



## Evidencing the applicability of physiological monitoring for health management within occupational settings: protocol for a systematic review

Denisse Bustos<sup>a</sup>, J. C. Guedes<sup>b</sup>, J. C. Torres Costa<sup>c</sup>

<sup>a</sup>Associated Laboratory for Energy, Transports and Aeronautics (PROA/LAETA), University of Porto, Porto, PT, ([up201602357@fe.up.pt](mailto:up201602357@fe.up.pt)), ORCID: 0000-0002-4942-7625. <sup>b</sup>Associated Laboratory for Energy, Transports and Aeronautics (PROA/LAETA), University of Porto, Porto, PT, ([jccg@fe.up.pt](mailto:jccg@fe.up.pt)), ORCID: 0000-0003-2367-2187. <sup>c</sup>Associated Laboratory for Energy, Transports and Aeronautics (PROA/LAETA), University of Porto, Porto, PT, ([zecatoco@sapo.pt](mailto:zecatoco@sapo.pt))

### Article History

Received 1 February 2019  
Accepted 25 March 2019  
Published 5 April 2019

### Keywords

Physiological monitoring  
Occupational Health  
Systematic Review

### DOI:

[10.24840/2184-0954\\_003.001\\_0007](https://doi.org/10.24840/2184-0954_003.001_0007)

### ISSN:

2184-0954

### Type:

Protocol

 Open Access

 Peer Reviewed

 CC BY

### Abstract

**Background:** The resulting interaction between occupational stress and individual susceptibility to illness demands careful management. This represents a dual challenge to organizations responsible for the well-being of personnel who engage in strenuous physical exertion, imposing requirements to be vigilant for, or even curtail, situations that may result in high physiological strain. The emergence of wearable physiological and monitoring technologies could prove advantageous in this regard.

**Objectives:** A systematic review is proposed to summarize current progress in the development of physiological monitoring systems for occupational applications. Thus, adhering with the PRISMA-P Statement, this systematic review protocol aims to present adequate guidelines to develop research that can provide appropriate results to the sought objective.

**Data sources:** Five databases will be accessed (SCOPUS, PubMed, Science Direct, Academic Search Complete and Web of Science) and a total of 12 keywords will be combined.

**Study eligibility and criteria:** Working-age study participants will be included. Assessment procedures will be considered when they do not interfere with normal tasks development and involve harmless procedures. **Study appraisal and synthesis methods:** Two authors will screen titles and abstracts against the eligibility criteria at first, and full-texts of potentially eligible records at a second phase, followed by extraction of data from qualifying studies. Two review authors will also assess the risk of bias and the quality of evidence, taking as a reference the Cochrane Collaboration's Tool. This protocol is registered in PROSPERO under the code CRD42019119787.

## 1. BACKGROUND

Athletes must compete with very high metabolic demands in outdoor temperature extremes. Miners and steelworkers are exposed to high heat conditions (Butlewski, Dahlke, Drzewiecka, & Pacholski, 2015; Chen, Chen, Yeh, Huang, & Mao, 2003). Firefighters, first responders, and soldiers often wear personal protective equipment that imposes additional thermal burdens from insulation and additional carried weight (Buller, Welles, & Friedl, 2017; De Maio et al., 2009; Faff & Tutak, 1989) and are exposed to extreme environments, inadequate sleep, information overload, dehydration and even impaired nutritional status (Lieberman et al., 2005; Yokota, Karis, & Tharion, 2014). All the mentioned are known as common risks associated with many professions, including those for whom optimal functioning at all times is critical. These safety-sensitive occupations include firefighters, first responders, police officers, physicians, airline pilots, soldiers and those operating heavy machinery (Barger, Lockley, Rajaratnam, & Landrigan, 2009).

In any of these cases, the resulting interaction between occupational stress and individual susceptibility to illness demands careful management. This represents a dual challenge to organizations responsible for the well-being of personnel who engage in strenuous physical exertion, imposing requirements to be vigilant for, or even curtail, situations that may result in high physiological strain in healthy personnel and also to identify and protect vulnerable

individuals. The emergence and ubiquitous uptake of wearable physiological and medical monitoring devices might help to address this challenge but requires that the right questions are asked in sourcing, developing, validating and applying such technologies (Stacey, Hill, & Woods, 2018).

Wearable physiological monitoring can provide predictions about an individual's health and performance from their real-time physiological state (Raskovic, Martin, & Jovanov, 2004). This precision medicine approach offers major improvements in population-based predictions derived from ambient conditions and the general context of an operation. Advances in computing power and microelectronics make possible these improvements in human performance assessment, with real-time physiological measurement capabilities and data processing that can provide actionable and important information about the individual (Li et al., 2016).

Available commercial systems applied in research include accelerometers (ActiGraph wGT3X-BT (Compagnat, Mandigout, Chaparro, Daviet, & Salle, 2018)), heart rate monitors (Polar Heart Rate Sensors (Hernando, Garatachea, Almeida, Casajús, & Bailón, 2018)), temperature sensors (ingestible capsules CorTemp™ (Mündel, Carter, Wilkinson, & Jones, 2016)) and integrated sensors (Equivital LifeMonitor (Liu, Zhu, Wang, Ye, & Li, 2013)).

However, currently available systems mostly do not satisfy the requirements for occupational use. Even when these systems offer something more than raw physiological data, computed information is usually based on proprietary algorithms that cannot be properly reviewed and validated, making the output unusable (Friedl, 2018).

The critical component of a real-time physiological monitoring system (RT-PSM) is the algorithm that turns data into useful and actionable knowledge for a worker or a small unit leader. Useful information from an RT-PSM system is defined as vitally important alerts that can be acted on to affect the outcome of an operation or mission and improve safety and effectiveness (Friedl, 2018).

To our knowledge, no systematic review has been developed addressing the applicability of these systems within working activities. Therefore, a systematic review is proposed with the aim of finding relevant information about current progress in the development of these physiological monitoring systems and their potential applications for occupational settings.

## 2. OBJECTIVES

This systematic review will be developed with two main purposes:

- The first objective is to summarize current progress in the development of noninvasive physiological monitoring systems for occupational applications.
- The second objective is to evaluate the reliability of provided results along with the quality of reporting and risk of bias of the final included studies.

As a result, the proposed review seeks to achieve the next specific goals:

1. To identify the objectives of the included studies and present a qualitative categorization and comparison based on the context in which the investigation was developed.
2. To detect noninvasive physiological monitoring methods and assessed parameters.
3. To analyze data processing and assessment procedures.
4. To assess and quantify the quality and potential risks of bias of included studies.
5. To gather conclusions on the best assessment methods to be applied within occupational settings at the time of determining future research opportunities.

## 3. METHODS

### 3.1. Research Framework

This systematic review protocol adheres with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) Statement (Moher et al., 2015; Shamseer et al., 2015).

### 3.2. Eligibility criteria

#### **Type of studies**

The intended review will mostly consider research published articles and articles in press.

Since the primary goal is to find relevant information on the applicability of physiological monitoring systems, theoretical studies such as literature reviews, protocols, and conference papers will be excluded. Reviews will only be considered as a source of complementary information and references will be tracked in search of additional articles that fulfill the inclusion criteria.

#### **Type of participants**

The research will focus on investigations developed within working-age (15-64) participants.

It will include both female and male population with no additional restrictions.

#### **Methods of assessment**

Investigations will be considered when they apply a noninvasive objective physiological assessment method. In other words, a method that does not interfere with the normal sequence of activities and involves harmless procedures for participants.

#### **Language**

The review will include articles written in English only.

### 3.3. Information sources

The research will be performed within five electronic databases: SCOPUS, Science Direct, PubMed, Academic Search Complete and Web of Science.

In order to compile the up-to-date progress on currently available physiological monitoring systems, the search will be conducted on journal articles from January 2014 to January 2019.

Furthermore, this study will also look through the reference lists of the collected articles to search for additional records fulfilling the goals of the review. The procedure will be repeated until no more relevant outcomes can be found.

Finally, the research will also consider the institutions and affiliations from the previously selected studies in order to identify additional sources of ongoing or unpublished investigations and have a complete perspective on the latest developments on the area.

### 3.4. Search strategy

The review will aim to focus on publications that address physiological monitoring and its potential applications in occupational settings. Thus, identified keywords corresponds to two groups, referring to each of those topics: group (A) with "physiological monitoring", "noninvasive monitoring", "medical monitoring", "wearable sensors", and group (B) with "assessment", "occupational", "model", "fatigue", "algorithm", "worker", "training" and "physical exertion".

Keywords from both groups will be combined as follows:

(( ("physiolog\*monitor\*") OR ("noninvasive monitor\*") OR ("medical monitor\*") OR ("wearable sens\*")) AND ((assessment) OR (occupational) OR (model) OR (fatigue) OR (algorithm) OR (worker) OR (training) OR ("physical exertion")))

This query will be adapted to the different databases engine specifications, as shown in Annex 1.

Later, on a second phase, while the selected articles are analyzed, potential new keywords will be identified, and a new search will be performed. Correspondingly, references will also be consulted in order to identify older articles that could provide complementary information. This procedure will be repeated in the newly found records until no more relevant results are obtained. Furthermore, other studies from the authors of the primary articles included in the review will be accessed in order to find related investigations that fulfill the inclusion criteria.

Finally, following a third phase of research, other sources of ongoing or unpublished works will be identified and accessed. They will potentially include research institutions and affiliations from specific occupational groups referenced on the previously selected records.

### 3.5. Study records

#### **Data management**

Once the search is complete and the number of compiled articles is recorded in Table 1 (see Annex 2), selected investigations from each database will be exported for screening and eliminating repeated records. Both the title and abstracts will be examined. Then, taking into consideration the established selection criteria, full-text from the qualifying studies will be retrieved and assessed.

The number of records from every filter stage will be registered in Table 1 (see Annex 2). This will allow keeping track of every investigation from the first identified studies to the final selected studies along with the number of excluded articles from every applied criterion.

Records will be managed with the "EndNote" software.

#### **Selection process**

Two reviewers will independently search through selected databases and journals. After the combination of keywords is inserted, three phases of exclusion will take place:

- Through search filters, the following criterions will be applied:
  - Date: Articles published between January 2014 and January 2019. Nevertheless, for the previously mentioned second and third stages of the search process, no date restrictions will be considered.
  - Type of articles: Articles and Articles in Press.
  - Source type: Journals.
  - Language: English.
- Duplicated articles will be removed.
- Studies will be excluded if any of the next conditions are identified:
  - They do not pursue a prognostic or preventive health objective.
  - They are not applied within an active working-age population.
  - They only consider invasive methods of assessment.
  - They only apply subjective measures such as self-reports or surveys.

Subsequently, full-texts will be collected by the same reviewers with the purpose of extracting pertinent information to determine the fulfillment of the inclusion conditions. In that regarding, investigations will be included if both of the following criterions are met:

- They objectively assess physiological monitoring data collected through non-invasive methods, without interfering with regular activities development.
- Assessments are developed for prevention and predicting purposes and have potential application for working environments.

The exclusion of any article after a full-text assessment will be justified and recorded. Correspondingly, the selection of studies will be summarized in the PRISMA flow diagram ([Moher, Liberati, Tetzlaff, Altman, & The, 2009](#)).

#### **Data collection process**

From the final considered investigations, full-texts will be retrieved with the objective of collecting information of interest.

Extracted information will include:

1. Study general information: authors, affiliations, publication year, country.
2. Sample characteristics: size, gender distribution, mean age, occupational group under study.
3. Context: in field/ laboratory conditions; associated risks and stressors.

4. Study primary characteristics: goals, considered physiological parameters, other assessed parameters, procedures/methods, specific outcome assessments, conclusions, equipment, and software.
5. Major study limitations.
6. Quality assessment: potential risks of bias (risk of selection bias, precision, risk of information bias, risk of investigator bias), reporting (assessment of the overall study quality), internal validity (assessment of bias due to study sample selection and/or confounding), external validity (assessment of whether the study results are generalizable), power (assessment of whether study results could be obtained by chance).

Specifically designed Excel spreadsheet with tables will be used to compile extracted data. This process will be performed by one reviewer and verified by another.

### **3.6. Data items**

Summary tables will be elaborated with the topics outlined in the previous section, essentially: reference and country, sample size, gender distribution and mean age range, occupational group, specific outcome assessments, study goals, conclusions, measured parameters and equipment, and software.

### **3.7. Outcomes and prioritization**

From this intended study, the following primary outcomes are expected:

1. To determine current progress on physiological monitoring procedures.
2. To identify the methods and equipment of measurement.
3. To identify the most studied occupational groups.
4. To identify performance and readiness applications and potential health and medical management applications.
5. To examine the quality of outcomes from non-invasive physiological monitoring procedures for laboratory and field conditions.

Additionally, as a secondary outcome, other evaluated parameters will be observed and the correspondence of results with previously identified variables will be determined. Lastly, the most frequently evaluated parameters will be identified and if possible, a comparison of outcomes from different studies will be made.

### **3.8. Risk of bias in individual studies**

The risk of bias will be assessed individually for this study. Two stages will take place along the assessment. Initially, the primary characteristics of each study will be identified and analyzed in accordance with the sought aims of this review. Considered parameters will include main purposes, assessed variables, specific outcome assessments, used equipment and software, assessment procedure.

Next, taking as a reference the Cochrane Collaboration's Tool ([Higgins et al., 2011](#)) for assessing the risk of bias (Table 1 in Annex 3), methodological issues will be addressed; ethical standards fulfillment, sample justification, clear description of the experimental procedure and practical difficulties.

Each of the selected topics will be ranged by 'yes', 'no' or 'unclear', this last one evidencing that information is not sufficient to determine the fulfillment of the criteria.

Studies presenting more positive answers to the established criteria will be the ones considered as the most suitable for the objectives of this review.

### **3.9. Data Synthesis**

If retrieved data permits it, a meta-analysis will be performed. Otherwise, a narrative synthesis will be conducted with basis on assembled data tables (with information from the selected publications), in which the main objective will be to present the physiological assessment procedures and the relevance of their outcomes. Bias will also be examined when analyzing the data.

The checklist from The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) Statement is going to delimitate this process (Moher et al., 2009).

### 3.10. Meta-bias (es)

If qualifying articles permit the establishment of a meta-analysis, a meta-bias will be conducted later.

### AUTHORS' CONTRIBUTIONS

Study design and development: DB, JCG, JTC. Title and abstract screening: DB, JCG. Full-text screening: DB, JCG, JTC. Data extraction: DB, JCG, JTC. Critical appraisal: DB, JCG. Data analysis and interpretation: DB, JCG. Draft of the protocol: DB. Support in draft's development: DB, JCG, JTC. All authors approved the final version.

### Funding

This work was accomplished during the period of a research scholarship granted by the Doctoral Program of Occupational Safety and Health of the University of Porto.

### REFERENCES

- Barger, L. K., Lockley, S. W., Rajaratnam, S. M., & Landrigan, C. P. (2009). Neurobehavioral, health, and safety consequences associated with shift work in safety-sensitive professions. *Current neurology and neuroscience reports*, 9(2), 155-164.
- Buller, M. J., Welles, A. P., & Friedl, K. E. (2017). Wearable physiological monitoring for human thermal-work strain optimization. *Journal of applied physiology*, 124(2), 432-441.
- Butlewski, M., Dahlke, G., Drzewiecka, M., & Pacholski, L. (2015). Fatigue of miners as a key factor in the work safety system. *Procedia Manufacturing*, 3, 4732-4739.
- Chen, M.-L., Chen, C.-J., Yeh, W.-Y., Huang, J.-W., & Mao, I.-F. (2003). Heat stress evaluation and worker fatigue in a steel plant. *AIHA Journal*, 64(3), 352-359.
- Compagnat, M., Mandigout, S., Chaparro, D., Daviet, J. C., & Salle, J. Y. (2018). Validity of the Actigraph GT3x and influence of the sensor positioning for the assessment of active energy expenditure during four activities of daily living in stroke subjects. *Clinical rehabilitation*, 32(12), 1696-1704. doi:10.1177/0269215518788116
- De Maio, M., Onate, J., Swain, D., Morrison, S., Ringleb, S., & Naiak, D. (2009). *Physical performance decrements in military personnel wearing personal protective equipment (PPE)*. Retrieved from
- Faff, J., & Tutak, T. (1989). Physiological responses to working with fire fighting equipment in the heat in relation to subjective fatigue. *Ergonomics*, 32(6), 629-638.
- Friedl, K. E. (2018). Military applications of soldier physiological monitoring. *Journal of Science and Medicine in Sport*. doi:<https://doi.org/10.1016/j.jsams.2018.06.004>
- Hernando, D., Garatachea, N., Almeida, R., Casajús, J. A., & Bailón, R. (2018). Validation of heart rate monitor Polar RS800 for heart rate variability analysis during exercise. *The Journal of Strength & Conditioning Research*, 32(3), 716-725. doi:10.1519/JSC.0000000000001662
- Higgins, J. P., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., Oxman, A. D., . . . Sterne, J. A. (2011). The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *Bmj*, 343, d5928.
- Li, R. T., Kling, S. R., Salata, M. J., Cupp, S. A., Sheehan, J., & Voos, J. E. (2016). Wearable Performance Devices in Sports Medicine. *Sports Health*, 8(1), 74-78. doi:10.1177/1941738115616917
- Lieberman, H. R., Bathalon, G. P., Falco, C. M., Kramer, F. M., Morgan III, C. A., & Niro, P. (2005). Severe decrements in cognition function and mood induced by sleep loss, heat, dehydration, and undernutrition during simulated combat. *Biological psychiatry*, 57(4), 422-429.
- Liu, Y., Zhu, S. H., Wang, G. H., Ye, F., & Li, P. Z. (2013). Validity and reliability of multiparameter physiological measurements recorded by the Equival LifeMonitor during activities of various intensities. *J Occup Environ Hyg*, 10(2), 78-85.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The, P. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLOS Medicine*, 6(7), e1000097. doi:10.1371/journal.pmed.1000097
- Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., . . . Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic reviews*, 4(1), 1.

gastro-intestinal tract temperatures during moderate-intensity cycling in temperate and hot conditions. *Clinical Physiology and Functional Imaging*, 36(1), 11-16. doi:10.1111/cpf.12187

Raskovic, D., Martin, T., & Jovanov, E. (2004). Medical monitoring applications for wearable computing. *The computer journal*, 47(4), 495-504. doi:<https://doi.org/10.1093/comjnl/47.4.495>

Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., . . . Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *Bmj*, 349, g7647.

Stacey, M. J., Hill, N., & Woods, D. (2018). Physiological monitoring for healthy military personnel: British Medical Journal Publishing Group.

Yokota, M., Karis, A. J., & Tharion, W. J. (2014). Thermal-work strain in law enforcement personnel during chemical, biological, radiological, and nuclear (CBRN) training. *Int J Occup Environ Health*, 20(2), 126-133. doi:10.1179/2049396714y.0000000056

**Annex 1:**

**Search strategy**

**SCOPUS**

(( TITLE-ABS-KEY ( "physiolog\*monitor\*" ) OR TITLE-ABS-KEY ( "noninvasive monitor\*" ) OR TITLE-ABS-KEY ( "medical monitor\*" ) OR TITLE-ABS-KEY ( "wearable sens\*" ) ) AND ( TITLE ( assessment ) OR TITLE-ABS-KEY ( occupational ) OR TITLE ( model ) OR TITLE-ABS-KEY ( fatigue ) OR TITLE ( algorithm ) OR TITLE-ABS-KEY ( worker ) OR TITLE-ABS-KEY ( training ) OR TITLE-ABS-KEY ( "physical exertion" ) ) )

**Pubmed**

((("physiological monitoring"[All Fields]) OR ("noninvasive monitoring"[All Fields]) OR ("wearable sensor"[All Fields]) OR ("medical monitoring"[All Fields])) AND ((assessment[Title]) OR (occupational[All Fields]) OR (model[Title]) OR ("fatigue"[All Fields]) OR (algorithm[Title]) OR (worker[All Fields]) OR ("training"[All Fields]) OR ("training"[All Fields]) OR ("physical exertion"[All Fields]))

**SCIENCE DIRECT**

("physiological monitoring" OR "noninvasive monitoring" OR "wearable sensors" OR "medical monitoring") AND (TITLE(assessment) OR occupational OR TITLE(model) OR fatigue OR TITLE(algorithm) OR worker OR training OR "physical exertion")

**Web of Science**

(TS=("physiolog\* monitor\*") OR TS=("noninvasive monitor\*") OR TS=("wearable sens\*") OR TS=("medical monitor\*")) AND (TI=(assessment) OR TS=(occupational) OR TI=(model) OR TS=(fatigue) OR TI=(algorithm) OR TS=(worker) OR TS=(training) OR TS=("physical exertion"))

**Academic Search Complete**

(AB "physiolog\* monitor\*" OR AB "noninvasive monitor\*" OR AB "wearable sens\*" OR AB "medical monitor\*") AND (TI assessment OR AB occupational OR TI model OR AB fatigue OR TI algorithm OR AB worker OR AB training OR AB "physical exertion")

**Annex 2**

**Table 1 - Form sheet summarizing the proposed rejection criteria**

Summary of collected articles	Summary of selected articles	Summary of rejected articles	Summary of Total Rejected Items						Database	Keywords combination										
			Date	Type of document	Source type	Language	Other	Out of topic		n° of selected articles	n° of collected articles	n° of articles included after criteria								
												Date	Type of document	Source type	Language	Other	Out of topic			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



### Annex 3

**Table 1 - The Cochrane Collaboration's tool for assessing the risk of bias.**

Domain	Support for judgement	Review authors' judgement
<i>Selection bias.</i>		
<b>Random sequence generation.</b>	Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.	Selection bias (biased allocation to interventions) due to inadequate generation of a randomized sequence.
<b>Allocation concealment.</b>	Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrolment.	Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment.
<i>Performance bias.</i>		
<b>Blinding of participants and personnel</b> <i>Assessments should be made for each main outcome (or class of outcomes).</i>	Describe all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective.	Performance bias due to knowledge of the allocated interventions by participants and personnel during the study.
<i>Detection bias.</i>		
<b>Blinding of outcome assessment</b> <i>Assessments should be made for each main outcome (or class of outcomes).</i>	Describe all measures used, if any, to blind outcome assessors from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective.	Detection bias due to knowledge of the allocated interventions by outcome assessors.
<i>Attrition bias.</i>		
<b>Incomplete outcome data</b> <i>Assessments should be made for each main outcome (or class of outcomes).</i>	Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported, and any re-inclusions in analyses performed by the review authors.	Attrition bias due to amount, nature or handling of incomplete outcome data.
<i>Reporting bias.</i>		
<b>Selective reporting.</b>	State how the possibility of selective outcome reporting was examined by the review authors, and what was found.	Reporting bias due to selective outcome reporting.
<i>Other bias.</i>		
<b>Other sources of bias.</b>	State any important concerns about bias not addressed in the other domains in the tool.  If questions/entries were pre-specified in the review's protocol, responses should be provided for each question/entry.	Bias due to problems not covered elsewhere in the table.