PEER REVIEW HISTORY

This paper was submitted to a another journal from BMJ but declined for publication following peer review. The authors addressed the reviewers' comments and submitted the revised paper to BMJ Open. The paper was subsequently accepted for publication at BMJ Open.

(This paper received three reviews from its previous journal but only two reviewers agreed to published their review.)

ARTICLE DETAILS

TITLE (PROVISIONAL)	Protocol for a Systematic Review and Qualitative Synthesis of Information Quality Frameworks in eHealth
AUTHORS	Fadahunsi, Kayode Philip; Akinlua, James Tosin; O'Connor, Siobhan; Wark, Petra A.; Gallagher, Joseph; Carroll, Christopher; Majeed, Azeem; O'Donoghue, John

VERSION 1 – REVIEW

REVIEWER	Tim Luckett University of Technology Sydney, Australia
REVIEW RETURNED	11-Jul-2018

GENERAL COMMENTS	Suggestions for improvement are as follows. Abstract and keywords The first sentence states that eHealth has become a very large repository of health information, but in the manuscript define eHealth as 'the use of information and communication technologies in healthcare (i.e. a process). Please change PsychINFO to PsycINFO. It is more matter for publication of results than the protocol, but I note the search was only current up until December 2016 – a very long time ago in eHealth terms! Should the keywords include 'systematic reviews'? Conversely, I wonder if 'guidelines' might be confusing given this term is usually associated with clinical guidelines? Is a strength of the review that it used a framework of any description, rather than BeHeMoTh more specifically? I suggest that the limitation identified by the authors is due to the absence of any established theoretical framework during synthesis. Introduction P4 line 33 – is it only information output that's a problem or also input/capture, as the example that follows this sentence suggests? Why are the authors so sure that a new IQ framework will be needed before they have reviewed existing work? Methods The RQs do not include any relating to the authors' aim to develop a new IQ framework. To fully comply with PRISMA, the authors need to indicate what publication and study types will be included. The fact they are searching a dissertations database suggested they are not limiting to published articles? If so, why are they not also searching the

	web for policy documents etc? Equally, the authors say they are including IQ frameworks bit make no reference to the types of studies (quantitative, qualitative, descriptive, evaluative etc) that will be included, if indeed they are interested in studies at all. If studies are not the focus, then the authors need to change later reference to studies as the unit of analysis. If studies are of interest, then more information is needed on how related information will be used during synthesis. On a related matter, the authors say they are assessing quality using the CASP tool but don't say how this information will be used. The authors should acknowledge that Covidence is software designed by the Cochrane collaboration. I don't think the 'outcomes' section of PRISMA works well for this review, and suggest this information be incorporated into the data extraction or synthesis sections. Analysis I was unclear what 'harmonise' means in this context. The authors write that 'generation of analytical themes from descriptive themes has been described as controversial because it is influenced by the insight and judgement of the reviewers'. However, depending on who the reviewers are, this can be a great strength, as well as a limitation. A description of the review team's expertise and experience, including variation in perspectives, would help the reader to contextualise the results. As noted above, I think the risk of bias could be reduced (whilst still maintaining the positive contributions of expert opinion) by using an established theoretical framework. More details are required of the methods to be used in the narrative synthesis. Popay and colleagues have authored authoritative guidance that may be useful to consult. Discussion The Discussion should include a section on the review's limitations.

REVIEWER	Yan Zhang University of Texas at Austin, USA
REVIEW RETURNED	30-Aug-2018

GENERAL COMMENTS	The paper reports a protocol for a systematic review and qualitative synthesis of information quality frameworks in eHealth. Data quality is critical for data-rich health technologies. The topic is important and timely. The overall plan is reasonable. I have the following questions for the authors to consider: 1. In Abstract, you mentioned you are going to include publications in English until Dec. 14 2016. Is there a particular reason for this time limit? When this study will take place? 2. P6, you mentioned you will "consider all technologies used for diagnostic, therapeutic or prognostic…., irrespective of whether they are used by healthcare professionals or patients." I would argue that the two user groups probably use different methods and apply different criteria to evaluate the quality of health information in clinic ehealth systems. Will it be valuable to separate them? 3. You mention that you will examine relationship existing between IQ dimensions. I wonder what this relationship looks like. It will be helpful to give an example. This comment is also related to my effort to make sense of RQ3 – How are IQ dimensions in eHealth related to each other? and picture possible results. 4. P9, you mention "studies will not be excluded based on quality assessment outcome" justify why. 5. P9. Analytic themes. What are analytic themes, can you give an

	example? 6. Creating a comprehensive IQ assessment framework is very useful, however, it doesn't help us to understand which dimensions are more important than others. Do you plan to do something on this end when analyzing the data?

VERSION 1 – AUTHOR RESPONSE

Reviewer's Comment	Authors' Response	Page
Reviewer 1		
Please state any competing interests or state 'None declared': None declared /None declared	No conflict of interest.	16
The first sentence states that eHealth has become a very large repository of health information, but in the manuscript define eHealth as 'the use of information and communication technologies in healthcare (i.e. a process).	The sentence is changed to "The eHealth **applications** have become a very large repository of health information……" We also gave examples of eHealth applications: telemedicine, mHealth apps, CDSS etc	4
Please change PsychINFO to PsycINFO.	PsychINFO changed to PsycINFO.	2, 8
It is more matter for publication of results than the protocol, but I note the search was only current up until December 2016 – a very long time ago in eHealth terms!	All relevant studies until November 2018 will be included.	8
Should the keywords include 'systematic reviews'? Conversely, I wonder if 'guidelines' might be confusing given this term is usually associated with clinical guidelines?	We have included 'systematic reviews' and removed 'guidelines' as advised	2
Is a strength of the review that it used a framework of any description, rather than BeHeMoTh more specifically?	The strength is changed to: We will use a theoretical framework for the literature search.	3
I suggest that the limitation identified by the authors is due to the absence of any established theoretical framework during synthesis.	The **thematic synthesis** approach adopted for this study is in itself an established theoretical framework. We have included further details about the stages of thematic synthesis for clarity.	11
P4 line 33 – is it only information output that's a problem or also input/capture, as the example that follows this sentence suggests?	We acknowledge that human errors contribute to patient safety problems associated with eHealth. However, human errors could be addressed through clinical governance and other interventions which are beyond the scope of this review.	4

Why are the authors so sure that a new IQ framework will be needed before they have reviewed existing work?	IQ frameworks for newer types of eHealth, such as the mHealth apps, are virtually non-existent and there is no generic IQ framework for eHealth which is applicable across different eHealth applications. Also, there is no consensus on IQ dimensions that are relevant to eHealth and their definition.	5
The RQs do not include any relating to the authors' aim to develop a new IQ framework.	Newly included RQs 3 and 4: RQ3: Which IQ dimensions indicate how well information in eHealth is fit for diagnostic, therapeutic or prognostic purposes? RQ4: How are these IQ dimensions in eHealth related to one another?	6
To fully comply with PRISMA, the authors need to indicate what publication and study types will be included.	Both published and grey literatures will be included. There will be no restriction based on study type as there is no evidence that one study type is superior to another when developing an IQ framework. In addition, restriction based on study type may lead to exclusion of potentially relevant IQ frameworks.	8
The fact they are searching a dissertations database suggested they are not limiting to published articles? If so, why are they not also searching the web for policy documents etc?	We believe that we have reasonably covered relevant grey literatures by searching SCOPUS, HMIC and PROQUEST Dissertation and Thesis.	8
Equally, the authors say they are including IQ frameworks bit make no reference to the types of studies (quantitative, qualitative, descriptive, evaluative etc) that will be included, if indeed they are interested in studies at all.	There will be no restriction based on study type as there is no evidence that one study type is superior to another when developing an IQ framework. In addition, restriction based on study type may lead to exclusion of potentially relevant IQ frameworks.	8
If studies are not the focus, then the authors need to change later reference to studies as the unit of analysis. If studies are of interest, then more information is needed on how related information will be used during synthesis.	The new IQ framework for eHealth will be derived from the thematic synthesis of the verbatim definition of IQ dimensions. The study details and other extracted framework-related information extracted will provide an understanding of the context of the new IQ framework.	12
On a related matter, the authors say they are assessing quality using the CASP tool but don't say how this information will be used.	The assessment is intended to provide a general idea about the quality of the existing IQ frameworks and the strength of evidence.	11

The authors should acknowledge that Covidence is software designed by the Cochrane collaboration.	The partnership of Covidence and Cochrane Collaboration is acknowledged	9
I don't think the 'outcomes' section of PRISMA works well for this review, and suggest this information be incorporated into the data extraction or synthesis sections.	The outcome information has been incorporated into the data extraction section	10
I was unclear what 'harmonise' means in this context.	We acknowledged that the word 'harmonize' could be ambiguous. We have replaced it as appropriate	
The authors write that 'generation of analytical themes from descriptive themes has been described as controversial because it is influenced by the insight and judgement of the reviewers'. However, depending on who the reviewers are, this can be a great strength, as well as a limitation. A description of the review team's expertise and experience, including variation in perspectives, would help the reader to contextualise the results.	A description of the review team's expertise and experience is included under Methods and Analysis.	6
As noted above, I think the risk of bias could be reduced (whilst still maintaining the positive contributions of expert opinion) by using an established theoretical framework.	The **thematic synthesis** approach adopted for this study is in itself an established theoretical framework. We have included further details about the stages of thematic synthesis for clarity.	11
More details are required of the methods to be used in the narrative synthesis. Popay and colleagues have authored authoritative guidance that may be useful to consult.	We have included more details about the stages of thematic synthesis for clarity.	11
The Discussion should include a section on the review's limitations.	Review strength and limitations are included in the Discussion.	12, 13
Reviewer: 2		
Please state any competing interests or state 'None declared': No conflict of interest	No conflict of interest	16
The paper reports a protocol for a systematic review and qualitative synthesis of information quality frameworks in eHealth. Data quality is	Thank you.	

critical for data-rich health technologies. The topic is important and timely. The overall plan is reasonable.		
In Abstract, you mentioned you are going to include publications in English until Dec. 14 2016. Is there a particular reason for this time limit? When this study will take place?	All relevant studies until November 2018 will be included. The study is on-going.	8
you mentioned you will "consider all technologies used for diagnostic, therapeutic or prognostic…., irrespective of whether they are used by healthcare professionals or patients." I would argue that the two user groups probably use different methods and apply different criteria to evaluate the quality of health information in clinic eHealth systems. Will it be valuable to separate them?	We agree. The review is now restricted to eHealth applications used by healthcare professionals. We will exclude self-management applications, used by patients for health education and disease tracking purposes, as their IQ requirements may be different from those eHealth applications used for clinical purposes.	7
You mention that you will examine relationship existing between IQ dimensions. I wonder what this relationship looks like. It will be helpful to give an example. This comment is also related to my effort to make sense of RQ3 – How are IQ dimensions in eHealth related to each other? and picture possible results.	An example of how IQ dimensions are categorised in an IQ framework to depict existing interrelationship is presented on Table 1. The 'security' category is explained in the text.	5
you mention "studies will not be excluded based on quality assessment outcome" justify why.	Studies will not be excluded based on quality assessment outcome as this is unlikely to have any major impact on the ultimate definition of the dimensions and the construction of the IQ framework. However, the assessment is intended to provide a general idea about the quality of the existing IQ frameworks and the strength of evidence	10, 11
Analytic themes. What are analytic themes, can you give an example?	Analytical themes are interpretations of the descriptive themes which usually go beyond the findings of the original studies. This stage will involve organisation of the IQ dimensions (descriptive themes) into different categories conceptualised by the reviewers based on their understanding of the definition of the dimensions. We do not give specific examples here so as to prevent bias in the data synthesis process. We also believe that the	11, 5

	example about the ‘security’ category in an existing framework suffices.	
Creating a comprehensive IQ assessment framework is very useful, however, it doesn’t help us to understand which dimensions are more important than others. Do you plan to do something on this end when analyzing the data?	We have acknowledged this as a limitation of the study. However, we are planning an International Online Delphi Study to address this.	3, 13