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To cite this article: Vivian Welch, Mark Petticrew, Jennifer Petkovic, David Moher, Elizabeth Waters, Howard White, Peter Tugwell & the PRISMA-Equity Bellagio group (2016) Extending the PRISMA statement to equity-focused systematic reviews (PRISMA-E 2012): explanation and elaboration, Journal of Development Effectiveness, 8:2, 287-324, DOI: [10.1080/19439342.2015.1113196](https://doi.org/10.1080/19439342.2015.1113196)

To link to this article: <https://doi.org/10.1080/19439342.2015.1113196>



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Published online: 29 Jan 2016.



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Extending the PRISMA statement to equity-focused systematic reviews (PRISMA-E 2012): explanation and elaboration

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The promotion of health equity, the absence of avoidable and unfair differences in health outcomes, is a global imperative. Systematic reviews are an important source of evidence for health decision-makers, but have been found to lack assessments of the intervention effects on health equity. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) is a 27-item checklist intended to improve the transparency and reporting of systematic reviews. We developed an equity extension for PRISMA (PRISMA-E 2012) to help systematic reviewers identify, extract, and synthesise evidence on equity in systematic reviews. In this explanation and elaboration paper we provide the rationale for each extension item. These items are additions or modifications to the existing PRISMA Statement items, in order to incorporate a focus on equity. An example of good reporting is provided for each item as well as the original PRISMA item. This explanation and elaboration document is intended to accompany the PRISMA-E 2012 Statement and the PRISMA Statement to improve understanding of the reporting guideline for users. The PRISMA-E 2012 reporting guideline is intended to improve the transparency and completeness of the reporting of equity-focused systematic reviews. Improved reporting can lead to better judgement of applicability by policymakers, which may result in more appropriate policies and programmes and may contribute to reductions in health inequities. To encourage wide dissemination of this article it is accessible on the International Journal for Equity in Health, Journal of Clinical Epidemiology, and Journal of Development Effectiveness websites.

Keywords: systematic reviews; health equity; reporting guidelines; research methodology

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Introduction

Promoting health equity and reducing avoidable health inequalities is a global imperative, endorsed by the Rio Summit in Brazil in 2011, the Pan American Health Organization, and the World Health Organization (“Rio Political Declaration 2011”; PAHO 2009; WHO 2012). Health inequalities are differences in health outcomes across individuals in a population or between different population groups, whereas health inequities are inequalities that are avoidable and unfair (Whitehead 1992; Petticrew et al. 2004). Inequities are not only due to poverty, but may also be due to unfair differences in health across other characteristics such as sex/gender, geography, and ethnicity (O’Neill et al. 2014). The concept of health equity also suggests that groups of people should not be prevented from achieving health due to factors such as discrimination or inadequate access. In this reporting guideline, we focus on unfair inequalities in health outcomes and therefore use the term ‘equity’. See [Box 1](#) for a description of the terminology related to disadvantaged populations that is used in this paper.

Systematic reviews are recognised as an important source of rigorously and transparently synthesised information by health decision-makers (PAHO 2009; Kelly et al. 2007; Lavis 2009; PAHO 2007). Health decision-makers have described lack of evidence on equity as a barrier to using systematic reviews and guidelines (Petticrew et al. 2004; Vogel et al. 2013), and arguably, primary studies themselves. However, a 2010 systematic review found that there is a lack of detail in the reporting of certain aspects important to health equity including population characteristics, assessment of credibility of subgroup analyses, and judgement about the applicability of the findings to other settings with fewer than half of the included reviews reporting on socio-demographic characteristics (such as age, sex, place of residence, ethnicity) of the study populations (Welch et al. 2010b). These are important factors to consider for health equity and the lack of reporting of these elements demonstrates the need to improve reporting of equity in systematic reviews, and to increase the overall investment in systematic reviews that can provide a clear emphasis on considerations of equity.

Reporting guidelines have been shown to improve the reporting of different study designs (Turner et al. 2012; Panic et al. 2013). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is a 27-item checklist to ensure complete and transparent reporting of the methods used in systematic reviews (Moher et al. 2009). However, the original PRISMA Statement did not include items specific for reporting on considerations of equity. Equity considerations include the definition of disadvantaged populations, methods to include equity considerations in analyses, and applicability of the evidence to other settings or populations. We developed an equity extension of the PRISMA Statement, called PRISMA-E 2012, to respond to these needs (Welch et al. 2012b). As of 8 July 2015, the PRISMA-E 2012 reporting guideline has been viewed almost 16,000 times, downloaded 2661 times, cited 50 times (Scopus), and shared 109 times using Twitter (99 tweets by 70 users according to Altmetrics). It is also cited as a reference for the World Health Organization Handbook on Guideline Development, the Oxford Textbook of Public Health, the Public Health Agency of Canada guidance, the Canadian Institutes of Health Research instructions for applicants, and the Journal of the Society for Social Work and Research. The Spanish version of PRISMA-E 2012, published in July 2013, has been downloaded 477 times as of 17 November 2014 (Scielo) and has received 1474 visits on the journal’s website (Welch et al. 2013).

Box 1: Terminology related to disadvantaged populations

To describe the populations who are experiencing inequitable differences, we use the term ‘disadvantaged’ although we recognise that this term may not be acceptable to all. In a methodology review of equity assessment, disadvantage was defined in terms of the avoidability or preventability of health inequalities (12 of 34 studies) (Welch et al. 2010b) by focusing on populations that have experienced health inequities (e.g. Aboriginal populations).

We have chosen to use the term ‘disadvantaged’ for PRISMA-E 2012 because we felt that despite its limitations (e.g. that it may be considered a condescending or paternalistic term), the term ‘disadvantaged’ more clearly defines a population that is experiencing or has experienced health inequities. Vulnerability encompasses a combination of risk, exposure, and resilience that do not always lead to health inequities, and other terms such as ‘marginalised’ are too narrowly focused and do not encompass the breadth of settings, contexts, and health inequities of interest.

To further facilitate and promote the use of the guideline of equity issues in systematic review (PRISMA-E 2012), we developed this explanation and elaboration to describe each of the items and provide examples from existing reviews to demonstrate good reporting.

Scope of PRISMA-E 2012

The PRISMA-E 2012 checklist was developed to improve the transparency and completeness of the reporting of systematic reviews of intervention studies with a focus on health equity. We define systematic reviews of intervention studies with a major focus on health equity as those designed to:

- (1) Assess the effects of interventions targeted at disadvantaged or at-risk populations (e.g. school feeding for disadvantaged children (Miller, Maguire, and Macdonald 2011)). These may not include equity outcomes, but by targeting disadvantaged populations they will reduce inequities.
- (2) Assess the effects of interventions aimed at reducing social gradients across populations or among subgroups of the population (e.g. interventions to reduce the social gradient in smoking, obesity prevention in children, interventions delivered by lay health workers (Welch et al. 2012b; Thomas et al. 2008; Thomson et al. 2010; Waters et al. 2011)).

In the PRISMA-E 2012 Statement we had a third type of systematic review focused on health equity, those that are not aimed at reducing inequities but where it may be important to understand the equity effects. For example, we had previously categorised the review examining lay health workers in this category. We have now grouped this review into the second type of review described above.

In 2010, approximately 20 per cent of systematic reviews indexed in Medline met at least one of the above criteria (Tsikata et al. 2003; Welch et al. 2010a). These reviews may

not include equity as an outcome, but may target disadvantaged populations, or assess differences of the effect of the intervention among disadvantaged populations.

The PRISMA-E 2012 items are focused on health equity, but may also apply to systematic reviews in non-health areas that address questions about inequity such as education, transport, justice, or social welfare. Additionally, some items in the checklist may be relevant to all systematic reviews, but have been included in this extension because of their specific importance to health equity. These items are additions or modifications to the existing PRISMA Statement items, in order to incorporate a focus on equity. For each item, the original PRISMA item is listed and the PRISMA-E 2012 extension item is noted below.

Methods of PRISMA-E 2012 reporting guideline

To develop the PRISMA-E 2012 reporting guideline, we followed the series of steps recommended by Moher and colleagues (2010), as reported in the previously published paper (Moher et al. 2010). The first step was to identify need and review the literature. We conducted a systematic review and a methodological study (Welch et al. 2010a, 2012c). Next, we conducted an online survey whose respondents included systematic review authors, policymakers, and systematic review funders (Welch et al. 2012b). Finally, we held a consensus meeting of international experts from 9 to 10 February 2012 at the Rockefeller Foundation's Bellagio Conference Centre in Bellagio, Italy. We took detailed minutes at the meeting and used these minutes to revise the PRISMA-E statement and develop this explanation and elaboration document. The complete PRISMA-E 2012 checklist is provided in Table 1.

Table 1. Checklist of items for reporting equity-focused systematic reviews.

Section	Item	Standard PRISMA Item	Extension for Equity-Focused Reviews
Title			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	Identify equity as a focus of the review, if relevant, using the term equity.
Abstract			
Structured summary	2	2. Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	State research question(s) related to health equity.
	2A		Present results of health equity analyses (e.g. subgroup analyses or meta-regression).
	2B		Describe extent and limits of applicability to disadvantaged populations of interest.

(Continued)

Table 1. (Continued).

Section	Item	Standard PRISMA Item	Extension for Equity-Focused Reviews
Introduction Rationale	3	Describe the rationale for the review in the context of what is already known.	Describe assumptions about mechanism(s) by which the intervention is assumed to have an impact on health equity.
	3A		Provide the logic model/analytical framework, if done, to show the pathways through which the intervention is assumed to affect health equity and how it was developed.
Objectives	4	Provide an explicit statement of questions being addressed with reference to PICOS.	Describe how disadvantage was defined if used as criterion in the review (e.g. for selecting studies, conducting analyses, or judging applicability).
	4A		State the research questions being addressed with reference to health equity
Methods Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g. web address), and, if available, provide registration information including registration number.	
Eligibility criteria	6	6. Specify study characteristics (e.g. PICOS, length of follow-up) and report characteristics (e.g. years considered, language, publication status) used as criteria for eligibility, giving rationale.	Describe the rationale for including particular study designs related to equity research questions.
	6A		Describe the rationale for including the outcomes (e.g. how these are relevant to reducing inequity).
Information sources	7	Describe all information sources (e.g. databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	Describe information sources (e.g. health, non-health, and grey literature sources) that were searched that are of specific relevance to address the equity questions of the review.
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Describe the broad search strategy and terms used to address equity questions of the review.
Study selection	9	State the process for selecting studies (i.e. screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	

(Continued)

Table 1. (Continued).

Section	Item	Standard PRISMA Item	Extension for Equity-Focused Reviews
Data collection process	10	Describe the method of data extraction from reports (e.g. piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g. PICOS, funding sources) and any assumptions and simplifications made.	List and define data items related to equity, where such data were sought (e.g. using PROGRESS-Plus or other criteria, context).
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g. risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g. I^2) for each meta-analysis.	Describe the methods of synthesising findings on health inequities (e.g. presenting both relative and absolute differences between groups).
Risk of bias across studies	15	15. Specify any assessment of risk of bias that may affect the cumulative evidence (e.g. publication bias, selective reporting within studies).	
Additional analyses	16	Describe methods of additional analyses (e.g. sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	Describe methods of additional synthesis approaches related to equity questions, if done, indicating which were pre-specified
Results			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g. study size, PICOS, follow-up period) and provide the citations.	Present the population characteristics that relate to the equity questions across the relevant PROGRESS-Plus or other factors of interest.
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see item 12).	

(Continued)

Table 1. (Continued).

Section	Item	Standard PRISMA Item	Extension for Equity-Focused Reviews
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group; (b) effect estimates and confidence intervals, ideally with a forest plot.	
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	Present the results of synthesising findings on inequities (see 14).
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g. sensitivity or subgroup analyses, meta-regression [see item 16]).	Give the results of additional synthesis approaches related to equity objectives, if done, (see 16).
Discussion Summary of evidence	24	Summarise the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g. health-care providers, users, and policymakers).	
Limitations	25	Discuss limitations at study and outcome level (e.g. risk of bias), and at review-level (e.g. incomplete retrieval of identified research, reporting bias).	
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	Present the extent and limits of applicability to disadvantaged populations of interest and describe the evidence and logic underlying those judgments.
	26A		Provide implications for research, practice, or policy related to equity where relevant (e.g. types of research needed to address unanswered questions).
Funding Funding	27	Describe sources of funding for the systematic review and other support (e.g. supply of data); role of funders for the systematic review.	

Note: This checklist should be read in conjunction with the Statement and Explanation and Elaboration document.

PICOS, participants, interventions, comparisons, outcomes, and study design.

How to use this paper

The format of this document is similar to the format used in other explanation and elaboration documents (Altman et al. 2001; Bossuyt et al. 2003; Vandembroucke et al. 2007; Liberati et al. 2009; Boutron et al. 2008). We feel this explanation and elaboration paper is an important contribution to the literature because it provides the detailed rationale, evidence, whenever available, and an exemplar, for recommending each item as well as examples of good practice. We recommend authors use this document in conjunction with the PRISMA-E 2012 statement and with the original PRISMA statement and explanation and elaboration papers. We use the term ‘we’ to refer to the consensus panel that met to finalise the PRISMA-Equity 2012 reporting guidelines in February 2012, as well as those who were unable to attend but contributed to the final reporting guidelines.

Item 1: title

Standard PRISMA item. Identify the report as a systematic review, meta-analysis or both.

In addition, for equity-focused systematic reviews: Identify equity as a focus of the review, if relevant, using the term equity.

Examples

- ‘Inequity in childhood immunization in India: a systematic review’ (Mathew 2012)
- ‘Can cost-effectiveness analysis integrate concerns for equity? Systematic review’ (Johri and Norheim 2012)

Explanation – Equity-focused systematic reviews need a concise title that includes the term ‘equity’ or ‘inequity’. At the consensus meeting, the panel felt strongly that a consistent term was needed in the title to help identify equity-focused reviews and we chose the term ‘equity’ because of our focus on unfair inequalities in health. Indexing of electronic databases is poor for terms relating to health equity or disadvantaged or vulnerable populations; therefore we suggest including ‘equity’ in the title will facilitate searching for equity-focused reviews. Not all systematic reviews will include equity in the title; thus, to improve searchability, ‘equity’ should be included in the abstract and/or keywords. This will also help policymakers find equity-focused systematic reviews. In a search of systematic reviews published in the last year in MEDLINE, we only found 11 with ‘equity’ in the title and 73 with equity in the title and/or abstract (Table 2).

Table 2. Systematic reviews with equity in the title (28 November 2013 to 27 November 2014).

Query	Items Found
(equit*[ti] OR inequit*[ti]) AND (MEDLINE[Title/Abstract] OR (systematic[Title/Abstract] AND review[Title/Abstract]) OR meta-analysis[Publication Type])	11
(equit*[Title/Abstract] OR inequit*[Title/Abstract]) AND (MEDLINE[Title/Abstract] OR (systematic[Title/Abstract] AND review[Title/Abstract]) OR meta-analysis[Publication Type])	73
(MEDLINE[Title/Abstract] OR (systematic[Title/Abstract] AND review[Title/Abstract]) OR meta-analysis[Publication Type])	19885

Item 2: abstract

Standard PRISMA item. Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.

In addition, for equity-focused systematic reviews: State research question(s) related to health equity.

Example

- ‘We aimed to systematically assess current evidence for the association between socioeconomic position (SEP) and caries. We included studies investigating the association between social position (determined by own or parental educational or occupational background, or income) and caries prevalence, experience, or incidence.’ (Schwendicke et al. 2014)
- ‘Our primary outcome is the utilization of [post-natal care] PNC services, and determinants of concern are: 1) socioeconomic status (for example, income, education); 2) geographic determinants (for example, distance to a health center, rural versus urban residence); and 3) demographic determinants (for example, ethnicity, immigration status)’ (Langlois et al. 2013)

Explanation – The abstract of the review needs to indicate whether the research questions and objectives are of relevance to equity or specific populations since some readers, including those making decisions about health programmes and policies, may only have access to the abstract (or only read the abstract). Thus, we recommend research questions related to health equity should be reported in the abstract to facilitate their retrieval for decision-making. We also recommend describing the type of inequities addressed by the review (e.g. health outcomes, health service coverage or access, financial risk).

Item 2A: in addition, for equity-focused systematic reviews: Present results of health equity analyses (e.g. subgroup analyses or meta-regression).

Example

- ‘No strong evidence of differential effects was found for smoking restrictions in workplaces and public places, although those in higher occupational groups may be more likely to change their attitudes or behaviour. Smoking restrictions in schools may be more effective in girls. Restrictions on sales to minors may be more effective in girls and younger children. Increasing the price of tobacco products may be more effective in reducing smoking among lower income adults and those in manual occupations, although there was also some evidence to suggest that adults with higher levels of education maybe more price sensitive. Young people aged under 25 are also affected by price increases, with some evidence that boys and non-white young people may be more sensitive to price.’ (Thomas et al. 2008)

Explanation – Findings related to equity questions should be presented in the abstract along with the main results. In addition, the abstract needs to differentiate between the main analyses and other analyses as well as any null findings. Of the 182 abstracts, 42 per cent do not describe the direction of the main effect in words, and 25 per cent do not provide numerical results (Beller et al. 2011). For equity-focused reviews, we have

found that equity findings (e.g. subgroup analyses by socioeconomic status or other indicators) are not well reported in the abstract. Including the equity findings in the abstract may facilitate finding equity-focused reviews. As mentioned above, some readers only read or have access to the abstract. We felt that including equity findings in the abstract will be helpful for users to determine whether the review is of interest. Therefore, the abstract should describe all relevant effects on health equity, both beneficial and harmful, as well as the methods used to assess health equity (White, Adams, and Heywood 2009).

As recommended by PRISMA for abstracts (Beller et al. 2013), the authors should report the main results in both numbers and words to meet the needs of different users.

Item 2B: in addition, for equity-focused systematic reviews: Describe extent and limits of applicability to disadvantaged populations of interest.

Example

- ‘Conditional cash transfer programmes have been the subject of some well-designed evaluations, which strongly suggest that they could be an effective approach to improving access to preventive services. Their replicability under different conditions – particularly in more deprived settings – is still unclear because they depend on effective primary health care, and mechanisms to disburse payments. Further rigorous evaluative research is needed, particularly where [conditional cash transfers] CCTs are being introduced in low income countries, for example in Sub-Saharan Africa or South Asia.’ (Lagarde, Haines, and Palmer 2009)

Explanation – Since the abstract may be all that a reader accesses, it is important that the abstract reports the extent and limits of applicability of the findings of the review in relation to equity concepts. We felt this information is important to all consumers and users of the review, including patients, practitioners, policymakers, press, and the public.

The reporting of applicability is not intended to be a recommendation for practice or policy. It is instead intended to provide the reader with information regarding the primary studies and the results of the review and how the results of equity considerations apply. While there is insufficient space to report applicability considerations for all populations, we felt that applicability to the target population of the review should be reported.

Introduction section

Item 3: rationale

Standard PRISMA item. Describe the rationale for the review in the context of what is already known.

In addition, for equity-focused systematic reviews: Describe assumptions about mechanism(s) by which the intervention is assumed to have an impact on health equity.

Examples

- ‘CCT programs are justified on the grounds that demand-side subsidies are needed to address constraints and bottlenecks of service delivery. CCT programs usually aim to increase demand for preventive health services and education because these services have positive spillover effects that justify the expense. CCT help overcome barriers to access of services. These programs address social equity concerns

because CCT can help to “level the playing field” thus creating equal opportunities.’ (Lagarde, Haines, and Palmer 2009)

- ‘Many lay health worker programs aim to address inequity by providing services to underserved communities.’ (Lewin et al. 2010)

Explanation – If available, systematic reviews with a focus on health equity should explicitly describe the assumptions about the effects of the intervention on health equity, or drivers of health inequity. Assumptions about outcomes along the causal chain and these hypotheses about health equity may be articulated using different methods such as a programme theory and can then be tested empirically with pre-planned analyses in the review (Waddington et al. 2012; Snilstveit 2012). The review should describe a priori how and why interventions are expected to work and the influence of factors such as setting and participant and programme characteristics. This explicit reporting of assumptions and underlying hypotheses will help the reader understand the choice of methods to assess the effects on health equity and the interpretation of results within the framework of these hypotheses.

Item 3A: in addition, for equity-focused systematic reviews: Provide the logic model/ analytical framework, if done, to show the pathways through which the intervention is assumed to affect health equity and how it was developed.

Examples

Figure 1 (Waddington and White 2014; White 2014)

Figure 2 (Niederdeppe et al. 2008)

Explanation – Health equity is influenced by multiple interacting factors such as context, setting, population characteristics, environment, public policy setting, health facility factors, and health provider factors (Whitehead 1992; Braveman and Gruskin 2003; Tugwell et al. 2006). A visual framework, or logic model, can show the links between these factors, the programme or intervention of interest, and the hypothesised effects on health equity. It can be used to show hypothesised pathways of influence on health equity, to focus the review, define the inclusion criteria, identify intermediate outcomes and harms, define the search strategy, and plan subgroup and effect modifier analyses (Anderson et al. 2011). For example, the logic model for a systematic review of preschool

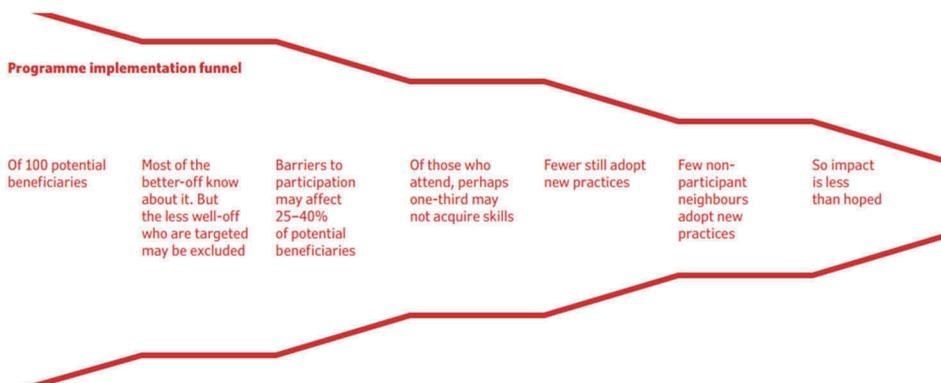


Figure 1. Item 3A, example 1 – Analytic framework.

Source: This is an example of a ‘funnel of attrition’. (Waddington and White 2014; White 2014).

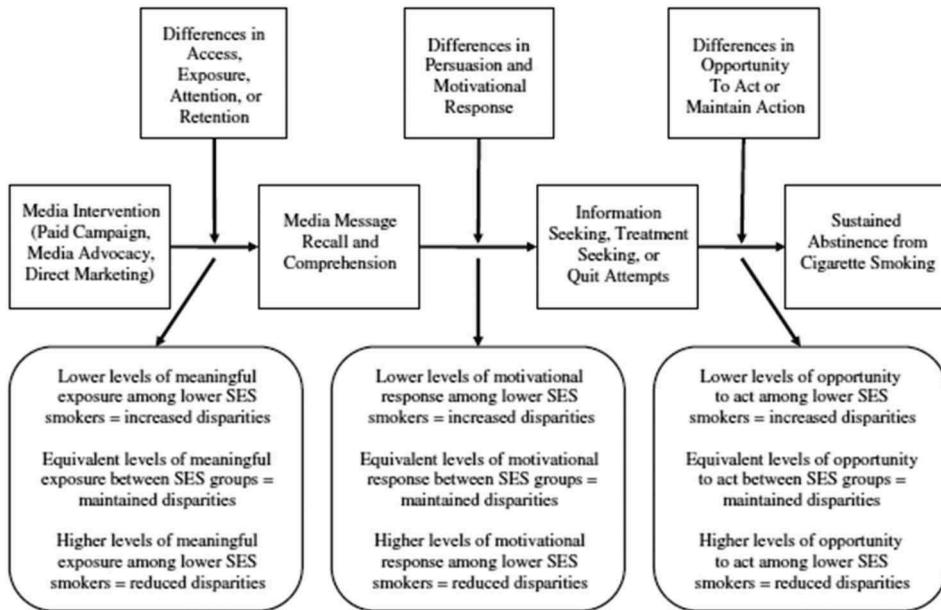


Figure 2. Item 3A, example 2 – analytic framework.

Source: This is an example of a logic model (Niederdeppe et al. 2008).

feeding shows that low socioeconomic status and household size may increase the risk of substitution (less food at home), thus decreasing the observed effects of preschool feeding (Kristjansson et al. 2012). A visual framework can be useful for policymakers and decision-makers who seek to answer questions about the effects of both targeted and universal interventions and how these programmes will work in their policy/decision-making settings and system. For complex interventions, a visual framework can help the reader unpack the ‘black box’, thus showing how the intervention might affect different subgroups of the population and can be used as a tool for articulating subgroup analyses a priori.

Many different methods exist for developing a logic model, and different logic models have been developed for the same question. Guidance for how to construct a logic model is available from the Cochrane Public Health Group and the Kellogg Foundation (Armstrong, Waters, and Doyle 2011; “Logic Model 2004”; Rogers 2014; Vogel 2012).

Item 4: objectives

Standard PRISMA item. Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).

In addition, for equity-focused systematic reviews: Describe how disadvantage was defined if used as criterion in the review (e.g. for selecting studies, conducting analyses, or judging applicability).

Example

- ‘For the purposes of this review, the term ‘disadvantaged’ is taken to denote women whom the primary investigators considered to be of low socio-economic status or educationally disadvantaged, or who are under the age of 20[children born to teenage mothers in the UK have been estimated to have a 63% increased likelihood of being born into poverty], or who are caring for children in single-parent households.’ (Macdonald et al. 2010)
- ‘Parents with children up to the age of school entry and who were socially disadvantaged in respect of poverty, lone parenthood or ethnic minority status.’ (Miller, Maguire, and Macdonald 2011)
- ‘We will retrieve studies implemented in low- and middle-income countries [LMICs], as defined by The World Bank Group’s classification... which study access to or utilization of PNC services by birthing women living in resource strained settings.’ (Langlois et al. 2013)

Explanation – Description of the specific population in the PICOS (Population, Intervention, Comparator, Outcome, Study Design) framework does not encompass explicit definition of how disadvantage or risk of inequity will be assessed, for example in reference to which group, disadvantaged by what mechanisms, and for which outcomes. Populations are at risk of health disadvantage for many different reasons that may interact with each other. There are many examples of factors that may contribute to disadvantage and these may interact with each other, such as geographical isolation, lack of access to health facilities, biologic vulnerability, historical oppression, social exclusion, health or language literacy, low resource settings, inadequate health systems, inadequate health insurance, health provider attitudes, stigmatisation, and discrimination (O’Neill et al. 2014). Systematic review authors can group such factors using the PROGRESS-Plus acronym: Place of residence, Race/ethnicity/culture/religion, Occupation, Gender/sex, Religion, Social Capital, Socioeconomic status (O’Neill et al. 2014; Evans and Brown 2003). However, grouping populations that share one characteristic across PROGRESS-Plus may lead to overgeneralisation since people within one category are heterogeneous (e.g. women range from poor to wealthy, with very different personal histories and exposures to health risks).

An explicit definition of how disadvantage will be assessed in the systematic review, either for targeted interventions or for subgroup analyses of universal interventions, is necessary to increase the likelihood that similar groups of people are compared, to make explicit the proposed reasons those people are considered disadvantaged, to explain why and how the programme is expected to work for people at different risk of health disadvantage, and to facilitate judgments about applicability in different settings and populations. If disadvantage is used as a criterion, it needs to be defined, as well as the proposed reasons for disadvantage (e.g. biologic, societal), and the comparator or reference group against which disadvantage is assessed. Disadvantage and vulnerability may be poorly reported in primary studies. However, systematic review authors should describe how they have operationalised their definition of disadvantage or inequity in their inclusion criteria, analyses, and judgements of applicability. For example, if

economically disadvantaged populations are the focus of the review, then a description of this population should be provided.

Item 4A: in addition, for equity-focused systematic reviews: State the research questions being addressed with reference to health equity.

Examples

- Two objectives ‘To determine the effectiveness of school feeding programs in improving physical and psychosocial health outcomes for low income school children.’ And ‘To compare the effectiveness of school feeding programmes for socio-economically disadvantaged children and advantaged children.’ (Kristjansson et al. 2007)
- ‘To assess the impact on maternal and infant health and on infant development of programmes offering home support in addition to the standard service for teenaged mothers (ages less than 20 years) who had recently given birth and who were socially or economically disadvantaged, for example because they were poor, lived inner city or were single parents.’ (Macdonald et al. 2010)

Explanation – If assessing the impact on inequities is an objective of the review, the research questions related to this objective should be stated. Potentially important subgroup effects are differences in the relative effect that are large enough that users might make different decisions based on the subgroup effect than they would be based on the overall effect. Review authors should give consideration to all potentially disadvantaged groups for which the intervention might have a different effect based on the intervention’s mechanism of action, including economic status, employment or occupation, education, place of residence, gender, and ethnicity.

Consideration of differences in relative effects for disadvantaged populations should be addressed similarly to any other subgroup analysis. As such, authors should distinguish between protocol and review items. The protocol should indicate plans for any subgroup analyses, including specifying which subgroups will be investigated, the predicted direction of the subgroup effect, and the indirect evidence supporting the prediction (e.g. biological or sociological rationale; studies of other relevant populations, interventions, or outcomes) (Sun et al. 2010, 2012). Only a small number of subgroups (i.e. only those for which there is a plausible reason such as indirect evidence for anticipating a subgroup effect) should be investigated.

Methods section

Item 6: eligibility criteria

Standard PRISMA item. Specify study characteristics (e.g. PICOS, length of follow-up) and report characteristics (e.g. years considered, language, publication, status) used as criteria for eligibility, giving rationale.

In addition, for equity-focused systematic reviews: Describe the rationale for including particular study designs related to equity research questions.

Examples

- ‘Cross-sectional quantitative study designs, qualitative study designs, or a combination of the two (mixed-methods studies). Specifically, we included, first, any type of cross-sectional study design reporting quantitative data. Second,

qualitatively-based studies had to have used either individual interviews or focus group interviews to collect data about [female genital mutilation/cutting] FGM/C and used qualitative data analysis methods, such as thematic analysis, to be eligible for inclusion. Third, mixed-methods studies that incorporated both quantitative and qualitative components where the research design matched the nominated study designs were included. Both the quantitative and the qualitative components of the study were subjected to the same inclusion criteria as the mono-methods studies and the study was only included when the inclusion criteria were met.’ (Berg and Denison 2012)

- ‘We included qualitative studies and studies using descriptive statistics which met the following criteria:
 - (1) reported on interventions as identified as “farmer field schools”, although not necessarily the same interventions as those included in the review of effects (review question 1);
 - (2) assessed determinants of service delivery quality, knowledge acquisition, adoption of technological improvements, diffusion, or sustainability (either directly or indirectly – for example, studies that were relevant to addressing barriers to and enablers of [farmer field schools] FFS effectiveness)...’ (Waddington et al. 2014)

Explanation – Evidence on equity impacts may come from a range of study designs, depending on the question, and the study designs included in a systematic review should be chosen based on the question according to their ‘fitness for purpose’ (Petticrew and Roberts 2003). The evidence of effects might have been assessed using randomised controlled trials (RCTs) or other intervention study designs such as interrupted time series or controlled before–after study. However, for many equity-focused reviews examining social or public health interventions, the context in which the intervention operates is important and may be reported in qualitative studies (Petticrew and Roberts 2003). Evaluations of policy-level and other interventions that have implications for reducing inequity and may provide important insight into the effects on equity may have been evaluated using non-randomised designs (e.g. natural experiments).

Authors should be able to capture different types of evidence through the inclusion of different study designs, but should justify the inclusion of these designs and provide the rationale. For example, barrier and facilitator data collection and analysis often require quantitative and qualitative data. New authors may not be aware of the rationale for preferred study designs. While most systematic reviews just list study design without rationale, the need to explain the rationale is not just an issue for equity, it should always be reported.

Item 6A: in addition, for equity-focused systematic reviews: Describe the rationale for including the outcomes (e.g. how these are relevant to reducing inequity).

Examples

- ‘Other smoking-related outcomes included compliance with age-of-sale legislation, density of advertising and vending machines, brand appeal, and awareness and receptivity to antismoking campaigns. This broad range of smoking-related outcomes was included in order to encompass the diverse ways in which tobacco control policies can influence youth smoking-related outcomes.’ (Brown, Platt, and Amos 2014a)

- ‘Changes in equity of access – increased access for disadvantaged groups or a reduction in gaps in coverage – could also be an important outcome measure. This required a preliminary analysis and categorisation of the population of interest along a socio-economic scale. We accepted any relevant methodology (e.g. wealth/asset index) provided it was rigorous and described in detail.’ (Lagarde, Haines, and Palmer 2009)

Explanation – As with all systematic reviews, outcomes need to be selected based on their relevance to the relevant stakeholder and/or user group (e.g. subjects/patients, practitioner (and the patient–practitioner dyad), the public, policymakers, and politicians). Equity-focused systematic reviews must, in addition, consider the relevance and importance of outcomes across categories of disadvantage that are deemed relevant for the review, including both health and non-health outcomes. Non-health-related outcomes can have direct impacts on health and equity. For example, the Whitehall study found that employment grade levels are related to health differences in which people with lower-grade jobs have higher rates of mortality and diseases, such as ischaemic heart disease, and lower self-perceived health status (Marmot et al. 1991).

In addition, measures may need to be developed and/or adapted to ensure that the methodology does not disadvantage participation or bias results across populations. Other situations are often found when a measure may be used across a population, and where the intervention effectiveness is analysed according to cultural diversity within the population. For example, a systematic review of culturally appropriate health education assessed the influence of culturally adapted measurement tools on knowledge outcomes using sensitivity analysis. (Attridge et al. 2014). The importance of outcomes for different settings and populations needs to be rated when selecting major outcomes, for example, in Summary of Findings (SOF) Tables for Cochrane reviews. An SOF table presents the main findings of the review for up to seven patient-important outcomes and rates the quality of the evidence (Higgins and Green 2011). SOFs are intended for those using the review, such as decision-makers (Guyatt et al. 2011).

Context, inconvenience, and burden (e.g. financial burden) for populations need to be considered as potentially important outcomes in equity-focused reviews even if they are not commonly reported in primary studies. Financial burden may be relatively greater for those who are poor and other burdens, such as stigma or travel time, may be different for different populations.

Equity of access to care and coverage of health services are important outcomes for some interventions that seek to improve access. Horizontal equity implies equal health care for equal need, whereas vertical equity implies greater health care for greater need. Authors should take a pragmatic approach to assessing the equity of access.

Item 7: information sources

Standard PRISMA item. Describe all information sources (e.g. databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.

In addition, for equity-focused systematic reviews: Describe information sources (e.g. health, non-health, and grey literature sources) that were searched that are of specific relevance to address the equity questions of the review.

Examples

- ‘We chose to restrict our search of electronic databases to the 20 databases that had produced the highest yield in the search for a previous systematic review on a related topic, the health effects of new roads.
- We developed our search syntax iteratively. We first conducted a scoping search with a provisional set of terms, retrieved the 100 most relevant abstracts, and then added additional indexing or text word terms used in those references to our search strategy. We then adapted the search syntax for each database or interface used. We did not limit the search using terms for study design.
- We decided not to attempt a “systematic” internet search. Instead, we used three quality assured gateway sites ([http:// www.omni.ac.uk](http://www.omni.ac.uk), <http://www.sosig.ac.uk>, and <http://www.eevl.ac.uk>) and our own knowledge to generate lists of potentially relevant websites, from which we selected a purposive sample of 16 sites that contained bibliographies or searchable databases of documents. These represented a range of types of organisation (academic, government, and voluntary), countries of origin (Canada, all the countries of the European Union, Norway, and the United States of America), and language of publication (Danish, English, French, Norwegian, and Swedish).’ (Ogilvie et al. 2005)
- ‘We searched the following electronic databases for primary studies:

The Cochrane Central Register of Controlled Trials (CENTRAL) 2009, Issue 1, part of the The Cochrane Library (www.thecochranelibrary.com) including the Cochrane Effective Practice and Organisation of Care (EPOC) Group Specialised Register (searched 3 March 2009)

MEDLINE, Ovid In-Process & Other Non-Indexed Citations and MEDLINE, Ovid (1948 to present) (searched 24 June 2011)

EMBASE, Ovid (1980 to 2009 Week 09) (searched 2 March 2009)

PsycINFO, Ovid (1806 to February Week 4 2009) (searched 4 March 2009)

EconLit, Ovid (1969 to February 2009) (searched 5 March 2009)

Sociological Abstracts, CSA (1952 to current) (searched 8 March 2009)

Social Services Abstracts, CSA (1979 to current) (searched 8 March 2009)

LILACS (searched 6 May 2009)

WHOLIS (searched 7 May 2009)

World Bank

Science Citation Index Expanded (SCI-EXPANDED) (1975 to present) (searched 8 September 2010)

Social Sciences Citation Index (SSCI) (1975 to present) (searched 8 September 2010). In addition we selected relevant databases from the LMIC database list at: <http://epocoslo.cochrane.org>. We did not search CINAHL or International Pharmaceutical Abstracts, so it is possible that studies relating to nursing or pharmaceuticals were missed. However, the general searches, including in websites focused on this topic, did not suggest that we had missed any relevant studies. We will add these databases when the review is updated.’ (Witter et al. 2012)

Explanation – Equity-focused reviews often go beyond issues of health and bridge other disciplines and thus information sources. For equity-focused systematic reviews, sources of information beyond the well-known health databases may be required. The search strategy may require inclusion of sources of information from different disciplines and different

databases (e.g. sociological abstracts, IDEAhealth, non-health transportation or environmental content databases, and discipline-specific grey literature). Authors should describe all sources of information used for the search and provide a brief description of each, and justify why these information sources were considered necessary and appropriate.

Some relevant information may be available only to members of a certain association or working group. It would therefore be helpful for authors to report the accessibility of the sources of information in addition to website links or other information that may help the reader identify where the information has originated.

Item 8: search

Standard PRISMA item. . Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.

In addition, for equity-focused systematic reviews: Describe the broad search strategy and terms used to address equity questions of the review.

Box 2: A note about searching

Caution should be used when developing the search strategy. Limiting the search using equity-related search terms is not recommended as many studies are not indexed using equity-related terms and potentially relevant studies could be missed. For equity-focused reviews, the search strategy may need to be broadened to reduce the risk of missing potentially included studies. Review authors should plan more time for screening.

Example

See [Table 3](#)

Explanation – Authors of equity-focused systematic reviews should report the search strategy and search terms used to identify the sources relevant to the equity questions. Equity questions may require comprehensive textword searches to identify specific populations, multi-component interventions, or settings of interest that may require combinations of text words. Additionally, equity-relevant reviews may relate to stigmatised populations, where language has evolved in order to identify the communities in a non-stigmatised way. Any search terms used should be clearly reported to ensure that the reader can duplicate the search. We do not suggest limiting the search to equity-relevant terms unless these equity search strategies have been validated. For example, the Cochrane Child Health filter has been validated (Leclercq, Leeftang, and van-Dalen 2010). Other validated search filters are collected in a repository by the InterTASC Information Specialists' Sub-Group Search Filter Resource. There is also ongoing work to validate a filter for identifying sex-specific analyses (Moerman, Deurenberg, and Haafkens 2009). See [Box 2](#) for more information on searching.

Item 11: data items

Standard PRISMA item. List and define all variables for which data were sought (e.g. PICOS, funding sources) and any assumptions and simplifications made.

Table 3. Review of the research on the effectiveness of health service interventions to reduce variations in health.

 Medline [. . .]

Using CD Plus Ovid software, searching only from 1990 to December 1994 with no language limitations and no publication type limitations.

Group 2: Describing possible strategies to reduce variation in health

- 011 consumer advocacy/
- 012 health promotion/
- 013 exp health planning/
- 014 insurance, health/
- 015 exp preventive health services/
- 016 exp health policy/
- 017 marketing of health services/
- 018 mass media/ 133
- 019 parenting/
- 020 primary health care/
- 021 exp public health/
- 022 exp self-help groups/
- 023 smoking cessation/
- 024 social support/
- 025 urban renewal/
- 026 exp public assistance/
- 027 health services accessibility/
- 028 delivery of health care/
- 029 environmental health/
- 030 exp patient acceptance of health care/
- 031 quality assurance, healthcare/
- 032 social change/
- 033 social justice/
- 034 public health/
- 035 accident prevention/
- 036 accidental falls/pc
- 037 accidents, home/pc
- 038 accidents, occupational/pc
- 039 accidents, traffic/pc
- 040 drowning/pc
- 041 consumer product safety/
- 042 disease outbreaks/pc
- 043 disease reservoirs/pc
- 044 disease transmission, patient-to-Professional/pc
- 045 disease transmission, Professional-to-patient/pc
- 046 environmental pollution/pc
- 047 health education/
- 048 hygiene/
- 049 sanitation/
- 050 insurance, medigap/
- 051 exp medicare/
- 052 medicare assignment/
- 053 medicaid/
- 054 ((free adj care) or ((nursery or preschool) adj education)).tw.
- 055 (after adj school adj care).tw.
- 056 (social adj support).tw.

Group 3: Describing possible associations of variations in health

- 057 housing/
 - 058 public housing/
-

(Continued)

Table 3. (Continued).

Medline [...]

059 nutritional status/
060 age factors/
061 uncompensated care/
062 socioeconomic factors/ 134
063 social class/
064 single parent/
065 exp ethnic groups/
066 poverty/
067 poverty areas/
068 unemployment/
069 rural health/
070 rural population/
071 urban health/
072 educational status/
073 urban population/
074 urbanization/
075 exp homeless persons/
076 medically uninsured/
077 medically underserved area/
078 (underinsured or uninsured or uncompensated or indigen\$ or (ethnic adj difference#)).tw.
079 (unemployed or unemployment or (low adj income#) or blacks or deprived or deprivation).tw.
080 (disadvantaged or endowed or unendowed or education\$ or equity or equitable).tw.
081 (inequity or inequities or inequitable or unequal or homelessness or illiterate).tw.
082 (inequality or inequalities or variation# or poverty or underprivileged).tw.
083 (family adj income) or (inner adj cit\$) or (minority adj group#) or (vulnerable adj group#)).tw. nutritional status/ or nutrition.tw.
084 minority groups/
085 [(((low or lower or less or poor or poorer or level) adj2(socioeconomic or education\$)).tw.)
086 (workplace or ((manual adj worker#) or occupation#) or (blue adj collar)).tw.
Group 4: Describing the characteristics potentially responsive to the intervention
087 exp health services/ec,og,st,sd,td,ut
088 exp vital statistics/
089 (health adj effects).tw.
090 health services accessibility/
091 ((campaign# or program# or intervention#) adj4 (access or accessibility or utili#ation
092 uptake or effect#).tw.
(Arblaster et al. 1996)

In addition, for equity-focused systematic reviews: List and define data items related to equity, where such data were sought (e.g. using PROGRESS-Plus or other criteria, context).

Example

- ‘...extracted data on study design, description of the intervention (including process), details on participants (including age, sex, number in each group), length of intervention, definition of poor/low income, other socio-demographic variables, including place of residence, race/ethnicity, age, and nutritional status, critical appraisal (see below), physical, cognitive, and behavioural outcomes. We had planned to extract data on cost-effectiveness, but found none. Where

possible, we recorded effects by socio-economic position.’ (Kristjansson et al. 2007)

Explanation – It is important for equity-focused systematic reviews to report all items for which data were sought even if the information was not available from the primary studies. Authors should explain the reasons for seeking data on these characteristics. If possible, authors should consider making their data extraction forms available online (e.g. as web-only appendices) or by request so that others may use or amend the forms in their own reviews.

Other data items that relate to the context of the population or intervention should also be reported as well as any interactions between context and PROGRESS-Plus factors. Each characteristic requires careful consideration regarding their definition and classification as well as their interaction with other contextual elements and how they influence health inequities. For example, there is no agreed-upon system for classifying race, ethnicity, and culture, particularly across different countries (O’Neill et al. 2014).

PROGRESS-Plus is one acronym that can be used to describe disadvantage (O’Neill et al. 2014; Evans and Brown 2003; Oliver et al. 2008). However, other frameworks for describing disadvantage and inequity exist and may also be used to capture equity-relevant data items. We support PROGRESS-Plus because it is easy to remember and is inclusive of all factors that may indicate disadvantage. About 68 per cent of systematic reviews describe the included population using one or more of the PROGRESS-Plus criteria and 13 per cent assess the effects of interventions disaggregated across one or more of these characteristics (Welch et al. 2012c).

Item 14: synthesis of results

Standard PRISMA item. Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g. I^2) for each meta-analysis.

In addition, for equity-focused systematic reviews: Describe methods of synthesising findings on health inequities (e.g. presenting both relative and absolute differences between groups).

Example

- ‘Studies demonstrating an overall effect on anthropometric outcomes were initially categorized according to whether they were effective or not effective among lower SEP groups. Within these categories, we then analysed studies to identify common characteristics between interventions, including the degree to which they addressed structural barriers to behavioural change; as noted earlier, particular structural barriers may be more or less prevalent among different SEP groups in a population.’ (Beauchamp et al. 2014)

Explanation – There is a need for a clear and explicit reporting of choices regarding analyses about health inequity and their rationale a priori. This includes reporting what will be compared and how these comparisons will be made. There are over 20 different approaches available to measure health inequalities between two groups (e.g. rate ratio, rate difference, low to high ratio) or between more than two groups (e.g. slope index of inequality, concentration index, index of dissimilarity) (Harper et al. 2013). Despite vigorous debate about the attributes, measurement properties, and implications of different measures and choice such as the referent group, there is no single accepted measure of health inequalities, and all are subject to limitations (Harper et al. 2010). Furthermore, the selection of how to measure health

inequalities may bias the interpretation of results (Harper et al. 2013). For example, the interpretation of any measure of changes in health inequalities over time depends on whether the outcome is an adverse effect or beneficial outcome, and on the baseline prevalence (Scanlan 2006). Authors should report the methods used to synthesise findings to ensure sufficient information.

Figure 3 (Thomas et al. 2008)

Measures of health inequalities may be useful as an input for population or economic models for projecting population impact on health inequalities. Considerations for choosing a measure of health inequalities are: 1) interpretability; 2) ease of calculation; and 3) information available from primary studies. While there is no agreement on the best approach, selection of measures of health inequalities needs to consider the advantages, data requirements, and limitations of these approaches. The choice of reference point (comparator), method of assessing differences (relative or absolute), measurement of differences, or end of study outcomes affects the difference observed between two or more groups (Keppel, Pamuk, and Lynch et al. 2005). Some measures (e.g. Gini, concentration index) may be less well understood by the users.

The measurement of health inequity depends on characteristics of the outcome measure and choices about comparisons, such as whether the outcome is desirable or undesirable, baseline prevalence, and absolute or relative differences (Keppel, Pamuk, and Lynch et al. 2005; Scanlan 2014). This was demonstrated with a before–after study of a coronary artery bypass graft (CABG) report card programme that compared the rates of CABG surgery between white, black, and Hispanic patients. The relative difference decreased between white and black patients for receipt of a CABG, but the absolute difference increased, therefore increasing the disparities between ethnicities (Scanlan 2014; Werner, Asch, and Polsky 2005).

The absolute effect provides the difference in effectiveness between while the relative effect describes the difference in effectiveness relative to a reference group, such as the

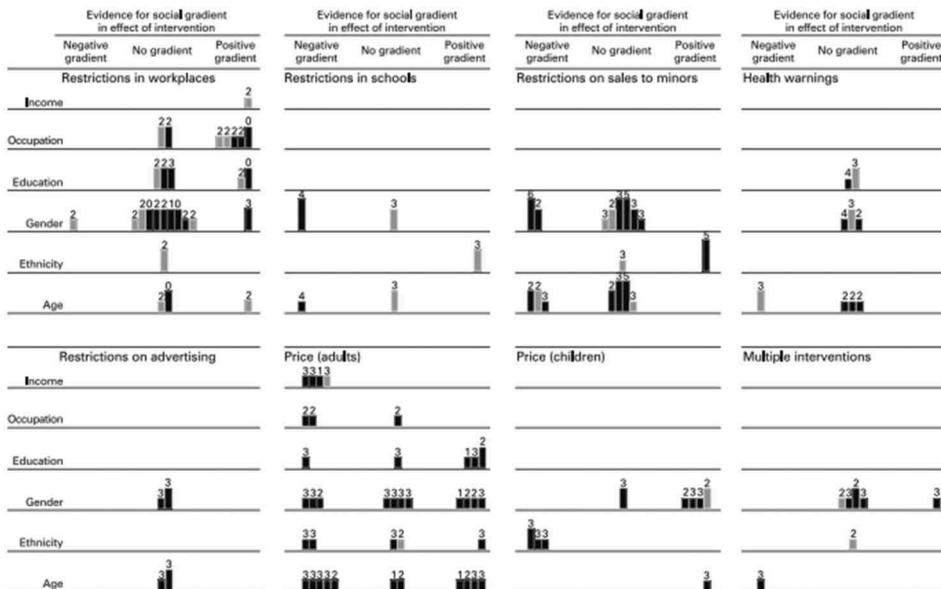


Figure 3. Harvest plot. Source: The 'harvest plot' synthesises and displays the evidence to support possible social gradients in the effects of the intervention (Thomas et al. 2008).

whole population (Mackenbach and Kunst 1997). Absolute differences can describe the proportion of the disadvantaged population affected, or not affected, by the intervention since disadvantaged populations may have worse health status and a higher risk of adverse outcomes (Scanlan 2014). Another example (Figure 4) demonstrates that while the rate of stomach cancer mortality for men and women declined between the years 1930 and 2000, the absolute difference between these rates decreased over that last 50 years while the relative difference has increased steadily (Harper and Lynch 2005). This demonstrates that although mortality rates have declined in both groups, the ratio of male-to-female stomach cancer mortality has increased (more men than women are dying from stomach cancer). It would be misleading to present one of these indicators without the others; therefore, we suggest that systematic review authors present the absolute and relative differences.

If the aim of the intervention being studied in the systematic review is to reduce inequities, authors should report how they plan to measure the effect on health inequities. If the review will compare effects in two groups, how will the difference be measured, synthesised, and interpreted at the systematic review level?

Figure 4 (Harper and Lynch 2005).

Item 16: additional analyses

Standard PRISMA item. Describe methods of additional analyses (e.g. sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.

In addition, for equity-focused systematic reviews: Describe methods of additional synthesis approaches related to equity questions, if done, indicating which were pre-specified.

Examples

- ‘Effect modifiers, such as high/low energy, compliance, substitution, and duration of the intervention were examined. In addition, study quality was considered since

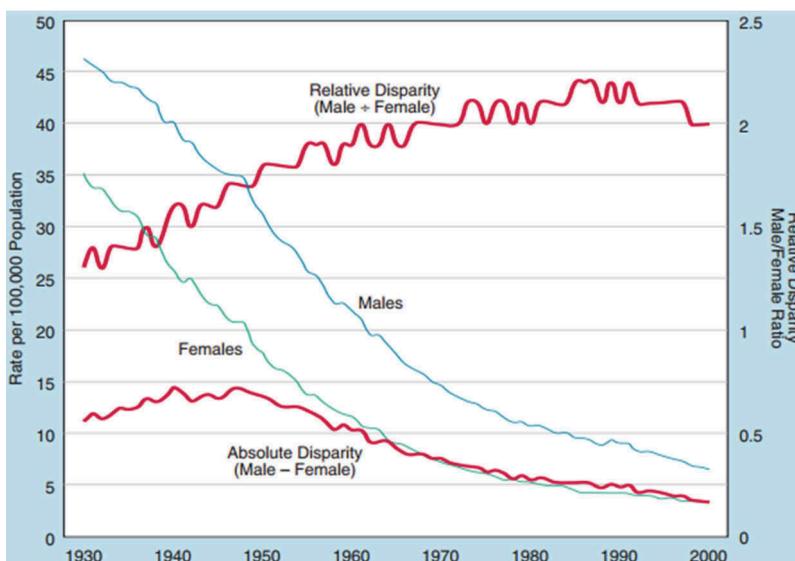


Figure 4. Absolute and relative gender disparity in stomach cancer mortality, 1930–2000 (Harper and Lynch 2005).

studies of lower quality often show higher effect sizes than those of higher quality. For example, biased outcome assessment is possible if the outcome assessors are not blinded to study group. This review tabulated the effects for each study by sorting them according to these effect modifiers (type of study, blinding versus unclear blinding, date of study, and high versus low energy) (Kristjansson et al. 2007). The effect of school feeding on learning outcomes may also be affected by contextual factors as teacher absenteeism and availability of learning materials, both of which may be worse in more disadvantaged communities.’ (Kristjansson et al. 2007)

- ‘This study examined the influence of program implementation, program activities, program environment, and individual characteristics on welfare-to-work programs. The authors also considered the unemployment rate for each to determine whether the programs were affected by the availability of jobs in the area in which the program was implemented.’ (Bloom 2005)

Explanation – Understanding how to reduce health inequities may require additional quantitative or qualitative analyses, such as causal pathway analyses or process evaluations and a greater use of subgroup analyses to explore the differential effects of public health or population-level interventions. Implementation of an intervention and its effectiveness may depend on participant characteristics such as age, education, gender, social status, context including the presence of complementary services, setting characteristics, and intervention characteristics (e.g. fidelity of intervention, delivery). Differences in participant characteristics, context, and intervention design or delivery may limit the ability to conduct a meta-analysis. These characteristics of interventions, setting, and participants may not be well-reported in primary studies, or have insufficient statistical power to find significant effects at the sub-group level (Hoffmann et al. 2014; Burford et al. 2013a). Systematic review authors may need to contact the primary study authors for information regarding subgroup analyses across different characteristics such as ethnicity and socioeconomic status. This information might have been analysed, but not reported in the published papers (Bhutta et al. 2011; Yousafzai et al. 2014) The move towards open access of trial data may make this more feasible in the future (Godlee 2012).

Subgroup analyses need to be conducted with caution and follow guidelines for reducing the likelihood of false results. Sun and colleagues have developed criteria for judging the credibility of subgroup analyses such as pre-specifying the hypothesised direction of effects, using a test for interaction, and keeping the number of subgroup analyses few, and justified based on prior empiric evidence (Sun et al. 2010).

Systematic reviews with an equity focus should document and describe relevant and important characteristics of the participants and settings, as well as implications for the ability to conduct pre-planned analyses.

Numerous additional methods may be employed to assess the influence of contextual factors, participant characteristics, and implementation such as qualitative review methods to understand the process of implementation and its relationship to effectiveness (e.g. using meta-ethnography, realist review, or thematic analysis) (Kastner et al. 2012). When reporting the use of these methods, authors should use the relevant, method-specific reporting guidance to transparently report their methods (e.g. RAMESES reporting guidelines for realist review or the Cochrane Handbook extension on qualitative reviews) (Wong et al. 2013; Noyes et al. 2008).

Results section

Item 18: study characteristics

Standard PRISMA item. For each study, present characteristics for which data were extracted (e.g. study size, PICOS, follow-up period) and provide the citations.

In addition, for equity-focused systematic reviews: Present the population characteristics that relate to the equity questions across the relevant PROGRESS-Plus or other factors of interest.

Examples – Present the population characteristics that relate to the equity questions across the relevant PROGRESS-Plus or other factors of interest.

- ‘Of the 82 studies included in this review, 55 studies (67%) were conducted in six high income countries: Australia, Canada, Ireland, New Zealand, the UK, and the USA. Forty-one of the 82 studies were conducted in the USA. Twelve studies (14.6%) were conducted in eight middle income countries (Brazil, China, India, Mexico, Philippines, Thailand, Turkey, and South Africa). Fifteen trials (18.3%) were from 10 low income countries Bangladesh, Burkina Faso, Ethiopia, Ghana, Iraq, Jamaica, Nepal, Pakistan, Tanzania, and Vietnam). In 59 studies the intervention was delivered to patients based in their homes. Five interventions were based solely in a primary care facility. . . A further eight studies involved a combination of home, primary care, and community based interventions. Four studies delivered the intervention mainly by telephone. . . while one implemented the intervention through community meetings. For five studies, other sites were used such as the workplace, churches, or homeless shelters.’ (Lewin et al. 2010)
- ‘Study participants had a mean age of 12.6 years and were described as of American Indian descent and representing the Pueblo, Navajo, Hopi, and Jicarilla Apache Indian Nations. The study setting was described as a boarding school exclusively for American Indian youth and promoting academic excellence.’ (Jull et al. 2013)

Explanation – Approximately 50 per cent of systematic reviews report the effect of sex/gender on outcomes, and less than 15 per cent report other PROGRESS-Plus characteristics, which may be important (Tsikata et al. 2003; Welch et al. 2012c; Tugwell et al. 2008). PROGRESS-Plus information is reported in primary studies more often than in systematic reviews (Tsikata et al. 2003; Tugwell et al. 2008). Reporting the characteristics of populations associated with disadvantage, if relevant to the SR question, helps the user/reader compare their own setting and population to those included in the studies and can influence decision-making.

It may be useful to include criteria relating to judgements about which PROGRESS-Plus factors are relevant for the review question. A number of frameworks are available to help identify characteristics that are relevant in describing the socioeconomic and demographic characteristics of populations in addition to PROGRESS-Plus, such as SCRAP (Sex, Comorbidities, Race, Age and Physiopathology) (Dans, Dans, and Guyatt 2008) and SUPPORT Collaboration framework (Oxman et al. 2009). There is little empirical evidence about the most efficient use of these frameworks. It is unlikely to be feasible to report all characteristics of interest, and not all characteristics may be relevant for each review. It is not necessary to report on all PROGRESS-Plus characteristics, as this might encourage data dredging. However, authors should consider which factors are relevant to their question a priori.

Authors should report characteristics of the setting, and whether these characteristics are entangled with the classification of disadvantage. For example, in the systematic review of school feeding for disadvantaged children, disadvantage was identified by attributes of the setting such as the location (poor, rural villages), the main occupation (e.g. ‘subsistence farmers’), and the presence of school breakfast programmes, which were only funded and provided in very poor areas with high malnutrition (Kristjansson et al. 2007).

Item 21: synthesis of results

Standard PRISMA item. Present results of each meta-analysis done, including confidence intervals and measures of consistency.

In addition, for equity-focused systematic reviews: Present the results of synthesising findings on inequities (see 14).

Example

- ‘This review sought to identify studies which had reported on sociodemographic characteristics known to be important from an equity perspective. For this process, the PROGRESS (Place, Race, Occupation, Gender, Religion, Education, Socio-economic status (SES), Social status) framework was utilised. All studies reported the gender of participants at baseline. Four studies reported the race of participants and the level of education of parents. . . and two studies included information about the employment status of parents at baseline. . . included information on SES of participants at baseline based on parental income. . . reported some indicators related to place (the proportion of participating schools in a rural or urban region) and SES (the proportion of participating schools in an urban region which were also in an area considered to be under-privileged). When analysing data on outcomes, only three studies analysed results by any of the PROGRESS items. . . analysed outcomes by gender. . . analysed outcomes by the same indicators of place and SES that were collected at baseline (these data are discussed above).’ (Waters et al. 2011)

Explanation – Authors should report the results of all analyses related to health inequities and specify which analyses were determined a priori and which were conducted post hoc. Raw values, as well as absolute and relative effects on health inequities should be presented for the reasons discussed above. All analyses conducted at the review level should be reported, even if they were lacking in data or were not statistically significant.

When examining the data across a population to identify population subgroups experiencing disadvantage, interventions may have a greater absolute effect even if the relative effect is the same. For example, a cohort of women smokers found that the relative risk of coronary heart disease for cigarette smokers was slightly lower among women with hypertension, hypercholesterolemia, or diabetes than among those without them (Willett et al. 1987). However, the absolute (or attributable) risk was two or more times higher for women with those conditions. Although the relative risk was lower, the absolute risk was much higher because the baseline risk of coronary heart disease was so much higher for non-smoking women with those conditions (Willett et al. 1987).

An SOF table is a recent requirement of Cochrane reviews, which presents the main findings of the review and the quality of the evidence (Higgins and Green 2011) and are intended for those using the review, such as decision-makers, and also facilitate the use of

the review for developing guidelines and recommendations (Guyatt et al. 2011). The SOF table is recommended to include seven patient-important outcomes. To appropriately consider equity using SOF tables, the authors should consider three strategies: 1) include an outcome related to health inequity to show whether the intervention enhanced health equity (Table 4); (Lagarde and Palmer 2011)

2) consider whether disadvantaged populations have different baseline risk of the important outcomes, and include a separate row in the summary of the finding table to show the absolute events for disadvantaged groups (Table 5); (Imdad et al. 2010)

and 3) consider whether a separate SOF table is needed because of the expected differences in relative effects (Table 6). (Brown, Platt, and Amos 2014b).

Item 23: additional analyses

Standard PRISMA item. Give results of additional analyses, if done (e.g. sensitivity or subgroup analyses, meta-regression [see Item 16]).

In addition, for equity-focused systematic reviews: Give the results of additional synthesis approaches related to equity objectives, if done (see 16).

Examples

- ‘Effect modifiers were age and socioeconomic status. Younger students had larger effects than older students and students with lower socioeconomic status (SES) had larger effects than those with higher SES.’ (Wilson and Lipsey 2007)

Table 4. Example of a summary of findings table that includes an outcome related to health inequity.

The impact of user fees on access to health services in low- and middle-income countries				
Population: Anyone using any type of health service in low- and middle-income countries.				
Settings: Burkina Faso, Kenya, Lesotho, Papua New Guinea.				
Intervention: Introducing or increasing user fees				
Comparison: No fees				
Outcomes	Relative change in utilisation (Rio Political Declaration on Social Determinants of Health 2011)	Number of studies	Quality of the evidence (GRADE)	Comments
Equity outcome – health utilisation by quartile	N/A	1	⊕⊖⊖⊖ Very low	This study where quality improvements were introduced at the same time as user fees found an increase in utilisation for poor groups. The authors did not report the results in a way that the relative change in utilisation could be calculated.

Note: CI, Confidence Interval; RR, Relative Risk (Lagarde and Palmer 2011).

Table 5. Example of a summary of findings table that includes a separate row to show the absolute events for disadvantaged groups.

Vitamin A supplementation for preventing morbidity and mortality in children from six months to five years of age					
Patient or population: Children aged between 6 months and five years					
Intervention: Vitamin A supplementation					
Comparison: Placebo or usual care					
Outcomes	Illustrative comparative risks (95% CI)	Relative effect (95% CI)	No. of Participants (studies)	Quality of the evidence (GRADE)	Comments
Diarrhoea-related mortality	Low-risk population 3 per 1000 2 per 1000 (2 to 3)	RR 0.72; 95% CI 0.57 to 0.91	90,951 (7 studies)	+++O moderate	Total number of participants reflects number randomised to studies. The analysis combined cumulative risk and risk per/1000 years follow-up.
Follow-up: 48–104 weeks	Medium-risk population 4 per 1000 3 per 1000 (2 to 4)				
	High-risk population 9 per 1000 6 per 1000 (5 to 8)				

Table 6. Example of a separate summary of findings table because of the expected differences for the disadvantaged population.

Summary equity impact of included studies and policies						
	Positive	Neutral	Negative	Mixed	Unclear	Total
Increases in price/tax of tobacco products	14	6	4	1	2	27
Smoke free – voluntary, regional, partial	1	1	19	0	4	25
Smoke free – compulsory, national, comprehensive	2	9	6	1	4	19
Mass media campaigns	3	2	5	2	6	18
Mass media campaigns – quitlines and nicotine replacement therapy	5	3	3	0	1	12
Controls on advertising, promotion, and marketing of tobacco	2	7	0	0		9
Population-level cessation support interventions	4	2	0	1	2	9
Settings-based interventions (community, workplace, hospital)	2	4	1	0	0	7
Multiple policies	0	2	0	1	1	4
Total policies	33	36	38	6	17	130
Total studies	31	30	37	6	14	117

- ‘This review used weighted regression analyses to investigate which elements of the programs were independently related to bullying and victimization effect sizes. These analyses showed that the most important elements of the program that were related to a

decrease in bullying were parent training/meetings and disciplinary methods. Of all the intensity and duration factors, the most important program elements were intensity for children and parent training/meetings.’ (Farrington and Ttofi 2009)

Explanation – The results of any additional syntheses related to the equity objectives should be reported as well as whether they were planned a priori and specified in the review protocol. This is consistent with published best practice in subgroup analysis (Sun et al. 2010). Subgroup analyses can be inappropriate, poorly specified, and prone to Type I and Type II error; therefore, all subgroup analyses need to be interpreted cautiously. Subgroup analyses in systematic reviews are generally reported with insufficient detail to judge their credibility (Sun et al. 2012).

Subgroups that were not identified at the protocol stage may be identified post hoc; however, the rationale for these analyses should be reported. Authors should report all subgroup analyses and any analyses to assess effect modifiers such as meta-regression – both statistically significant and non-significant to avoid outcome reporting bias of reporting only statistically significant results (Boutron et al. 2010). This may be difficult, as effect modifiers may not be clearly reported in the primary studies. In some cases, there may be too few studies in particular settings of interest to draw conclusions. Intervention effects can be influenced by their design and implementation as well as the context within which it was implemented. For example, in the school feeding review, learning outcomes such as mathematics achievement were found to be higher with school meals programmes, but context was important for this outcome; if there were no teachers then there was no change in educational achievement with feeding.

Analyses related to contextual factors should be fully reported including a description of whether data was lacking from primary studies.

Discussion section

Item 26: conclusions

Standard PRISMA item. Provide a general interpretation of the results in the context of other evidence, and implications for future research.

In addition, for equity-focused systematic reviews: Present extent and limits of applicability to disadvantaged populations of interest and describe the evidence and logic underlying those judgements.

Example

- ‘This review included studies from high income countries as well as lower-middle- and upper-middle-income countries, with five studies conducted in countries within the latter two groupings (Thailand, Brazil, Chile and Mexico). This means that, while predominantly conducted within high-income settings, the findings from this review may be generalisable to a number of settings. A total of nineteen studies specifically reported incorporating strategies to target socio-economic and/or cultural diversity or disadvantage. One such study was conducted outside of the high-income country setting, in Chile, an upper-middle-income country. Of the remaining eighteen studies, seven studies conducted in the USA were of interventions targeting African American children and their communities and another two studies targeted Native American communities. Other studies targeted participants of low socio-economic status, or were implemented in areas of social disadvantage. By far the most common setting for interventions included in this review were schools (43 studies). Other interventions were (or included) home-based (14 studies),

community based (six studies), or were set in a health service (two studies) or care setting (two studies). Eleven studies incorporated interventions across multiple settings.’ (Waters et al. 2011)

Explanation – The conclusion should provide a transparent assessment of the applicability, the transferability, and the generalisability of the findings to the specific disadvantaged populations of interest (recognising it is impossible to make these judgments for all possible populations). Authors should clearly report any disadvantaged population that was specified in the protocol and the reasons that consideration was given to the applicability of the results to the specified population. The applicability of the findings of a review to disadvantaged populations should be addressed similarly to considerations of applicability to any other population (Lavis 2009; Guyatt et al. 2011; Dans, Dans, and Guyatt 2008; Dans et al. 2007; Schünemann et al. 2011).

Authors should specify disadvantaged populations or settings for which the intervention is likely to be relevant. In the discussion review authors should consider the potential impact of: economic status, employment or occupation, education, place of residence, gender, and ethnicity as potential influences on the applicability of the results to disadvantaged populations, as well as resource or capacity constraints, health system arrangements or baseline conditions as potential reasons for there being a difference in the potential applicability of the results to low-income countries or disadvantaged populations. Authors should justify any judgments about applicability using transparent methods. There is no agreed-upon checklist for judging applicability, although many are available (Burford et al. 2013a; Welch et al. 2012a). However, authors should provide rationale, and any data used to make judgements about applicability.

Applicability of results is often overlooked in systematic reviews. For example, an assessment of systematic reviews related to public health found that only 13 per cent discussed applicability (Ahmad et al. 2010). The panel felt that the conclusion of an equity-focused systematic review should provide a transparent assessment of the applicability, the transferability, and the generalisability of the findings to at least one specific disadvantaged population of interest. This population should be pre-specified in the protocol with rationale. Authors should also specify additional disadvantaged populations or settings for which the intervention is likely to be relevant.

The applicability of the findings of a review to disadvantaged populations should be addressed similarly to considerations of applicability to any other population, using explicit methods (Lavis 2009; Guyatt et al. 2011; Dans, Dans, and Guyatt 2008; Dans et al. 2007; Schünemann et al. 2011). There is no agreed-upon checklist for judging applicability, although many checklists are available (Burford et al. 2013a). Authors should provide a rationale for the method they choose, and any data used to make judgements about applicability, such as other evidence about the possible impact of economic status, employment or occupation, education, place of residence, gender, and ethnicity, as well as resource or capacity constraints, health system arrangements or baseline conditions.

Item 26A: in addition, for equity-focused systematic reviews: Provide implications for research, practice, or policy related to equity where relevant (e.g. types of research needed to address unanswered questions).

Examples

- ‘The body of evidence in this review provides some support for the hypothesis that obesity prevention interventions in children can be effective, and where examined,

have not caused adverse outcomes or increased health inequalities. To this end, the direction of research and evaluation must move into how to implement effectively to scale, sustain the impacts over time and ensure equitable outcomes. In addition, interventions need to be developed that can be embedded into ongoing practice and operating systems, rather than implementing interventions that are resource intensive and cannot be maintained long-term.’ (Waters et al. 2011)

- ‘Future research should promote the development of effective interventions to enhance the online health literacy of consumers. Thus there is a need for well-designed and rigorously conducted randomised controlled trials (RCTs). These RCTs should involve diverse participants (regarding disease status, age, socio-economic group and gender) to analyse to what extent online health literacy reduces a barrier to using the internet for health information, or if socio-economic group, gender and age are more important in influencing internet use. Trials should be conducted in different settings (including low, middle and high income countries) and should examine interventions to enhance consumers online health literacy (search, appraisal and use of online health information) like internet training courses.’ (Car et al. 2011)

Explanation – Implications for research, practice, and policy should highlight the effects on equity. This section of the review should state the research that needs to be done to address existing knowledge gaps and should also suggest what the unanswered research questions are – that is, by specifying the questions that still need answering instead of stating that we ‘need more research’.

Discussion

We developed the PRISMA-E 2012 checklist following guidance suggested by Moher and colleagues (Moher et al. 2010). This reporting guideline is intended to improve transparency and completeness of reporting of equity-focused systematic reviews. Improved reporting can lead to better judgement of applicability by policymakers, which may result in more appropriate policies and programmes and may lead to reductions in health inequities.

This explanation and elaboration document is intended to accompany the PRISMA-E 2012 Statement to improve understanding of the reporting guideline for users (Welch et al. 2012b). The original PRISMA Statement has been endorsed by almost 200 journals; therefore, we recommend that authors of equity-focused systematic reviews use both the PRISMA checklist and the PRISMA-E 2012 checklist.

Potential limitations of the PRISMA-E 2012 checklist are that certain terminologies used in the reporting guideline may not be well defined or widely used and may be defined differently by different users. To mitigate these concerns, we pilot tested the checklist with different groups of systematic reviews authors including those in high-income as well as low- and middle-income countries. The results of these pilot tests have been reported elsewhere (Burford et al. 2013b). While some of the PRISMA-E 2012 extension items may apply to non-equity-focused reviews, we felt that their importance for equity-focused reviews was great enough to warrant development of a specific reporting guideline for these reviews. In addition, there is no planned update of the PRISMA Statement so we have included them in this reporting guideline.

We are committed to a broad-based dissemination strategy of PRISMA-E 2012 and hope to have endorsement by all journals endorsing the PRISMA Statement. Our

dissemination strategy includes contact with journal editors, systematic review authors and trainers, and dissemination at meetings and conferences. We will continue to monitor endorsement of the checklist by journal editors. We plan to evaluate this reporting guideline at a future date to determine its impact on the reporting of equity-focused systematic reviews. We will measure the ‘footprint’ of PRISMA-E 2012 by tracking the number of requests for support (e.g. emails, phone calls), and indicators of sharing of PRISMA-E 2012 through various networks, such as LinkedIn, Twitter, and Facebook. We will also measure web metrics, such as downloads of the Word file of the reporting guideline checklist from our website.

We hope that journal endorsement and implementation, and use by systematic reviewers will improve the reporting of equity-focused systematic reviews. Widespread use of the PRISMA-E 2012 checklist may increase the requests for more data from primary researchers, which may in turn improve the reporting of equity considerations in primary research.

Acknowledgements

The members of the PRISMA-Equity Bellagio group who authored this paper are: Rifat Atun, Harvard School of Public Health, USA; Shally Awasthi, King George’s Medical College, India; Virginia Barbour, *PLOS Medicine*, UK; Zulfiqar A. Bhutta, Robert Harding Chair in Global Child Health & Policy, Centre for Global Child Health, The Hospital for Sick Children, Toronto, Canada & Founding Director, Center of Excellence in Women and Child Health, The Aga Khan University, Karachi, Pakistan; Luis Gabriel Cuervo, Research Promotion & Development, Pan American Health Organization, USA; Trish Groves, Deputy Editor, *BMJ*, UK; Tracey Koehlmoos-Perez, Headquarters U.S. Marine Corps, United States; Elizabeth Kristjansson, School of Psychology, Faculty of Social Sciences, University of Ottawa, Canada; David Moher, Ottawa Hospital Research Institute, Canada; Andy Oxman, Global Health Unit, Norwegian Knowledge Centre for Health Services, Cochrane EPOC Review Group, Norway; Tomas Pantoja, Universidad Católica de Chile, Santiago, Systematic Review Methods Centre Cochrane EPOC editor, Alliance for Health Systems and Policy Research, Chile; Mark Petticrew, London School of Hygiene and Tropical Medicine, Campbell and Cochrane Equity Methods Group, UK; Jennifer Petkovic, Campbell and Cochrane Equity Methods Group, University of Ottawa, Canada; Terri Pigott, Campbell Methods Coordinating Group; Campbell Statistics Group, Loyola University Chicago, USA; Kent Ranson, Alliance for Health Systems and Policy Research, WHO, Switzerland; Tessa TanTorres, World Health Organization, Choosing Interventions that are Cost-Effective (WHO-CHOICE), Switzerland; Prathap Tharyan, Cochrane Evidence Aid, Department of Psychiatry; Cochrane Schizophrenia Group; Coordinator, South Asian Cochrane Network - India, India; David Tovey, The Cochrane Library, UK; Peter Tugwell, University of Ottawa, Department of Medicine, Faculty of Medicine, University of Ottawa, Canada; Jimmy Volmink, Cochrane HIV/AIDS Review Group; South Africa Cochrane Centre, Medical Research Council of South Africa; Stellenbosch University, South Africa; Elizabeth Wager, Sideview, UK; Elizabeth Waters, Melbourne School of Population Health, The University of Melbourne, Australia; Vivian Welch, Ottawa Hospital Research Institute, Campbell and Cochrane Equity Methods Group, Bruyère Research Institute, University of Ottawa, Canada; George Wells, Cardiovascular Research Methods Centre, University of Ottawa Heart Institute, Cochrane Non-Randomized Studies Methods Group; Howard White, International Initiative for Impact Evaluation (3ie); Campbell International Development Coordinating Group, India.

In memoriam: We are greatly saddened by the loss of our esteemed friend and colleague, Elizabeth Waters, whose contributions were invaluable to this work.

Disclosure statement

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf (available by request to the corresponding author). The authors report no competing interests.

Funding

The development of the PRISMA-E 2012 reporting guideline was funded by the Canadian Institutes of Health Research [grant number KPE 114370] and the Rockefeller Foundation. VW holds an Ontario Early Researcher Award. PT holds a Canada Research Chair in Health Equity. DM is funded by a University Research Chair. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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