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The Application of the Literature Review Appraisal Toolkit on Environmental Health Systematic Reviews

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Abstract

Environmental health systematic reviews have long been of poor quality when comparing them to clinical health systematic reviews. The main reason for the poor quality of environmental health systematic reviews is the lack of a specific protocol. The University of California-San Francisco's Program for Reproductive Health and the Environment has, because of the discrepancy, created a protocol specific to conducting environmental health systematic reviews. The protocols efforts would be futile without a nonbiased way to evaluate systematic reviews and therefore the protocol used. The Literature Review Appraisal Toolkit is a valuable tool created to navigate and evaluate the credibility of current published environmental health systematic reviews. The LRAT was applied to multiple published systematic reviews that focused on three different topics that PHRE was focusing on. The results of the LRAT are for each case study show the majority of published environmental health systematic reviews to be unsatisfactory and all of them not following an outlined protocol. The continual use of a tool to rate environmental health systematic reviews will be necessary just as the application of strict protocols will be necessary. The current standard for environmental health systematic reviews is very low and demanding better quality is necessary to make environmental health systematic reviews useful to the medical field and transparent for decision-making and policy development.

I. Introduction

Systematic reviews are defined as rigorous, protocol-driven approaches to minimizing error and bias in the aggregation and appraisal of evidence relevant to answering a research question (Whaley et al., 2016). Systematic reviews are useful for health care workers when it comes to making decisions and allocating resources. The application of systematic reviews on environmental health research specifically chemical risk assessments is a relatively new adaption. The most challenging aspect of applying systematic reviews to toxological studies is unlike medical studies there are no randomly controlled trials that use human subjects Whaley et al. (2016) Therefore, observational human data and animal data is relied upon. Whaley et al., (2016) put together a group of experts to brainstorm about what needs to be addressed when adapting systematic reviews for environmental health studies.

The University of California-San Francisco's Program for Reproductive Health and the Environment (PRHE) has developed a protocol for conducting environmental health systematic reviews. This protocol has been coined The Navigation Guide Systematic Review Methodology, the purpose of this protocol is to help make the systematic review process of environmental health studies more transparent and reduce bias. While this protocol has been developed the need to evaluate environmental health systematic reviews regardless if a protocol was used needs to be done with an appropriate application.

The application of an appraisal tool is essential because it serves as an independent judgement of published systematic reviews, it lets it be known where the current reviews are falling short. It will help with the further improvement of protocols as these systematic reviews become more frequently appraised. The current standard for environmental health systematic reviews is quite low and the problem that needs to be fixed is to raise that standard

and have a consistent appraisal of published reviews.

II. Background

The PRHE department has not been the first organization to address the lack of systematic review protocols used in environmental health reviews. Starting in 2011, The National Toxicology Program (NTP) Office of Health Assessment and Translation (OHAT) decided to develop the OHAT Approach (Rooney et al., 2014). OHAT regularly conducts literature reviews that evaluated environmental substances, and wanted to incorporate systematic reviews into their work. OHAT then took the appropriate steps to develop their own systematic review protocol called the OHAT Approach that they use when they produce their systematic reviews.

PRHE and OHAT both work on the community level of the ecological model however the communities they are addressing are slightly different. This leads to potentially the production of two different kinds of protocols that can be used for environmental health systematic reviews. The OHAT looks to be a well-developed protocol and is effective, however OHAT developed a protocol specifically for them to use, and PRHEs Navigation Guide could potentially be used by any organization. Both are very useful and effective. Also both protocols that are used could be analyzed with an application such as the Literature Review Appraisal Toolkit (LRAT) to see if the protocol results in a transparent systematic review.

The importance of using a tool such as the LRAT to evaluate environmental health systematic reviews is because there is no specific way to evaluate if a certain protocol proves more valuable over another. The use of an evaluation tool will help determine if a certain used protocol is superior to another or if many can be implemented and produce quality systematic reviews.

III. Scope of the Project

The project that was completed was done at the University of California-San Francisco, Program for Reproductive Health and the Environment (PRHE), under the guidance of Patrice Sutton and Research Assistant Natalyn Daniels. PRHE was founded in 2007 and the programs mission is:

> "To meet the need for continued environmental reproductive health research and for the translation of science into preventive policy action, enhanced health care and heightened public awareness."

The PRHE program works on the community level of the ecological model. PRHE program is in the process of developing a Navigation Guide that would serves as a standard protocol for developing systematic reviews specifically for environmental health. PRHE focuses on toxological studies that have a mother to child relationship. While PRHE has developed their own case studies to perform systematic reviews using the Navigation Guide protocol, PRHE wanted to compare their reviews with other similar published reviews. Paul Whaley has developed and appraisal tool for rating the quality of environmental health systematic reviews.

The Literature Review Appraisal Toolkit (LRAT) was developed by Paul Whaley to serves as a tool to judge the credibility of current published systematic reviews specifically environmental health systematic reviews. The three cases studies PRHE wanted to focus on were "air pollution and autism spectrum disorder", "polybrominated diphenylethers (PBDEs) and attention deficit hyperactivity disorders and IQ", and "formaldehyde and asthma". After thorough literature searches with the help of the public health librarians at UCSF, select systematic reviews that answered a similar question to

that of the PRHE teams were accumulated. All reviews were then thoroughly read and rated using the LRAT.

The LRAT has nine total rating questions that can be rated either "unsatisfactory", "unclear", or "satisfactory". Comments can be entered for each question as to why a specific rating was chosen over the other two. The questions focus on the objective, protocol, interests of the authors, search strategy, selection strategy, directness of evidence, methodological quality of evidence, synthesis of evidence, and summation. The complete set of instructions for applying the LRAT can be found in Appendix A (Table 1). The LRAT allows the ratings to be entered online and it delivers an email with a table of your ratings, an example of this can be found in Appendix B. There were a total of 3 articles reviewed for the air pollution and autism spectrum disorder case study as well as the systematic review published by the PRHE staff, "A Systematic Review and Meta-Analysis of Multiple Airborne Pollutants and Autism Spectrum Disorder" by Lam, Juleen et al., 2016. After each reviewer (there were 3-5) per article there was a reconciliation completed to determine the final ratings that would be used, those ratings can be found in Appendix C (Table 2). There were a total of ten articles selected to undergo the LRAT from the PBDEs and ADHD and IQ case study, again there was a reconciliation and final rating were determined amongst the reviewers. Those final ratings can be found in Appendix C as well (Table 3). There were a total of 6 systematic reviews analyzed by the LRAT for the formaldehyde and asthma case study, the reconciliation for that case study is in the process so the final ratings are not yet available.

The completion of the LRAT project is underway and there are hopes for it to be published in the future.

IV. Public/Population Health Impact: Findings and Significance

The relevance of this project was twofold, first the LRAT served as a great tool to use to analyze the credibility of the current published systematic reviews, and second it serves as a comparison between the qualities of systematic reviews the PRHE team produces compared to what is already published. The complied final LRAT ratings in Appendix C (Tables 2 and 3) all have one thing in common, they all received an "Unsatisfactory" for question 2 which refers to the published protocol used to prepare the systematic review. This is a key finding to support the need to develop a standard protocol specific to systematic reviews for environmental studies.

The next steps include continuing applying the LRAT to environmental health systematic reviews, the developer Paul Whaley, is currently updating the LRAT which will soon be called CREST. This new application will address areas where the users of the LRAT felt it fell short. It will be important for organizations to produce quality systematic review that follow strict protocols to demand a higher quality of reviews to start being published. PHREs main objective of the development of the Navigation Guide Systematic Review Methodology is a protocol that holds the researchers and authors accountable while delivering a quality meta-analysis that can be used to make decisions and allocated resources. The goal is to have an honest and clear systematic review that can be easily interpreted by those in the medical field and therefore easily translated to the population at hand.

PHRE is funded by a number of organizations as well as government funded through grants. Funding for the future will always be not guaranteed. Currently environmental health research will be going through a massive change due to the new president elect and those he has

appointed to specific offices. Therefore, it is important to remain proactive to prepare and advocate for environmental health research.

V. Conclusion

It is evident that conducting systematic reviews for environmental health studies is challenging and leads to very confusing conclusions that are nontransparent. It is important to be able to come to understandable conclusions when reviewing environmental health research so it can be applied for decision making purposes. UCSF's PHRE has developed a strict protocol for conducting thorough and transparent systematic reviews for environmental health research. OHAT is another organization that has developed a protocol for their use to better conduct systematic reviews.

The creation and application of these protocols could only be taken with a grain of salt if there is not a consistent tool that is used to consistently review old and newly published systematic reviews. The LRAT is a valuable tool that is created to analyze the credibility of environmental health systematic reviews. The three case studies PHRE chose to perform meta-analyses of we all compared to current systematic reviews that have a similar objective or goal. It was clear current published systematic reviews that focused on the three specific topics of choice were poorly done and every systematic review failed to follow a protocol. The application of the LRAT made these results possible and helps validate the need for strict protocols. The continual use of the LRAT will be necessary to demand quality reviews, the LRAT is currently being upgraded to the CREST application, which will be an even better tool to use.

The takeaway from this should be the need to publish as well as demand higher quality environmental health systematic reviews. The field of environmental research is a difficult field

to work and as there is limited and unpredictable funding sources. The fight to develop a standard and consistent evaluation of published reviews will always be necessary as it will benefit not only those of reproductive age but entire populations.

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Appendices

Appendix A

Questions

Q1. Objective: does the review address a clearly-focused, relevant question?

Hide detailed explanation

The fundamental issue. Reviews should ask a clearly-focused question which addresses, in the most useful way possible, an issue of controversy or uncertainty. A review should therefore include a clear explanation of why the question has been formulated as it has.

Why this is important. Reviews are not helpful if the question cannot be easily understood, is too broad to have specific application or too narrow in scope to inform a decision. Because there can be a big difference between what the real problem actually is and what the reviewers think the problem is, it is very important that the question being asked in a review does not mislead the reader about the real problem which needs to be solved.

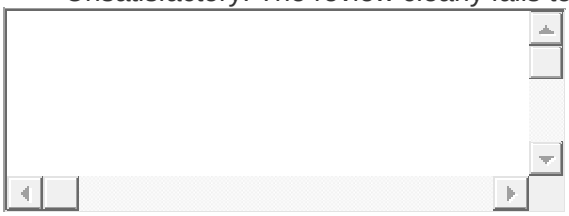
For example, a review might show that tobacco packaging has little influence on the smoking habits of adults and conclude there is nothing to be gained from introducing plain packaging; however, the real issue might be the influence which tobacco packaging has on uptake of smoking among children.

The answers to the two reviews might produce very different tobacco packaging policy, which is why it is important to make sure the scope of a review properly targets the issue which needs to be addressed. The process for framing the question should therefore be transparent and the question itself should be clear, as should the reason for asking it.

Our experience. When we reviewed EFSA's 2010 Opinion on BPA, we felt that the question being answered by the review was ambiguous in its scope and that EFSA had not given sufficient explanation as to why its particular interpretation of the scope was the most appropriate, hence the evaluation of "unsatisfactory".

For EFSA's draft 2014 Opinion on BPA there appeared to be two conflicting objectives in the Opinion, one of which addressed the problem of interest but was apparently superseded by another which did not, resulting in a judgment of "unclear" (a case could be made that this should be "unsatisfactory"; for us, the main point is that a review of ambiguous scope, whether unclear or unsatisfactory, is probably equally inadequate).

- Satisfactory. The objective of the review is clear and addresses the problem of interest.
- Unclear. There is insufficient documentation to evaluate whether or not the review addresses the primary problem of interest, and/or the objective is unclear
- Unsatisfactory: The review clearly fails to address the problem of interest



2. Protocol: has the review been conducted according to procedures defined in a pre-published protocol?

Hide detailed explanation

The fundamental point. When conducting an experiment in a laboratory, it is important that a method is developed and then followed – otherwise, it is not possible to know if the results are a product of the experimental set-up or the changes made part-way through its conduct.

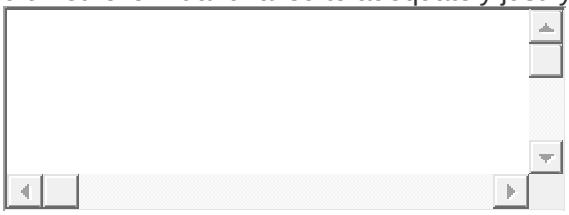
The same is true for literature reviews: inadvertent or not, changes in method can allow reviewers to shape their review to give the results they think they should be getting, rather than the ones which are supported by the data. Protocols therefore have a vital role to play in reducing the risk of expectation bias distorting the results of a review.

All reviews should be conducted according to pre-published protocols. This is virtually unheard of in toxicology, so don't be surprised if a review hasn't followed a protocol. If a protocol was pre-published, you should check to make sure the reviewers followed it; if they did not (sometimes changes do have to be made) this should be justified and not bias the outcomes of the review.

Our experience. We haven't yet seen a review of toxicological data which has followed a pre-published protocol; however, the US National Toxicology Panel and the Navigation Guide are both in the process of conducting pilot systematic reviews of toxicity data.

- Satisfactory. There was a pre-published protocol and any deviations from it were adequately justified

- Unclear. It is not possible to determine if there was a pre-published protocol or, if there was one, whether or not it was followed
- Unsatisfactory. Either there was no pre-published protocol, or there was one but the reviewers did not follow it and failed to adequately justify why



Q3. Interests: is there a comprehensive declaration of interests and contributions?

Hide detailed explanation

The fundamental point. In order to put the findings of a review in their full context, we need to know both the interests of each person involved in the review and the contributions which each person made to the review process.

This means we need to know all the interests which might have affected the conduct of the review, from academic interests, memberships, affiliations, relationships, financial interests and anything else which could have shaped someone's input into a review. Information about the specific contributions each reviewer made to the review (in reality, very rarely given) is necessary to see how these interests might have influenced the review process.

Our experience. When we reviewed EFSA's 2010 and draft 2013 and draft 2014 Opinions on BPA, we felt that the way in which individual interests were declared was quite comprehensive.

However, retrieving this information and then trying to work out how the various interests of each of expert involved in the Opinion might have influenced their input to the process was very difficult because it required forensic analysis of lengthy declaration documents, making it at best unclear whether or not the declarations were satisfactory.

- Satisfactory. The interests and contributions of each person involved in the review have been declared in sufficient detail and do not seem likely to have compromised the review

- Unclear. There is insufficient documentation to judge whether the reviewers' interests might have had a negative impact on the objectivity of the review
- Unsatisfactory. There are conflicts of interest which may have compromised the objectivity of the review

Q4. Search strategy: did the authors locate all the research which might have been relevant to answering the specified question?

Hide detailed explanation

The fundamental point. A review should locate all the evidence relevant to its objective. Otherwise, how can the reviewers be sure they have not missed a piece of information which might have altered their conclusions?

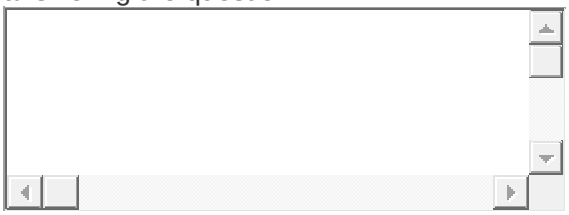
A review should therefore include a detailed description of its search method and its results in a manner which allows you to try the search yourself and see if any relevant papers have been left out. Ideally, a review would include the following information:

- Search strings used
- Databases searched
- Number of results retrieved from each database
- Number of duplicate results
- Total number of references put through to screening against inclusion criteria

Our experience. Our experience of this varies widely. We felt the 2010 EFSA Opinion on BPA conducted a comprehensive literature search, even though it wasn't as well documented as we would have liked.

On the other hand, it was unclear to us how the literature search for EFSA's draft 2013 exposure assessment of BPA could be comprehensive; when we ran a search ourselves to compare our results to theirs, we found a number of studies which appeared relevant but were not mentioned in EFSA's results. EFSA's draft 2014 Opinion was no better, being quite open about how it was deliberately selective in its approach to identifying papers for review.

- Satisfactory. The review clearly demonstrates that it located all the research of possible relevance to answering the question
- Unclear. There is insufficient documentation to determine if the search strategy was comprehensive or not
- Unsatisfactory. The search strategy missed research which is of possible relevance to answering the question



Q5. Selection: did the authors employ a screening process which selected for analysis all the studies of actual relevance to their research objective?

Hide detailed explanation

The fundamental point. Not all the evidence from the literature search will be relevant to the review objective. It will therefore be necessary for the reviewers to select, from all the studies they found, only those which can help them answer their review question.

This selection process can easily introduce bias if not done properly, however, so you need to check if any studies of apparent relevance to the review objective were not included in the review (or studies which are not relevant but included anyway). To do this, you should look for the following:

- An explicit statement of inclusion and exclusion criteria, with a rationale for their use
- A list of the excluded studies with a brief reason for exclusion of each
- A list of the included studies

Our experience. We do not often see clear inclusion and exclusion criteria being used in a review; if we do see them, we often find they are not followed – suggesting they were not properly thought-through in the first place. This suggests reviewers are allowing themselves to choose which studies they want to look at on a case-by-case basis, increasing the risk of bias in the review process.

- Satisfactory. The reviewers consistently applied a clear set of inclusion criteria, such that all studies of actual relevance to the review objective were put forward to analysis

- Unclear. There is insufficient documentation of selection criteria and their application to judge whether or not all studies of actual relevance to the review objective were put forward to analysis
- Unsatisfactory. The review either included studies which did not meet the specified inclusion criteria, or it excluded studies which did meet the inclusion criteria

Q6. Directness of evidence: did the reviewers apply a fair test of external validity to each of the studies included in their review?

Hide detailed explanation

The fundamental point. A prospective epidemiological study looking at the effects of tobacco smoke on lung cancer might be considered a more direct type of evidence than an animal study looking at the same thing, because the prospective epidemiological study requires fewer inferential leaps than the animal study before drawing conclusions about how tobacco smoke exposure causes cancer in people.

This degree to which a study set-up is directly representative of the real-world situation it is modelling is what we call “external validity” (directness of evidence or, roughly speaking, “relevance” in the language of risk assessment).

When we are combining several studies in a single review of evidence, we therefore need a test which grades studies according to their external validity, so they can be given greater or lesser weight in the final analysis. In order to produce an accurate result, this test must be able to accurately distinguish more direct studies from less direct ones (i.e. be valid) and must be consistently applied to all the studies in the review.

If the review’s test of external validity is either not valid or not consistently applied, the review will not consistently put greater weight on those studies which are directly relevant to the outcome of interest, introducing bias and inaccuracy into the review process and making the results of the review less credible.

The reviewers should therefore:

- present you with their scheme for appraising the external validity of the studies they have reviewed;
- demonstrate that they applied their scheme consistently;

- and provide support for the ability of their scheme to reliably distinguish more direct studies from less direct ones.

Our experience. Generally, we find external validity difficult to appraise because few reviews distinguish clearly between external and internal validity in their discussion of the methodological quality of research.

- Satisfactory. The reviewers consistently used valid criteria in appraising studies according to how directly relevant they are to answering the review question
- Unclear. There is insufficient documentation to determine whether or not the relevance criteria are either valid or consistently applied
- Unsatisfactory. The reviewers either inconsistently applied criteria for appraising the relevance to the review question of the included studies, or the criteria they used were invalid

Q7. Methodological quality of evidence: did the reviewers apply a fair test of internal validity to each of the studies included in their review?

Hide detailed explanation

The fundamental issue. As part of the review process we need to get some sense of the extent to which the results of each study in the review can be believed, so we can consistently put more weight on the studies which are more credible and less weight on the studies which are less credible.

The credibility of a study (what we call “internal validity” and is roughly-speaking called “reliability” by risk assessors) is determined by what the researchers did in the course of their study to ensure that the results of the study are not misleading. For example, this would include whether the researchers were blinded, if test subjects were randomly allocated to control and intervention groups, and so on.

To demonstrate that better studies are always given more weight in the analysis than worse studies, a review should:

- clearly describe all the criteria according to which the internal validity of each study in the review is being judged;

- present evidence that the criteria reliably distinguish methodologically better studies from worse (i.e. are both valid and comprehensive);
- demonstrate the criteria have been applied consistently to each study in the review.

Our experience. Generally we find that criteria for appraising the internal validity of studies are poorly developed and inconsistently applied, with decisions left to the unexplained judgment of individual experts. As such, it is often impossible to tell if studies have been appraised consistently or not.

- Satisfactory. The reviewers consistently applied a valid set of criteria for appraising the methodological quality of evidence in the review
- Unclear. There is insufficient documentation to judge whether or not the reviewers' test for internal validity was valid or consistently applied
- Unsatisfactory. There is positive evidence that the criteria used for appraising the methodological quality of evidence were either invalid or inconsistently applied

Q8. Synthesis of evidence: did the authors combine, according to a valid methodology, the results, directness and methodological quality of evidence into a statement of what is and is not known in relation to the objective of the review?

Hide detailed explanation

The fundamental point: The purpose of doing a literature review (at least, of the hypothesis-driven kind we are concerned with here) is to yield a statement of the extent to which the available evidence supports or refutes the hypothesis defined in the objective of the review.

To contribute to this, the synthesis section of a review should provide:

- a better estimate of the effects on health which a chemical might have than can be given by any single study;
- a description the strength of the evidence supporting that estimate;
- and a presentation of what is and is not known in relation to these effects, thereby placing the estimate of effect in its full research context.

This means a review should offer a clear description of how the results of the analysis of the external and internal validity (the directness and methodological robustness) of the studies included in the review are combined into a statement of what is and is not known in relation to the objective of the review, with evidence of the validity of the approach taken.

However, it is difficult to generalise about how this should be done, except to say that any method for doing so should be valid and consistently applied, so the knowledge gleaned from the included studies is transmitted through analysis into conclusions; additionally, the methodology should be fully documented.

Our experience: It is very difficult to pin down any a priori criteria for judging the validity of a review's approach to synthesising research. We often find that methodologies are not explained and instead left to expert judgment; or we find that a method may be clearly described yet, as far as we can judge, not yield an obviously satisfactory interpretation of the data.

Of all the domains, this is the most difficult to analyse and we hope to improve our guidance in this area in the future.

- Satisfactory. The reviewers consistently applied a valid methodology for synthesizing the results of the review into an overall conclusion of what is known in relation to the review objective
- Unclear. There is insufficient documentation to judge whether or not the reviewers' approach to synthesizing the results of their analysis was valid or consistently applied
- Unsatisfactory. There is positive evidence that the approach taken was either invalid or inconsistent

Q9. Summation: is the summary section of the review representative of its main findings?

Hide detailed explanation

The fundamental issue. It might seem obvious, but the answer to a review question should represent the major findings of the review (it is amazing how often conclusions over-state actual findings). Summary sections of a review should include the following:

- a statement of the quantity of evidence;
- a qualified statement of the overall strength of the evidence, combining the overall external applicability of the evidence with its overall internal validity;
- a clear connection between this judgment of strength and the final answer given;
- a statement of the limitations of the review process, including potential biases;
- a statement of agreement and disagreement with other studies and reviews.

Why this is important. Reviews are conducted in order to yield answers. It is fair, then, to expect that the answer should be clear and representative of the main findings of the review, and also be properly qualified in terms of the overall strength of the evidence supporting it, whether or not it agrees with other reviews, anticipate any research which might change its conclusions and so forth.

Our experience. We are surprised at how often reviews seem only to give partial answers to the questions they set out to address or pull up short in giving a full account of the significance and limitations of their findings, as if the authors are not clear as to all the factors they should be considering in formulating their conclusions.

- Satisfactory. The way the review is summarized accurately reflects its principal findings
- Unclear. It is not possible to determine whether or not the summary sections of the review accurately reflect its principle findings
- Unsatisfactory. The way in which the review is summarized fails to reflect its principal findings

Appendix B

Table 1.

LRAT completed ratings table.

Question	Judgement	Comment
Q1. Objective: does the review address a clearly-focused, relevant question?	Yes	
Q2. Protocol: has the review been conducted according to procedures defined in a pre-published protocol?	No	
Q3. Interests: is there a comprehensive declaration of interests and contributions?	Unclear	
Q4. Search strategy: did the authors locate all the research which might have been relevant to answering the specified question?	Yes	
Q5. Selection: did the authors employ a screening process which selected for analysis all the studies of actual relevance to their research objective?	Yes	
Q6. Directness of evidence: did the reviewers apply a fair test of external validity to each of the studies included in their review?	Unclear	
Q7. Methodological quality of evidence: did the reviewers apply a fair test of internal validity to each of the studies included in their review?	Unclear	
Q8. Synthesis of evidence: did the authors combine, according to a valid methodology, the results, directness and methodological quality of evidence into a statement of what is and is not known in relation to the objective of the review?	Unclear	
Q9. Summation: is the summary section of the review representative of its main findings?	Yes	

Appendix C

Table 2

Finalized LRAT ratings for Air pollution and autism case study.

Air pollution and autism	Objective?	Protocol?	Interests?	Search Strategy?	Selection?	Directness of evidence	Methodological quality of evidence?	Synthesis of evidence?	Summation
Rossingol 2014	Unclear	Unsatisfactory	Unclear	Satisfactory	Satisfactory	Satisfactory	Unsatisfactory	Unclear	Unsatisfactory
Kalkbrenner 2014	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unclear	Satisfactory	Satisfactory	Unclear	Satisfactory	Unclear
Elisabet Suades-Gonzales 2015	Unsatisfactory	Unsatisfactory	Unsatisfactory	Satisfactory	Unclear	Satisfactory	Unsatisfactory	Satisfactory	Satisfactory

Table 3

Finalized LRAT ratings for PDBEs and ADHD & IQ case study.

PBDEs and ADHD & IQ	Objective?	Protocol?	Interests?	Search Strategy?	Selection?	Directness of evidence	Methodological quality of evidence?	Synthesis of evidence?	Summation
Roth 2014	Unsatisfactory	Unsatisfactory	Unclear	Unclear	Unclear	Satisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory
Berghius 2014	Unsatisfactory	Unsatisfactory	Unclear	Unclear	Unsatisfactory	Satisfactory	Unsatisfactory	Unclear	Unsatisfactory
Kim 2014	Unsatisfactory	Unsatisfactory	Unclear	Satisfactory	Unclear	Satisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory
de Cook 2012	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unclear	Unclear	Satisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory
Chao 2014	Unclear	Unsatisfactory	Unclear	Unsatisfactory	Unsatisfactory	Unclear	Unsatisfactory	Satisfactory	Unclear
Brandt 2012	Unclear	Unsatisfactory	Unsatisfactory	Unclear	Unsatisfactory	Unclear	Unsatisfactory	Unsatisfactory	Unclear
Muir 2013	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unclear	Unsatisfactory	Unsatisfactory	Unsatisfactory
Dzwilewski 2015	Unclear	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory	Satisfactory	Unsatisfactory	Unsatisfactory	Unclear
Pinson 2016	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unclear	Unsatisfactory	Unsatisfactory	Unsatisfactory
Vrijheida 2016	Unclear	Unsatisfactory	Unclear	Unclear	Unclear	Satisfactory	Unclear	Satisfactory	Unclear

Final Learning Objectives

Appendix D

Goal 1: To become more efficient in determining what makes a good systematic review				
Objectives (S)	Activities	Start/End Date	Who is Responsible	Tracking Measures
Help with LRAT	LRAT (Literature Review Appraisal Toolkit)	June-December 2016	Patrice Sutton/Natalyn Daniels	7 hours/week

Goal 2: To observe and network with those in different public health positions				
Objectives (S)	Activities	Start/End Date	Who is Responsible	Tracking Measures
Participate in day to day activities with the staff		June-December 2016	Patrice Sutton/Kristin Shiplet	1 hour/week

Goal 3: Effectively communicating and translating environmental health news, science, policy, etc.				
Objectives (S)	Activities	Start/End Date	Who is Responsible	Tracking Measures
Research Translation	Updating, translating website information for the public	June-December 2016	Patrice Sutton/Kristin Shiplet	1 hour/week

Goal 4: To be able to narrow down my interests in the reproductive environmental health field				
Objectives (S)	Activities	Start/End Date	Who is Responsible	Tracking Measures
Constant networking		June-December 2016	Patrice Sutton/Kristin Shiplet	1 hour/week

Master of Public Health Program FIELDWORK TIME LOG

Student Information	
Student's Name: Kristen Davis	Campus ID # 20344063
Student's Phone: 352-281-0046	Student's Email: kmdavis4@dons.usfca.edu
Preceptor Information	
Preceptor's Name: Patrice Sutton/Kristen Shiplet	Preceptor's Title: Academic Coordinator/Operations Manager
Preceptor's Phone: 415-476-3203/476-3209	Preceptor's Email: Patrice.Sutton@ucsf.edu / Kristin.Shiplet@ucsf.edu
Organization: University of California – San Francisco	
Student's Start Date: June 2016	Student's End Date: Hours/week: December 2016

Time Log for (Check One):

_____ **Summer 2015** _____**Fall 2015**

_____**X**_____ **Summer 2016** _____**Fall 2016**

Week	Total # of Hours for Week	Preceptor Initials
6/5-6/11	4	
6/12-6/18	3	
6/19-6/25	2	
6/26-7/2	2	
7/3-/7/9	2	
7/10-7/16	8	
7/17-7/23	9	
7/24-7/30	10	
7/31-8/6	11	
8/7-8/13	11	
8/14-8/20	11	
8/21-8/27	10	

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Time Log for (Check One):

_____ **Summer 2015** _____**Fall 2015**

_____ **Summer 2016** _____**X**_____**Fall 2016**

Week	Total # of Hours for Week	Preceptor Initials
8/28-9/3	10	
9/4-9/10	13	
9/11-9/17	10	
9/18-9/24	10	
9/25-10/1	18	
10/2-10/8	20	
10/9-10/15	18	
10/16-10/22	18	
10/23-10/29	17	
10/30-11/5	12	
11/6-11/12	19	
11/13-11/19	18	
11/20-11/26	16	
11/27-12/3	18	

Student Evaluation of Field Experience

Student Information	
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Please use the following key to respond to the statements listed below.

SA = Strongly Agree A = Agree D = Disagree SD = Strongly Disagree N/A = Not Applicable					
My Field Experience…					
Contributed to the development of my specific career interests	SA	A	D	SD	N/A
Provided me with the opportunity to carry out my field learning objective activities	SA	A	D	SD	N/A
Provided the opportunity to use skills obtained in MPH classes	SA	A	D	SD	N/A
Required skills I did not have Please list:	SA	A	D	SD	N/A
Required skills I have but did not gain in the MPH program Please list: Website development (Drupal)	SA	A	D	SD	N/A
Added new information and/or skills to my graduate education Please list:	SA	A	D	SD	N/A
Challenged me to work at my highest level	SA	A	D	SD	N/A
Served as a valuable learning experience in public health practice	SA	A	D	SD	N/A
I would recommend this agency to others for future field experiences.	Yes			NO	
My preceptor…					
Was valuable in enabling me to achieve my field learning objectives	SA	A	D	SD	N/A
Was accessible to me	SA	A	D	SD	N/A
Initiated communication relevant to my special assignment that he/she considered of interest to me	SA	A	D	SD	N/A
Initiated communication with me relevant to general functions of the agency	SA	A	D	SD	N/A

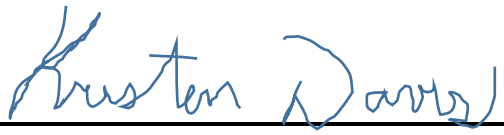
2. Would you recommend this preceptor for future field experiences? Please explain.

X Yes _____No _____Unsure

Patrice Sutton was a valuable resource, she is well educated on the subject of reproductive environmental health. Patrice is also very flexible so she works well around a student who may be working full time such as myself.

3. Please provide additional comments explaining any of your responses.

4. **Summary Report**: All students are required to prepare a written summary of the field work to be submitted with this evaluation form.



11/28/2016

Student Signature Date

MPH Program Competency Inventory

USF MPH Competencies	Notes
1. Assess, monitor, and review the health status of populations and their related determinants of health and illness.	
2. Demonstrate the ability to utilize the proper statistical and epidemiologic tools to assess community needs and program outcomes.	
3. Identify and prioritize the key dimensions of a public health problem by critically assessing public health literature utilizing both quantitative and qualitative sources.	LRAT (Literature Review Appraisal Toolkit) ~200 hours
4. Specify approaches for assessing, preventing, and controlling environmental hazards that pose risks to human health and safety.	
5. Apply theoretical constructs of social change, health behavior and social justice in planning community interventions.	
6. Articulate the relationship between health care delivery and financing, public health systems, and public policy.	
7. Apply evidence-based principles to the process of program planning, development, budgeting, management, and evaluation in public health organizations and initiatives.	LRAT (Literature Review Appraisal Toolkit) ~200 hours
8. Demonstrate leadership abilities as collaborators and coordinators of evidence based public health projects.	Becoming engaged in the day to day activities ~25 hours
9. Identify and apply ethical, moral, and legal principles in all aspects of public health practice.	Becoming engaged in the day to day activities ~25 hours
10. Develop public health programs and strategies responsive to the diverse cultural values and traditions of the communities being served.	Website (Translational Research) ~75 hours
11. Effectively communicate public health messages to a variety of audiences from professionals to the general public.	Website (Translational Research) Presentations about completed work periodically. ~75 hours
12. Advance the mission and core values of the University of San Francisco.	Upheld the mission and core values of USF throughout the whole internship. 300 hours