwise could achieve that, and it has not been forthcoming over seven years of conflict."

8. The authors mentioned only limitations but what about strengths if the study. What makes this study unique? How does it compare to other studies reporting on the impact of the conflict on healthcare professionals? What is the new finding that has not been reported in any previous study?

Author response: We agree a greater discussion of the significance of the study is warranted. We added language at the beginning of the discussion at line 510-517: "To the authors' knowledge, this is

the first research study to illuminate the experiences of indigenous health workers in Syria seeking to provide health care to people in need while themselves under attack. Unlike international aid workers, whose experience has have been extensively studied, local doctors, nurses and other health workers who remain in their country to try to relieve suffering have received far less attention in the context of research. This qualitative study of 29 health workers subjected to bombing and chemical attacks provides new insights into the overwhelming challenges they face, their persistence in trying to meet them, and the psychological toll of carrying on."

9. The authors note in the limitations that the majority of participants were in Gaziantep for SAMS training in October 2014 during a 5 day period? How many out of the total interviewed attended the training? This should have been something flagged up in the methods section. The authors refer to this resulting in respondent bias. I think this statement needs more qualifying and explaining: How? And why?

Author response: We now include how many out of the total interviewed attended the training in the methods section (line 20). Why and how respondent bias may have arisen is also now more fully addressed at line:685-687: "The potential for respondent bias (e.g., specific geographic experience or gendered framing) is also acknowledged in that the pool of participants interviewed was limited to those available at the 2014 trainings and then later in 2017, those with specific knowledge of the chemical attacks."

10. Can the authors comment why in their view were all the Syrian respondents male and that only two female American healthcare professionals included? What is the reason for this? Why were there no female healthcare professionals interviewed in a three-year period? And what has been done (if any) to address this (or not)? Did this result in any bias? How?

Author response: We have now added to the manuscript to address the gender bias in the sample, and acknowledge it as a limitation and potential source of bias. As there were two female American health professionals who had worked alongside indigenous health providers for extended periods at the 2014 trainings and willing to be interviewed, we decided to include their voices as an important addition to the data. The following has been added to the text at line 579-688: "The findings are subject to a number of limitations. Firstly, there is the potential for respondent bias (e.g., specific geographic experience or gendered framing) due to a number of factors constraining the pool of available participants. The majority of participants were in Gaziantep for SAMS trainings in October 2014, and therefore data are limited to the experiences of a sample of health workers, collected within a short five-day period, and then later in 2017 to those with specific knowledge of the chemical attacks. Furthermore, most participants were male despite outreach to both male and female health professionals currently inside Syria. This is mainly due to the scarcity of female health professionals attending the 2014 trainings (which includes cultural barriers and travel concerns for women from Syria into Turkey) and the lack of female representatives recommended to interview after the chemical attacks in 2017. To address this concern, future research on healthcare providers inside Syria should aim to include female health workers as well as interview questions that address gender-specific challenges among healthcare workers inside Syria."

11. Could the authors make a comment on the relevance of their findings to violations to healthcare in other opposition controlled areas in areas other than those in the North west of Syria? Or to ISIS controlled areas? And maybe also comment or refer to any evidence to point to how the situation differs in government controlled areas? Have the latter at all been affected in any way, especially given the size of displaced populations inside Syria? A few sentences in the discussion on this will tie really nicely with what the authors mention in the background, page 2 lines 39-46 on the presence of three healthcare systems.

Author response: The study did not address areas controlled by ISIS or the government. We added a few sentences, with references, discussing government controlled areas in areas of the manuscript where it seemed to best fit with the flow of the manuscript.

Introduction Line 78-85: “Health care workers operating within opposition-controlled areas have struggled to provide services in the midst of a multi-dimensional crisis.10 A protracted war on healthcare infrastructure has led to inadequate access to basic necessities and a unprecedented humanitarian crisis.11-15 It is in this setting that health providers must make daily decisions at the micro, meso, and macro-level of healthcare provision (e.g., who receives care, which hospital to repair, where to target supplies). Conversely, in government controlled areas the health care system has a premium on servicing its forces, with few health resources available for the civilian population, and coerced medical staff to remain and treat them.” [refs added]

Limitations Line 499-504: “Finally, these findings do not apply to areas of the country controlled by the Islamic State or to government-controlled areas. In government-controlled areas, the health system is understood to be largely intact, though capacity is variable, and the impact of the war can be felt through indiscriminate mortar attacks, emigration of senior physicians, travel restrictions and inconsistent supplies.”[refs added]

12. What is the key conclusion of the study and how the findings maybe used? Could the authors pull out all the relevant points and provide a conclusion at the end of the discussion? In its present form the ending is too abrupt.

Author response: “We have identified a “conclusion” to the study and elaborated on it as follows, which is then followed by the existing last paragraph of the paper, line 649-658: “This study shows the consequences for health practitioners who seek to provide medical care for a population at war of working in conditions where they are subjected to bombing of hospitals and other forms of violence including chemical attacks. It is remarkable that doctors and nurses continue to work in conditions of such danger, and how they have carried on despite dire shortages of staff and supplies while seeking to treat war injuries as well as other health conditions. While they are resilient, they suffer enormously. The study underlines the consequences to health workers in the failure by the international community to take effective means to protect them from aerial assaults, chemical attacks, and other forms of violence. It further underlines the imperative of taking strong steps to protect health workers in war and to focus on the needs of health workers who struggle to continue to fulfill the right to health through the war, even while under attack.”

VERSION 2 – REVIEW

REVIEWER	Reviewer's identity confidential
REVIEW RETURNED	25-May-2018

GENERAL COMMENTS	Thank you for your response to the feedback. I am happy with the responses and modifications made. One comment pertaining to your revision of the discussion: please include limitations and strength in the body of the discussion and not after Conclusions which should be kept at the end. Please note that some of the line references you made in your responses were wrong. e.g. 222-226 for qualified health professionals and criteria.