**PROVIDING TRANSPARENCY IN SYSTEMATIC REVIEW METHODS: THE CASE FOR PROTOCOL REGISTRATION**

Well conducted systematic reviews are generally considered to be the best quality research evidence to inform policy and practice.(1) Systematic review methods involve a consistent, transparent and reproducible approach to identifying, evaluating and summarizing the evidence on a topic.(2, 3) But how can editors, peer reviewers, clinicians, guideline developers and policy makers, tell whether a systematic review is well conducted?

There is evidence of publication and selective outcome reporting biases in systematic reviews. For example in a study comparing the outcomes planned with those reported in the published review, 22% were found to have discrepancies in at least one outcome measure.(4) Potential bias from changes being made after seeing the results from individual trials was found in 29% of the reviews examined; and outcomes promoted from secondary in the protocol to primary in the review report were more likely to be significant than if there was no discrepancy. The findings of this and other studies have also highlighted a problem with poor reporting of systematic reviews.(5-7) This has prompted a number of initiatives aimed at addressing these issues and helping the reader assess robustness for themselves.

The Preferred Reporting Items for Systematic review and Meta-analysis (PRISMA) guideline was published in 2009 with the aim of improving reporting standards.(8, 9) Many journals now make a PRISMA flowchart and checklist mandatory with the submission of systematic review manuscripts. On the back of this, PRISMA-A guidelines for reporting review abstracts and PRISMA-P for reporting review protocols were published.(10-12) Most major publishers, including Wiley, promote the use of reporting guidelines. The Equator network provides free, comprehensive access to current reporting guidelines for a variety of study methods ([www.equator-network.org/](http://www.equator-network.org/)). In a wider movement to improve the transparency of methods and quality of reporting research, journals that publish systematic reviews are increasingly requiring details of protocol registration as part of the submission process.

PROSPERO, an international prospective register of systematic review protocols was launched in Feb 2011 ([www.crd.york.ac.uk/PROSPERO/](http://www.crd.york.ac.uk/PROSPERO/)).(13, 14) A protocol, a detailed plan of how the review will be carried out, is essential for a systematic review to be well conducted. While the many different biases that can impact a review cannot be eliminated, steps can be taken to minimise their effect. Making details of the protocol available in advance through public registration provides readers with the opportunity to compare the final report with what was planned and identify potential biases. To ensure prospective recording of planned intentions, ideally, registration should be before formal screening against inclusion criteria has started, but reviews are eligible for registration provided that data extraction has not yet started.

PROSPERO provides a dedicated web-based interface that is electronically searchable, giving open access to registered review protocols from around the world. Protocols for systematic reviews assessing interventions (Including qualitative and individual participant data reviews), diagnostic accuracy, prognostic factors, prevention, epidemiological reviews relevant to health and social care, public health, service delivery in health and social care, methodology, provided there is an outcome of clear relevance to the health of humans are accepted. Systematic review protocols can include any type of any study design. Reviews of reviews and reviews of methodological issues that contain at least one outcome of direct patient or clinical relevance are also accepted. Scoping reviews are excluded as originally the focus of the register was on systematic reviews of effectiveness; volume of submissions current prevents consideration of their inclusion. In addition to registrations from individual review teams around the world, protocols from the major organisations producing reviews such as the Cochrane Collaboration, and the Joanna Briggs Institute are included in the register.

The registration dataset captures the key elements of review design and administrative details necessary for registration. Submitted registration forms are checked against the scope for inclusion in PROSPERO and for clarity of content before being made publicly available on the register, rejected, or returned to the applicant for clarification. Submissions are not peer reviewed as part of this process and can therefore vary in level of detail and quality. The public records include an audit trail of major changes to planned methods, details of when the review has been completed, and links to resulting publications when provided by the authors. In addition to providing a single site for searching for on-going reviews, PROSPERO records are permanent, so that even if the findings of a registered review are never published and/or referenced in the registration record, details of the review team are available for users to contact.

Protocol registration not only helps in reducing bias by providing transparency but can also help avoid unplanned duplication. Minimising waste is high on research agendas around the world.(15) A study that found 49 out of 73 (67%) reviews had overlapping meta-analyses on the same topic, concluded that while some independent replication can be justified, research resources are being wasted.(16) There are justifiable reasons for repeating or undertaking complementary systematic reviews and meta-analyses, but these should be planned and undertaken in the full knowledge of existing and ongoing reviews.(17, 18) PROSPERO provides researchers, funders and commissioners with free searchable access to details of what is already being addressed and when the results are likely to be available. Timely checking helps to avoid unplanned duplication.

A final advantage of protocol registration is that by detailing review methods in a publicly available record, authors can refer to the registration record in their manuscript and use the saved word count to focus on the presentation of the results, analysis and discussion.

Registration of a review protocol, and/or making a protocol publicly available such as on an organisational website or by publication in a journal, is a major step in providing the transparency necessary to show editors, peer reviewers, clinicians, guideline developers and policy makers, that a systematic review is well conducted and the findings can be relied upon. Registration on PROSPERO is free to all.

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