PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	SMOKE-FREE HOMES – WHAT ARE THE BARRIERS, MOTIVATORS AND ENABLERS? A QUALITATIVE SYSTEMATIC REVIEW AND THEMATIC SYNTHESIS
AUTHORS	Passey, Megan; Longman, Jo; Robinson, Jude; Wiggers, John; Jones, Laura

VERSION 1 - REVIEW

REVIEWER	Dr Sean Semple University of Aberdeen, Scotland
REVIEW RETURNED	26-Oct-2015

GENERAL COMMENTS	This is a well-written manuscript describing a systematic review of qualitative studies that have explored the barriers, motivators and enablers experienced by smokers to making their home smoke-free. The authors have used well-structured and comprehensive search methods to identify the relevant literature and have performed their thematic analysis appropriately. This is an important piece of work that brings together a wide range of studies that have gathered qualitative data relating to the experiences of smokers (and non-smokers) in relation to SFH. I have a small number of suggestions that the authors may wish to incorporate to their introduction and discussion. 1. It is worth noting the emerging evidence that suggests that implementing SFH rules is associated with an increased likelihood of smoking cessation and prevention of relapse at 6-months. The paper 'The Effectiveness of Cigarette Price and Smoke-Free Homes on Low-Income Smokers in the United States' (Am J Public Health. 2013;103:2276–2283. doi:10.2105/AJPH.2013.301300) would be a useful addition to the introduction in terms of the wider public health benefits of SFH. 2. Similarly it may be useful to cite recent work estimating inhaled particle doses for those living within a smoking-home and how the implementation of SFH rules would results in greatest benefit for pre-school children and elderly, housebound adults. The reference is: "Fine particulate matter concentrations in smoking households: just how much secondhand smoke do you breathe in if you live with a smoker who smokes indoors?" Tob Control. 2015 Oct;24(e3):e205-11. doi: 10.1136/tobaccocontrol-2014-051635. Epub 2014 Oct 20. 3. Within the discussion under policy and practice implications the authors may wish to explore the likely interaction between mass media campaigns and national policies in relation to smoke-free homes. Scotland may be a useful example to cite in terms of the recent Governmental target to reduce the number of children

	exposed to SHS at home by 50% by 2020 and the use of a SFH-specific media campaign (rightoutside.org) that does not focus on cessation.

REVIEWER	Dr Nauman Safdar Social and Health Inequalities Network, Pakistan
REVIEW RETURNED	08-Nov-2015

GENERAL COMMENTS	1) Definition of Second Hand Smoke and Smoke Free Home needs to be included. 2) Exclusion criteria needs explanation. 3) Within the discussion section, policy and practice implication for low, low-middle and high income countries should be independently specified.

REVIEWER	Dr Gillian Gould University of Newcastle Australia
REVIEW RETURNED	25-Nov-2015

GENERAL COMMENTS	See below. The main revisions required are to address potential risks of bias within the methodology chosen, and increased clarity for reporting the findings in relation to quality of studies. The discussion sections of the included papers should not be included in the qualitative analysis. <u>Peer Review of SR on SFH</u> This is a very needed review of smoke-free homes. It is stated to be a review of qualitative literature, but it appears to be a review of mixed methods studies. This should be reflected in the title, abstract and methods. There are some methodological issues that are required to ensure rigour and improve the paper. Abstract Line 10 – add Cochrane Database Strengths and Limitation dot points Authors claim this is the first systematic review of its kind, however there is another review submitted for publication on smoke-free homes that they may be aware of….it would be safer to say ‘as far as we know’, in case that is published first. Introduction Line 17 – definition of SFH - is this the ideal definition of a 'true' smoke-free home? What about smoking on verandah? There is no discussion that one has to be a minimum distance away for indoor air quality to improve. 20-21 …and also variation in ways that SFH are reported in the literature

	39 - is the aim to develop a global intervention? 57 – figure 1 appears to be a text box Methods Search strategy and in particular search terms are not detailed sufficiently in the paper. I do not think it appropriate to refer to the PROSPERO instead of making explicit. However I did look it up and even there the search terms are not listed so the search cannot be re-run independently. There are several papers that I am aware of that sound like they should fit the criteria. Some are in Indigenous populations, which would count as 'vulnerable'. Quality Assessment How were studies scored - how was it decided which were high quality - where is this summary rating for each paper? Or summary for risk of bias? Data Extraction How did authors make sure quantitative elements of the mixed studies were excluded from the analysis – or were they included? Including the discussion in the qualitative synthesis introduces potential elements that are not directly associated with the study findings, such as discussions about how the findings are similar/dissimilar from other studies, and recommendations for policy and practice, strengths limitations etc. It would be fine to include a quote if it appears in the discussion, but to include all text from the discussion would be misleading and a source of bias. Analysis and synthesis In this section please can you clarify that analysis was therefore deductive and inductive. Quality assessment There is little transparency about which studies were rated highly and which were not. This information should be added, and some indication given as to whether this analysis impacted on the contribution made to the synthesis by each study. Naturally the lower quality studies may have a higher risk of bias, and although they are stated to contribute conceptually, the bias remains within them: authors should also add a statement of caution for interpretation. Analysis and synthesis As with other qualitative research, authors need to address their own issues of reflexivity and other potential sources of bias – such as the inclusion of several of their own papers in the analysis (I counted 5 that were obvious) and how this was dealt with. NB citations numbers on table 2 did not correlate with the included papers cited elsewhere. Some papers had many more illustrative quotes, but I was unable to check the balance of which papers they were from, and whether they were from the authors' own studies.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name
Dr Sean Semple

This is an important piece of work that brings together a wide range of studies that have gathered qualitative data relating to the experiences of smokers (and non-smokers) in relation to SFH. I have a small number of suggestions that the authors may wish to incorporate to their introduction and discussion.

1. It is worth noting the emerging evidence that suggests that implementing SFH rules is associated with an increased likelihood of smoking cessation and prevention of relapse at 6-months. The paper 'The Effectiveness of Cigarette Price and Smoke-Free Homes on Low-Income Smokers in the United States' (Am J Public Health. 2013;103:2276–2283. doi:10.2105/AJPH.2013.301300) would be a useful addition to the introduction in terms of the wider public health benefits of SFH.
Response: While we agree that there is emerging evidence of multiple benefits from implementing a SFH, we have not included reference to this particular article. Due to word limitations, we have not discussed the benefits of having a SFH anywhere in our review, as we are focusing on barriers, motivators and enablers, rather than benefits. Consequently, we don't consider that reference to this particular article really fits within either the introduction or the discussion.

2. Similarly it may be useful to cite recent work estimating inhaled particle doses for those living within a smoking-home and how the implementation of SFH rules would results in greatest benefit for pre-school children and elderly, housebound adults. The reference is: "Fine particulate matter concentrations in smoking households: just how much secondhand smoke do you breathe in if you live with a smoker who smokes indoors?" Tob Control. 2015 Oct;24(e3):e205-11. doi: 10.1136/tobaccocontrol-2014-051635. Epub 2014 Oct 20.
Response: While we have not included a discussion of the benefits of SFH (see above), we have added a comment in the first paragraph of the introduction to indicate that the elderly, as well as children, are predominantly exposed to SHS in the home, and have cited this reference.

3. Within the discussion under policy and practice implications the authors may wish to explore the likely interaction between mass media campaigns and national policies in relation to smoke-free homes. Scotland may be a useful example to cite in terms of the recent Governmental target to reduce the number of children exposed to SHS at home by 50% by 2020 and the use of a SFH-specific media campaign (rightoutside.org) that does not focus on cessation.
Response: We have added a sentence in the 2nd paragraph of the section on policy and practice implications regarding preliminary evidence that suggests that mass media campaigns specifically addressing second hand smoke are effective in reducing smoking in the home, although campaigns focused on smoking cessation are not (Lewis et al, 2015).

Reviewer: 2
Reviewer Name
Dr Nauman Safdar

1) Definition of Second Hand Smoke and Smoke Free Home needs to be included.
Response: We have added a definition of secondhand smoke after the first sentence of the introduction. We have already included a definition of smoke-free home in the first paragraph of the introduction, but we have now added a reference for this, and modified it slightly for clarity and to be consistent with the CDC definition.

2) Exclusion criteria needs explanation.

Response: We have added an explanation for the exclusions.

3) Within the discussion section, policy and practice implication for low, low-middle and high income countries should be independently specified.
Response: Unfortunately, as only two of the papers within our review were from a middle income country (China) and none were from low income countries, we do not consider it appropriate to extrapolate from the included papers to these settings. However, we recognise this as a major limitation of the review and have therefore added a comment regarding this in the limitations section, as well as at the end of the first paragraph in the section on policy and practice implications.

Reviewer: 3
Reviewer Name
Dr Gillian Gould

This is a very needed review of smoke-free homes. It is stated to be a review of qualitative literature, but it appears to be a review of mixed methods studies. This should be reflected in the title, abstract and methods.
Response: The review is only of qualitative research – for the mixed methods papers we only included the qualitative components. We have clarified this in the Data extraction section in the methods. As it is a review of qualitative research, we have therefore not changed the title or abstract.

There are some methodological issues that are required to ensure rigour and improve the paper.
Abstract
Line 10 – add Cochrane Database
Response: This has been done.

Strengths and Limitation dot points
Authors claim this is the first systematic review of its kind, however there is another review submitted for publication on smoke-free homes that they may be aware of….it would be safer to say ‘as far as we know’, in case that is published first.
Response: We have added ‘To our knowledge’ at the beginning of this statement.

Introduction
Line 17 – definition of SFH - is this the ideal definition of a 'true' smoke-free home? What about smoking on verandah? There is no discussion that one has to be a minimum distance away for indoor air quality to improve.
Response: We are using the CDC definition, and have added a citation for this.

20-21 …and also variation in ways that SFH are reported in the literature
Response: We agree with the reviewer that there is variation in the way that SFH are reported in the literature, but we don’t think this relates to the sentence which is about why many people are still exposed to SHS. We have therefore not made any changes.

39 - is the aim to develop a global intervention?
Response: No, it is not our aim to develop a global intervention. We have modified this sentence for greater clarity.

57 – figure 1 appears to be a text box
Response: Yes, this is a text box, but the author instructions for BMJ Open only refer to figures or tables, not boxes, so we have labelled it a figure. We are happy for the journal editors to change this.

Methods

Search strategy and in particular search terms are not detailed sufficiently in the paper. I do not think it appropriate to refer to the PROSPERO instead of making explicit. However I did look it up and even there the search terms are not listed so the search cannot be re-run independently. There are several papers that I am aware of that sound like they should fit the criteria. Some are in Indigenous populations, which would count as 'vulnerable'.
Response: The Medline search strategy is available through a link in the PROSPERO registration (please see http://www.crd.york.ac.uk/PROSPEROFILES/14115_STRATEGY_20140908.pdf). The reviewer may have missed it as it is necessary to click on a link to access it. We have added this link to the article for ease of reference. We have also added a statement in the paper that these terms were modified as appropriate for other databases and are available from the authors on request. As there were a large number of databases searched, we haven't included all of them on the PROSPERO website.

Quality Assessment
How were studies scored - how was it decided which were high quality – where is this summary rating for each paper? Or summary for risk of bias?
Response: As we note in the section on quality assessment in the methods, there is ongoing debate regarding quality appraisal of articles for inclusion in qualitative systematic reviews. For our quality assessment we used two processes – the CASP (which assesses the quality of reporting) and an assessment of their conceptual richness. Neither of these processes result in a score like quantitative assessment tools do (such as the Newcastle Ottawa Scale). The decision regarding the quality of each paper was a qualitative one made by the team via detailed discussion. Studies were not excluded on the basis of this assessment, because the assessment is based on the quality of reporting, rather than the quality of the study itself, (which is unknown). Given the subjective nature of this decision, and the lack of empirical data on the relationship between the quality of reporting and the quality of study implementation (Tong et al 2008 Experiences of Parents Who Have Children With Chronic Kidney Disease: A Systematic Review of Qualitative Studies Pediatrics 121(2) 349-360, doi:10.1542/peds.2006-3470) we have not described paper by paper the quality rating. However, as the papers assessed as higher quality contributed more to the synthesis and quotes used, we have amended the section on quality assessment in the results to reflect this.

Data Extraction
How did authors make sure quantitative elements of the mixed studies were excluded from the analysis – or were they included?
Response: As we only extracted the qualitative components (see above), these were the only sections included in the analysis and synthesis.

Including the discussion in the qualitative synthesis introduces potential elements that are not directly associated with the study findings, such as discussions about how the findings are similar/dissimilar from other studies, and recommendations for policy and practice, strengths limitations etc. It would be fine to include a quote if it appears in the discussion, but to include all text from the discussion would be misleading and a source of bias.
Response: Including discussion sections in the qualitative synthesis is common practice when synthesising qualitative research (e.g. Irving et al 2012 Factors that influence the decision to be an organ donor: a systematic review of the qualitative literature Nephrol Dial Transplant 27: 2526–2533 doi: 10.1093/ndt/gfr683; Tong et al 2008 Experiences of Parents Who Have Children With Chronic Kidney Disease: A Systematic Review of Qualitative Studies Pediatrics 121(2): 349-360, doi:10.1542/peds.2006-3470; Tong et al 2011 The perspectives of kidney transplant recipients on medicine taking: a systematic review of qualitative studies Nephrol Dial Transplant 26: 344-354 Doi: 10.1093/ndt/gfq376) and allows access to important 'second order constructs' (Tong 2008) interpreted by the authors from their data facilitating a deeper understanding of the topic. Although the whole of the discussion section for each paper was extracted, only sections of the discussion that were

relevant to our qualitative synthesis and that related to the paper's primary qualitative data were coded and included in the review. We have added a sentence in the 'Analysis and synthesis' section of the clarifying this. Please see the first paragraph of the Synthesis section in the Results, for a description of how we have made a clear distinction between primary data quotes and authors interpretations within the manuscript.

Analysis and synthesis
In this section please can you clarify that analysis was therefore deductive and inductive.
Response: Most social research uses both inductive and deductive reasoning processes. Overall, we would categorise our approach as inductive, as our aim was to develop a higher order thematic synthesis which went beyond the data reported in the primary studies. This approach was in line with others with similar aims e.g. Thomas and Harden (2008). We understand that given we have applied a priori constructs (barriers, motivators and enablers) to the analysis and synthesis that this could potentially be described as using a deductive approach. However, we used traditional inductive reasoning, which was open and exploratory within the boundaries of these core constructs, to move from specific observations to pattern identification to broader conclusions. We have consciously chosen not to include the terms inductive and deductive as we believe it would be confusing for the reader to state that our analysis and synthesis was both inductive and deductive.

Quality assessment
There is little transparency about which studies were rated highly and which were not. This information should be added, and some indication given as to whether this analysis impacted on the contribution made to the synthesis by each study. Naturally the lower quality studies may have a higher risk of bias, and although they are stated to contribute conceptually, the bias remains within them: authors should also add a statement of caution for interpretation.
Response: Please see our response to the comment on Quality assessment earlier.

Analysis and synthesis
As with other qualitative research, authors need to address their own issues of reflexivity and other potential sources of bias – such as the inclusion of several of their own papers in the analysis (I counted 5 that were obvious) and how this was dealt with.
Response: JML and LLJ are authors on one of the included papers, and JR is an author on five papers. Two authors (MEP and JML) undertook the initial searches and review of papers for inclusion. Three authors (MEP, JML and LLJ) undertook the data extraction, quality assessment and coding for all papers, with MEP completing all these tasks for the paper on which JML and LLJ were authors. Although JR contributed to the interpretation and synthesis of the findings she was not involved in any of these earlier steps. The contributions of each author are already stated in the Contributorship Statement. We have added a sentence to each of the sections on Quality Assessment, Data Extraction and Analysis and Synthesis to clarify the steps taken to reduce bias.

NB citations numbers on table 2 did not correlate with the included papers cited elsewhere. Some papers had many more illustrative quotes, but I was unable to check the balance of which papers they were from, and whether they were from the authors' own studies.
Response: We apologise for this error, which we only noticed after the paper had been submitted. It has now been rectified in the revised version.

VERSION 2 – REVIEW

REVIEWER	Dr Gillian Gould University of Newcastle, Australia
REVIEW RETURNED	24-Jan-2016

GENERAL COMMENTS	Thank you for the opportunity to review this revised submission. There are two areas in which my previous comments were not sufficiently addressed. 1. Search Strategy Thank you for drawing attention to the link to the search strategy on Medline. I have a persisting concern that this strategy has not shown up many papers on Indigenous populations regarding to smoke-free homes. The authors did not address my comment on the inclusion of Indigenous papers in my first review. I know of eight other papers on Indigenous populations that I believe could fit the criteria, of qualitative research that includes views on smoke-free homes in a vulnerable population. The problem in the search appears to be that the single term "vulnerable" population is not sufficient to reliably find these populations. It is a word that may not be used by authors as a keyword. This term could have been expanded to include terms for those we may place in the 'category', such as those with low SES, low education, racial and ethnic minority populations, youth, women and in particular Indigenous peoples (CDC criteria). While the authors have in their limitations section a caveat about the review not addressing risks to other vulnerable people like pregnant women and adults, these sorts of papers where not as far as I could see specifically excluded from the review in the methodology. Unless the authors re-design the search, the best way forward would be to make it absolutely clear in the 'limitations' section that a comprehensive search was not conducted for 'vulnerable populations' such as racial/ethic minorities and Indigenous populations, and as such some of these may have been omitted. 2. Quality Assessment I accept the authors' response to some extent. The quality assessment sub-heading is not reporting the assessed quality of the study but 'quality of reporting' – please clarify in results. But I also consider transparency is important here. If the authors have rated 14 papers to be a higher level of reporting, but are not explicit as to which these are (ie by including their numerical citations) then the reader is left to figure this out themselves by trying to understand which papers had more quotes or contributed more to the analysis – the authors have done this work – why keep this a secret? I strongly recommend that the choices authors made in the review being made explicit.

VERSION 2 – AUTHOR RESPONSE

1. Search Strategy

Thank you for drawing attention to the link to the search strategy on Medline. I have a persisting concern that this strategy has not shown up many papers on Indigenous populations regarding to smoke-free homes. The authors did not address my comment on the inclusion of Indigenous papers in my first review. I know of eight other papers on Indigenous populations that I believe could fit the criteria, of qualitative research that includes views on smoke-free homes in a vulnerable population.

The problem in the search appears to be that the single term "vulnerable" population is not sufficient to reliably find these populations. It is a word that may not be used by authors as a keyword. This term could have been expanded to include terms for those we may place in the 'category', such as

those with low SES, low education, racial and ethnic minority populations, youth, women and in particular Indigenous peoples (CDC criteria). While the authors have in their limitations section a caveat about the review not addressing risks to other vulnerable people like pregnant women and adults, these sorts of papers where not as far as I could see specifically excluded from the review in the methodology. Unless the authors re-design the search, the best way forward would be to make it absolutely clear in the 'limitations' section that a comprehensive search was not conducted for 'vulnerable populations' such as racial/ethic minorities and Indigenous populations, and as such some of these may have been omitted.

Response:
We used 'Vulnerable Populations/' in collaboration with our University librarians, as it is a MeSH Heading (hence the /, and therefore the broadest umbrella heading) with entry terms including Disadvantaged; Underserved Patients, Underserved Populations, and Sensitive Population Groups (see scope note at https://www.nlm.nih.gov/cgi/mesh/2016/MB_cgi). This is the heading that indexers use for any paper which has to do with disadvantaged populations. It therefore does not matter if the author has not used this as a keyword.

In addition, 'vulnerable populations' was not the only term used to identify our sample. The search terms in box 1 of our Medline search example, uses 'OR' between search terms, and therefore picked up all papers which were indexed or used a title or keyword of 'family, family relations, infant, child, young adult, mother, father, parent, carer, health personnel, healthcare provider, clinician, practitioner or policy maker'. This meant the S (sample) part of our modified SPIDER search strategy was a very wide net indeed and picked up all papers which included something about vulnerable populations or families/caregivers or practitioners of any sort. This wide net of 'sample' was combined as an 'AND' with the phenomenon of interest (smoke-free homes/secondhand smoke) and the design evaluation and research type as qualitative. We also hand-searched key research journals, reference lists of the included papers, and undertook key author searching in an effort to ensure a comprehensive search. Our assessment is that the papers identified by this reviewer were very likely to have been picked up in our comprehensive and systematic search and then were subsequently excluded at various points in our decision tree (Figure 2 in our paper). The most likely reason for their exclusion is that "the findings relating to smoke-free homes were incidental rather than key and/or data were minimal". We have therefore not made any changes to the paper in regard to this comment.

2. Quality Assessment
I accept the authors' response to some extent. The quality assessment sub-heading is not reporting the assessed quality of the study but 'quality of reporting' – please clarify in results. But I also consider transparency is important here. If the authors have rated 14 papers to be a higher level of reporting, but are not explicit as to which these are (ie by including their numerical citations) then the reader is left to figure this out themselves by trying to understand which papers had more quotes or contributed more to the analysis – the authors have done this work – why keep this a secret? I strongly recommend that the choices authors made in the review being made explicit.
Response:
In our previous response to this issue raised by the reviewer we stated:
As we note in the section on quality assessment in the methods, there is ongoing debate regarding quality appraisal of articles for inclusion in qualitative systematic reviews. For our quality assessment we used two processes – the CASP (which assesses the quality of reporting) and an assessment of their conceptual richness. Neither of these processes result in a score like quantitative assessment tools do (such as the Newcastle Ottawa Scale). The decision regarding the quality of each paper was a qualitative one made by the team via detailed discussion. Studies were not excluded on the basis of this assessment, because the assessment is based on the quality of reporting, rather than the quality of the study itself, (which is unknown). Given the subjective nature of this decision, and the lack of empirical data on the relationship between the quality of reporting and the quality of study

implementation (Tong et al 2008 Experiences of Parents Who Have Children With Chronic Kidney Disease: A Systematic Review of Qualitative Studies Pediatrics 121(2) 349-360, doi:10.1542/peds.2006-3470) we have not described paper by paper the quality rating. Although it is not a a common approach taken in qualitative systematic reviews (see for example Tong et al 2008 Experiences of Parents Who Have Children With Chronic Kidney Disease: A Systematic Review of Qualitative Studies Pediatrics 121(2): 349-360, doi:10.1542/peds.2006-3470), given the reviewers strong feelings about this point we have included the numerical citations of the papers rated as high quality by the review team.

Please note that we used track changes during this modification, but the addition of the citations was not picked up by this process, and thus doesn't show as a change in the document. This is the only change to the paper and is in the 2nd sentence of the Quality Assessment section of the Results.