PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Taking stock of vaccine hesitancy among migrants: a scoping review protocol
AUTHORS	Tankwanchi, Akhenaten; Jaca, Anelisa; Larson, Heidi; Wiysonge, Charles; Vermund, Sten

VERSION 1 – REVIEW

REVIEWER	Patricia Coelho de Soarez Faculdade de Medicina, Universidade de Sao Paulo, Brazil
REVIEW RETURNED	10-Nov-2019

GENERAL COMMENTS	The study aimed to take stock of the current evidence of vaccine hesitancy among immigrants. This work is relevant and of interest to the readers of the BMJ Open due to the resurgence and repeated outbreaks of vaccine-preventable diseases. WHO declared vaccine hesitancy one of the world's top ten threats to global health in 2019. Some methodological steps were not presented with the necessary detail, or were not mentioned in the text. I recommend the inclusion or further details of some items before its publishing in BMJ Open. Please, find below my suggestions for improving the quality report of the manuscript. TITLE Page 2: I would remove the word systematic from the title: Taking stock of vaccine hesitancy among immigrants: a scoping review protocol ABSTRACT Page 3: Include eligibility criteria in the structured abstract. Page 3, Line 31 - Remove the word systematic from the methods. In the JBI reviewer's manual the study design is presented as "scoping review" not as "systematic scoping review". Page 3, Line 35 - I suggest the use of the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) checklist instead of PRISMA-P. INTRODUCTION Include the explanation why the review questions/objectives lend themselves to a scoping review approach METHODS Page 7, Line 50 – I suggest the use of the PRISMA-ScR (Preferred

	Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) checklist instead of PRISMA-P. Page 9, Lines 23-32 - Include databases with dates of coverage and contact with authors to identify additional sources, as well the date last searched.

REVIEWER	Philip Tarr University of Basel, Kantonsspital Baselland Director of Swiss National Research Program NRP74 on "Vaccine Hesitancy"
REVIEW RETURNED	21-Dec-2019

GENERAL COMMENTS	The authors should be applauded for their scoping review of vaccine hesitancy (VH) among immigrants: Prevalence and determinants of VH in immigrant communities is a pertinent topic of review and research. This is a welcome addition to currently ongoing research, communication, and policy efforts to address VH. Specific comments 1) Introduction, p. 5, lines 36 and following: Authors appropriately point out that access to and continuity of care are more challenging for immigrant populations, compared to the general/resident population. Stated otherwise, VH is perhaps typically perceived as an issue more prevalent in resident than in the immigrant populations. Therefore, in addition to measles outbreaks among Somali Americans (line 50), authors should consider adding other examples of settings where VH (rather than access issues) seemed to be the driver of outbreaks or low immunization rates. 2) Intro, p.6, line 18: is “vaccination compliance” a prudent term. Sounds too normative, does not seem appropriate term in a country like Switzerland that has no vaccine mandates. 3) Intro, p. 6, line 23: “minimal” access barriers seems an overly optimistic assumption, even for some rich countries where e.g. HPV vaccination rates continue to be low, and access barriers and inadequate services and policies remain important drivers of low vaccination rates (e.g. in Switzerland, where I live and work) 4) Intro, p. 6, line 25/29: are authors sure that VH can appropriately summarized as a behavior – is it not rather that the decision to delay or omit vaccines is the behavior, while VH is a state of mind potentially underlying the behavior. Consider rephrasing. On page 7, lines 5/7, the authors point to this issue. 5) Conclusions, p. 15, lines 22/25: can authors provide references for their statement that there are “high prevalence of VH among migrants”. In general, authors might consider adding a few sentences on the uncertainties/complexities involved in attributing outbreaks/low vaccination rates to VH vs. inadequate services. For example, even if VH might be present, access to physicians who take their time to understand the immigrants’ concerns, and, perhaps most importantly, speak the immigrants’ language might go a long way towards addressing potential VH and increasing vaccination rates. Our research team’s suspicion is that access issues are more important than typically acknowledged, i.e. VH can be erroneously used as causal explanation for underimmunization when inadequate services/policies are more important.

	Minor issues 1) as per BMJ Open instructions, please include dates of your review in the manuscript

REVIEWER	Simone Périnet Public Health Agency of Canada
REVIEW RETURNED	02-Jan-2020

GENERAL COMMENTS	NIL

REVIEWER	Anita Heywood UNSW Sydney, Australia
REVIEW RETURNED	22-Jan-2020

GENERAL COMMENTS	The proposed scoping review on vaccine hesitancy among migrant populations is timely and valuable and will inform future interventions aimed at increasing vaccine uptake. Most studies of vaccine hesitancy exclude migrant groups, or do not disaggregate by immigrant status. I have a few minor comments and suggestions as stated below. Abstract: You state that outbreaks of vaccine-preventable diseases in immigrant communities suggest that they are“particularly vulnerable to vaccine hesitancy”. However, this is speculative, given that there is no current review of the evidence. Suggest this is rephrased to state that hesitancy could be a factor in their susceptibility to these VPDs (given that not all issues of access are addressed by convenience). Introduction: In the introduction you state that “unsuspecting immigrants may succumb to anti-immunization messaging and begin to resist vaccination for philosophical, religious or political reasons, empowered by their newfound freedoms and rights in the host nation” – again, I find this statement to be speculative. I would be interested to understand if immigrant groups also brought their vaccine concerns with them from their host country. See Wilson et al. Barriers to immunization among newcomers: A systematic review. Vaccine 2018;36:1055-1062. Page 6 – paragraph 1 – I think it is also important to include here that there is also a fear of autism in this community, which has higher prevalence than rest of Minnesota population. Pg 6 line 20 – remove % after 2014. Restrictive policies that deny access to immunisation for many migrant groups doesn’t neatly fit into the hesitancy (convenience/access) category and worth mentioning this in the introduction. e.g. access to universal healthcare. While the aim of the scoping review is to assess issues of vaccine hesitancy in migrant populations, it will only tell part of the “story” of under-vaccination in this population. Inclusion criteria: - Will articles that focus on vaccine hesitancy in the wider population be assessed for whether results as disaggregated by immigrant

	status? - The inclusion criteria don't specify if only primary research papers will be included. Types of participants: - The protocol states that individuals are target participants. Does this mean that case reports will be included? Table 1 - Will studies with no comparator be included? i.e. on immigrant populations only (not currently clear). Discussion Line 45: the *statement about Somalis should include vaccine hesitancy in Som*alia.

REVIEWER	Pietro Luigi Lopalco University of Pisa, italy
REVIEW RETURNED	03-Feb-2020

GENERAL COMMENTS	The paper reports in a good level of detail a study protocol for a scoping literature review on the role of vaccine hesitancy in the migrant population worldwide. Some very minor comments: page 7, line 50, should read PRISMA-P, I guess page 8, line 30, will different age groups taken into account? children, adults? what about special populations like pregnant women? page 9, line 10. What is meant for "location of immunisation services"? Is it the way the vaccination service is organised or is it simply the distance to the next immunisation service? page 13, data charting template. Maybe the vaccine/vaccines which the study is referring to (if mentioned) should be listed. A study just on hesitancy specifically related to HPV vaccination, childhood vaccines, etc. could be retrieved and maybe worthy to be highlighted

VERSION 1 – AUTHOR RESPONSE

REVIEWER 1 : Patricia Coelho de Soarez – Universidade de Sao Paolo, Brazil		
Title	I would remove the word systematic from the title: Taking stock of vaccine hesitancy among immigrants: a scoping review protocol	Per the reviewer's recommendation, we have removed the word "systematic" from the title of our manuscript. Our revised manuscript is now titled *Taking stock of vaccine hesitancy among migrants: a scoping review protocol.*
Abstract Page 3	Include eligibility criteria in the structured abstract.	Although we did not use the phrase "eligibility criteria" in the abstract, we believe we have provided adequate information for "inclusion" when we write: "*Studies published in English or French between January 1999 and December 2019 will be drawn from most or all of the following multidisciplinary databases… The search will include an extensive list of keywords to capture multiple dimensions of confidence*

		and hesitancy vis-à-vis vaccines among migrants.”
Page 3, line 31	Remove the word systematic from the methods. In the JBI reviewer's manual the study design is presented as “scoping review” not as “systematic scoping review”.	We have removed the phrase “systematic scoping review” from the entire manuscript. However, we wanted to note that we got this phrase from the following JBI publication: *Guidance for conducting systematic scoping reviews*. doi:10.1097/XEB.0000000000000050
Page 3, line 35	I suggest the use of the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) checklist instead of PRISMA-P.	We thank the reviewer for her suggestion of the PRISMA-ScR checklist. We have replaced all mentions of PRISMA-P with PRISMA-ScR.
Introduction	Include the explanation why the review questions/objectives lend themselves to a scoping review approach.	We have added the following excerpt in the manuscript: “*Given the relative recency of vaccine hesitancy as a research area and given that we are not aware of any comprehensive evidence of vaccine hesitancy among migrant populations, the above objectives are suitable and consistent with the ‘reconnaissance’ purpose of the scoping review. Scoping will also allow us to identify and define crucial concepts, gaps in the literature and types and sources of evidence to inform practice, policy and research.*” (Page 7, 2nd paragraph)
Methods Page 7, line 50	I suggest the use of the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) checklist instead of PRISMA-P.	We thank the reviewer for her suggestion of the PRISMA-ScR checklist. We have replaced all mentions of PRISMA-P with PRISMA-ScR.
Page 9, lines 23-32	Include databases with dates of coverage and contact with authors to identify additional sources, as well the date last searched.	We have added the suggested details in our manuscript. The revised draft now reads: “*All or most of the following databases will be searched from* ***1st January 1999 to 31st December 2019****: Africa-Wide Information, Allied and Complementary Medicine … PsycInfo, and Web of Science. Given that we aim at examining both the scientific and grey literature, we will also search Google and Google Scholar in addition to the multidisciplinary mainstream and regional databases listed above.* ***Last, we will contact the authors of all studies included in our synthesis to identify potential additional sources****.* ***We anticipate that the search for articles will be run across all databases between April and June 2020****.*” (Page 10, first paragraph)
REVIEWER 2: Phillip Tarr – University of Basel, Switzerland		
Introduction Page 1, line 36	Authors appropriately point out that access to and continuity of care are more challenging for immigrant populations, compared to the general/resident population. Stated otherwise, VH is perhaps typically perceived as an issue	Per the reviewer's recommendation, we have added the following excerpt in the Introduction section: “*Non-vaccinators are also found among*

	more prevalent in resident than in the immigrant populations. Therefore, in addition to measles outbreaks among Somali Americans (line 50), authors should consider adding other examples of settings where VH (rather than access issues) seemed to be the driver of outbreaks or low immunization rates.	*Orthodox Jewish communities in New York, Greater London and Belgium, Amish communities in Ohio, and anthroposophical believers across Europe.*" (Page 5, last paragraph)
Page 6, line 18	"Vaccination compliance" a prudent term. Sounds too normative, does not seem appropriate term in a country like Switzerland that has no vaccine mandates.	We have replaced the term "vaccination compliance" with "vaccination coverage" and "vaccine uptake." (Page 5, 2nd paragraph)
Page 6, line 23	"Minimal" access barriers seems an overly optimistic assumption, even for some rich countries where e.g. HPV vaccination rates continue to be low, and access barriers and inadequate services and policies remain important drivers of low vaccination rates (e.g. in Switzerland, where I live and work)	We have substituted the qualifier "minimal" with the adjective "reduced." (Page 6, first paragraph)
Page 6, line 25-29	Are authors sure that VH can appropriately summarized as a behavior – is it not rather that the decision to delay or omit vaccines is the behavior, while VH is a state of mind potentially underlying the behavior. Consider rephrasing. On page 7, lines 5/7, the authors point to this issue.	Although contested, the definition of VH as a "behavior" comes from the SAGE Working Group on VH. Nonetheless, we have replaced the phrase "behavioral factors" with "psychosocial processes." (Page 6, first paragraph)
Conclusions Page 15, lines 22-25	Can authors provide references for their statement that there are "high prevalence of VH among migrants". In general, authors might consider adding a few sentences on the uncertainties/complexities involved in attributing outbreaks/low vaccination rates to VH vs. inadequate services. For example, even if VH might be present, access to physicians who take their time to understand the immigrants' concerns, and, perhaps most importantly, speak the immigrants' language might go a long way towards addressing potential VH and increasing vaccination rates. Our research team's suspicion is that access issues are more important than typically acknowledged, i.e. VH can be erroneously used as causal explanation for under-immunization when inadequate services/policies are more important.	Per the journal editor's request, we have deleted the Discussion and Conclusions sections of the original draft because the protocol format in BMJ journals does not include these sections. As a result, we have deleted the sentence(s) for which references are requested. We can reassure the reviewer that we will discuss the cultural barriers to immunization in our review.
Minor Issues	As per BMJ Open instructions, please include dates of your review in the manuscript.	We have added the following sentence in the manuscript: "*We anticipate that the search for articles will be run across all databases between April and June 2020.*" (Page 10, first paragraph) However, we are still not sure if by "dates of your review" the reviewer meant the dates when the search for articles will be run, or the anticipated date of completion of the scoping review.
REVIEWER 3: Simone Périnet – Public Health Agency of Canada, Canada		

		We did not receive comments from this reviewer.
REVIEWER 4: Anita Heywood – University of New South Wales, Australia		
Abstract	You state that outbreaks of vaccine-preventable diseases in immigrant communities suggest that they are "particularly vulnerable to vaccine hesitancy". However, this is speculative, given that there is no current review of the evidence. Suggest this is rephrased to state that hesitancy could be a factor in their susceptibility to these VPDs (given that not all issues of access are addressed by convenience).	We thank the reviewer for her correct observation. We have revised the problematic sentence which now reads: "*While vaccination is often a requirement for immigration, repeated outbreaks of vaccine-preventable diseases within certain immigrant communities in some host nations suggest that vaccine hesitancy could be a factor in their susceptibility to vaccine-preventable diseases.*"
Introduction	In the introduction you state that "unsuspecting immigrants may succumb to anti-immunization messaging and begin to resist vaccination for philosophical, religious or political reasons, empowered by their newfound freedoms and rights in the host nation" – again, I find this statement to be speculative. I would be interested to understand if immigrant groups also brought their vaccine concerns with them from their host country. See Wilson et al. Barriers to immunization among newcomers: A systematic review. Vaccine 2018;36:1055-1062 PubMed .	All we wanted to suggest was that the anti-science posture/propaganda of some populist politicians likely contributes to the inoculation of vaccine misinformation in the minds of the vulnerable masses, which likely include some members of migrant communities. A 2017 BMJ article by Owen Dyer states: 'This year US anti-vaccine activists have been energized by the election to the presidency of one of their own in Donald Trump. The president, who linked vaccines to autism in Republican primary debates,[2] met Wakefield shortly before the election. Afterwards, Wakefield, who now lives in Texas, said that Trump had told him that he was "on our side."[3]' (Note: Andrew Wakefield is the author of the discredited Lancet study which linked MMR vaccine with the development of autism). Nonetheless, we have rephrased the sentence to include the reviewer's interest. The revised entry now reads: "*Vaccine skeptics and populist politicians in some host countries openly challenge the scientific consensus about the effectiveness of vaccination. As a result, some migrants with pre-established concerns about vaccination may see their concerns reinforced while others may succumb to anti-immunization messaging and begin to question the benefits of some vaccines.*" (Pages 4-5)
Page 6, paragraph 1	I think it is also important to include here that there is also a fear of autism in this community, which has higher prevalence than rest of Minnesota population.	Per the reviewer's suggestion, we have included the following excerpt in the Introduction section: "*Prior to the 2011 outbreak, measles-mumps-rubella (MMR) vaccine coverage among two-year-old Somali children in Minnesota had declined significantly from >91% in 2004 to 54% in 2010, as Somali parents began refusing MMR vaccine for their children owing to concerns of high autism rate in their community.[18]*" (Page 5, 2nd paragraph)
Page 6, line	Remove % after 2014.	We have removed % after the year 2014 and we

20		thank the reviewer for finding this typo.
	Restrictive policies that deny access to immunisation for many migrant groups doesn't neatly fit into the hesitancy (convenience/access) category and worth mentioning this in the introduction. e.g. access to universal healthcare. While the aim of the scoping review is to assess issues of vaccine hesitancy in migrant populations, it will only tell part of the "story" of under-vaccination in this population.	Per the reviewer's recommendation, we have added the following excerpt in the Introduction section. "*In choosing to focus on vaccine hesitancy, neither do we imply nor believe that the main determinant of under-immunization in migrant populations is their reluctance to vaccinate. Political discourses that fuel prejudice and exclusion of the other, restrictive policies that deny good quality healthcare to the poor and access to universal health coverage to migrant populations, especially undocumented migrants, may represent far greater barriers to immunization than vaccine hesitancy.*[37-39]" (Page 7, 2nd paragraph)
Methods Inclusion Criteria	Will articles that focus on vaccine hesitancy in the wider population be assessed for whether results as disaggregated by immigrant status?	Yes, we will assess articles that focus on VH in the wider population so long as such articles disaggregate results by immigrant status. We have specified this on Page 8, last paragraph.
	The inclusion criteria don't specify if only primary research papers will be included.	Because our aim is to summarize all the existing evidence of VH in migrant populations, we plan to include <u>all</u> relevant articles, i.e., primary studies, reviews, policy reports, comments, etc. (Page 8, last paragraph)
Types of Participants	The protocol states that individuals are target participants. Does this mean that case reports will be included?	Yes, <u>all</u> evidence will be included, from single-case reports to population-level studies. (Page 8, last paragraph)
Table 1	Will studies with no comparator be included? i.e. on immigrant populations only (not currently clear).	Yes, studies that focus on immigrant populations will be included. We have clarified this in Table 1 by adding "no comparator" among comparator items. (Page 10)
Discussion	Line 45: the statement about Somalis should include vaccine hesitancy in Somalia.	Per the journal editor's request, we have deleted the Discussion and Conclusions sections of the original draft because the protocol format in BMJ journals does not include these sections. As a result, the reviewer's suggested addition in the Discussion section is no more applicable. We moved the comment about VH among Somali migrants in non-Western host nations to the Introduction section. Given that our review is about migrants, we decided against any reference of Somalis in Somalia in the Introduction. We will likely add such a statement when discussing the implications of our scoping review findings. "*While there is evidence of vaccine hesitancy among Somali migrants in the United States and in Norway, we do not know at this writing how prevalent this issue is among Somalis living in other Western nations or non-Western host countries with a much larger Somali diaspora (e.g., Ethiopia, Kenya, Yemen). It is also unclear*

		whether, and if so why, Somali migrants might be more susceptible to vaccine hesitancy than other African migrants." (Page 5, last paragraph)
REVIEWER 5: Pietro Luigi Lopalco - University of Pisa, Italy		
Methods Page 7, line 50,	Should read PRISMA-P, I guess	We thank the reviewer for noticing that we misspelled the acronym PRISMA. We have corrected the typo. (See page 8, first paragraph)
Page 8, line 30,	Will different age groups taken into account? children, adults? what about special populations like pregnant women?	Ours is an all-inclusive scoping review to assess all existing evidence of VH in migrant populations. Yes, if there are any studies of VH among immigrant children or pregnant women, we will include them. (Page 9, first paragraph)
Page 9, line 10.	What is meant for "location of immunisation services"? Is it the way the vaccination service is organised or is it simply the distance to the next immunisation service?	In the interest of clarity, we have substituted the phrase "location of immunization services" with the phrase "*location/place where vaccination services are provided*." (Page 9, 3rd paragraph)
Table 3	Data charting template. Maybe the vaccine/vaccines which the study is referring to (if mentioned) should be listed. A study just on hesitancy specifically related to HPV vaccination, childhood vaccines, etc. could be retrieved and maybe worthy to be highlighted.	We thank the reviewer for suggesting that we add "vaccine" among the data to be charted. We have added a "*Vaccine*" row in Table 3 with the following data description "*Vaccine that is accepted, delayed, or rejected*." (Page 12)

VERSION 2 – REVIEW

REVIEWER	Philip E. Tarr Kantonsspital Baselland, University of Basel, Switzerland
REVIEW RETURNED	16-Apr-2020

GENERAL COMMENTS	I am not shown the authors' point by point responses to my queries. from what i can tell, the authors have now adequately addressed my comment.

REVIEWER	Anita Heywood UNSW Sydney, Australia
REVIEW RETURNED	20-Apr-2020

GENERAL COMMENTS	The authors have considered my previous comments and made appropriate edits, or justified their position. I only have a few additional minor comments. Introduction: Page 6, line 29. Non-vaccinators are also found among Orthodox Jewish communities in New York,15 Greater London and Belgium,21-23 Amish communities in Ohio,24 and anthroposophical believers across Europe.25 - I believe these papers refer to ethic minority groups, not migrant communities. For an opposing evidence on Somali vaccine beliefs to those included in your introduction, see Abdi et al. 2019. https://www.ncbi.nlm.nih.gov/pubmed/31537444 No other comments. All the best with undertaking this worthy review.

VERSION 2 – AUTHOR RESPONSE

REVIEWER 2: Phillip Tarr – University of Basel, Switzerland		
	I am not shown the authors' point by point responses to my queries. From what I can tell, the authors have now adequately addressed my comment.	While do not understand how and why Reviewer 2 could not see our point-by-point responses to his comments, we appreciate the reviewer's overall satisfaction with/span>our revisions.
REVIEWER 4: Anita Heywood – University of New South Wales, Australia		
Introduction Page 6, line 29	*"Non-vaccinators are also found among Orthodox Jewish communities in New York,[15] Greater London and Belgium,[21-23] Amish communities in Ohio,[24] and anthroposophical believers across Europe.[25]"* I believe these papers refer to ethic minority groups, not migrant communities. For an opposing evidence on Somali vaccine beliefs to those included in your introduction, see Abdi et al. 2019. https://www.ncbi.nlm.nih.gov/pubmed/31537444	We have replaced the statement on ethnic minority groups with the following excerpt: *"Emerging evidence from England reveals human papillomavirus (HVP) vaccine acceptance could be very low among UK-based immigrant parents from Eastern, Southern and Western Africa due to fears that their young daughters might become promiscuous and even infertile after HPV vaccination.[22]"* Of note, we have cited a different source from the one suggested by Reviewer 4. We believe the study we cited presents better evidence of vaccine hesitancy among African migrants other than Somalis.
	No other comments. All the best with undertaking this worthy review.	Thank you for your informed review and encouragements!