Alliance for HPSR Briefing Note

Synthesis methods in Systematic reviews of Health Policy and Systems Research

Everyday public policymakers make critical decisions in order to improve health and reduce health inequalities in their health systems. In doing this, a number of questions about what to implement and how to organise the health system could arise. Should the roles of allied health professionals be extended? How much should patients be involved in the planning and development of health care? How should primary care physicians be paid in order to retain them in underserved areas? Will introducing conditional cash transfers for disadvantaged families improve their children’s health? Should hospital at home be introduced to reduce costs without deteriorating patients’ outcomes? Few would dispute the relevance of these questions for many low- and middle-income countries (LMICs) health systems and most people would wish decision-makers make informed decisions about them. But informed by what?

Health policy and systems research (HPSR) could make major contributions to more informed decision making processes about health systems issues. However, because of the wide array of disciplines and methods which HPSR draws upon, the answers to many of those questions are scattered in different sources and not available in a form that decision makers find easy to appraise or use. Likewise, the use of individual pieces of research – in the form of individual reports or studies – eventually could lead to the implementation of conflicting policy options. For example, introduction of users’ fees was pushed forward by the World Bank in the 1980s based on limited evidence, while the current position based on a number of reviews advises great caution in their use in health systems. (2-5) Reviews of the available evidence made in a systematic and transparent way could offer a number of advantages to public policymakers when addressing those issues. (6,7) These kind of reviews have been called ‘systematic review’ in order to distinguish it from the more ‘traditional review’.

Amongst the advantages of systematic reviews it could be mentioned, first, that they reduce bias in the estimation of the effectiveness of an intervention by identifying all studies that address a specific question (mostly about alternative policy options). In that sense, the likelihood that policymakers will be misled by research is lower with systematic reviews than with individual studies. Second, systematic reviews reduce the role that chance has to play in estimating effectiveness of different options by increasing the number of units for study, providing more precise estimates of effects. Therefore, policymakers can be more confident about what can be expected form an intervention when they use a systematic review. Third, drawing on an existing systematic review constitutes a more efficient use of time because the research literature has already been identified, selected, appraised and synthesized in a systematic and transparent way. Fourth, a systematic review can be more constructively contested than an individual study because debates can focus on appraisal and synthesis rather than on the reasons that one study was identified and selected over others.
Although a consensus relating to “good practices” has been reached for systematic reviews that inform decision making in clinical practice, most of the known work has been focused in the evaluation of the effects of health interventions through the use of randomized controlled trials and its statistical synthesis using meta-analytic techniques。(8;9) However, in the area of HPSR, the questions formulated are far beyond those related to the effectiveness of competing policy options (the “what works?” type of question); and the type of studies potentially useful to answer those questions is broader than in the case of clinically focused-questions. Both of these issues challenge the use of ‘classical’ methods for summarizing the available evidence regarding a specific question in a systematic review and a number of different approaches have been used to synthesize evidence from different sources.

In this context, this briefing note aims to describe (i) the available methods for synthesis of HPSR evidence available; (ii) some general criteria to be used for choosing one of these synthesis methods. This briefing note intends to provide the broad global health research community and funders of health research with an understanding of synthesis methods in the HPSR field and their use in the context of conducting systematic reviews of HPSR.

The process of the systematic review

A systematic review attempts to collate all empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question. (9) Systematic reviews adhere to a strict scientific design based on explicit, pre-specified and reproducible methods. As well as establishing what we know about a particular question, they can also demonstrate where knowledge is lacking and in this way guide future research.(8)

Conducting a systematic review involves a number of stages that can be summarised as follows:

- Formulating the review question. The problem to be addressed has to be specified in the form of a well-structured question. All other aspects of the review follow directly from this question.
- Identifying relevant literature. Comprehensive literature searches have to be conducted to identify potentially relevant studies that can shed light on the question. This is an essential feature to make a review systematic. Although the sources to be used will depend on the review question, current guidance suggests the use of – at least – electronic databases (such as Medline, Embase and the Cochrane Central Register of Controlled Trials), reference lists of included studies and contact with authors or experts in the specific field.
- Including/excluding studies. A number of criteria to decide which studies should be included in the review need to be specified. Those criteria – in most cases – have to be applied by at least two reviewers. Although some reviews could be focused on the locally available evidence or be restricted to the languages with which the reviewers are familiar, they should intend to be global in reach.
• Assessing quality of the included studies. A judgment about the authors’ ability to minimize bias in the design, conduct and analysis of included studies should be done. Reviewers can use a number of available tools for this purpose.

• Summarising the evidence. The findings of the studies included in the review should be summarised through the use of different approaches (including statistical meta-analysis).

• Interpreting the findings. Inferences for policy and practice could be generated by interpreting and exploring the relevance of the findings.

Our focus here will be in the different methods available to summarise the findings and more guidance about the other steps included in a systematic review could be found in the specialized literature.(8-10)

What are the available methods for synthesis?

Methods for the quantitative synthesis of numerical data have been around for the last 35 years and their mathematical foundations were described a century ago.(11) However, the synthesis of diverse types of evidence seems to have a relatively shorter history.(12) Even though it may be an emerging area of research there are already a number of apparently different methods for synthesis available. In 2005 Dixon-Woods et al outlined eleven possible approaches to syntheses involving qualitative and quantitative evidence,(13) and there are yet more methods described in the specialised literature.(14)

Therefore rather than attempt to outline all the possible methods currently available for synthesis – and following the framework presented by Pope et al(15) – we have organized the description of available methods in three broad areas according to their primary objective, and the type of studies and data primarily used by the specific synthesis method. In the ‘quantitative approaches’ section we describe methods that use numerical data or transform evidence into numbers to enable different types of statistical or logical analyses. In the ‘qualitative approaches’ section we describe methods that use text based data or transform other evidence into this form in order to generate conceptual and theoretical interpretations or explanations of a body of evidence. Finally in the ‘mixed approaches’ section we describe methods that combine the findings of multiple studies that are labeled broadly as using ‘qualitative’ or ‘quantitative’ methods. Our selection of methods is based mainly on i) how useful we think they may be in the HPSR field; ii) the availability of specific guidance about the method; and iii) the availability of examples illustrating the use of the specific method.

1. Quantitative approaches
   1.1. Meta-analysis

It refers to the statistical synthesis of the data from primary studies, where the weights assigned to each study are based on mathematical criteria that are specified in advance. The formulas used in meta-analysis are extensions of formulas used in primary studies, and are used to address similar kinds of questions to those addressed in primary studies. Although the use of meta-analysis has increased in the context of studies assessing the effects of
interventions (such as the randomized controlled trial), this approach may be conducted for a variety of reasons and purposes.(16)

More detailed guidance about how to conduct this kind of synthesis could be found at the websites of the Cochrane Collaboration (http://www.cochrane.org/) and the UK Centre for Reviews and Dissemination (http://www.york.ac.uk/inst/crd/).

Illustrative example

<table>
<thead>
<tr>
<th>The effectiveness of lay health workers in primary and community health care(17)</th>
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</table>
| Lewin et al assessed the effects of LHW interventions in primary and community health care on health care behaviours, patients’ health and wellbeing, and patients’ satisfaction with care. A 'lay health worker' was defined as any health worker carrying out functions related to health care delivery; trained in some way in the context of the intervention; and having no formal professional or paraprofessional certificated or degree of tertiary education. They searched the Cochrane Effective Practice and Organisation of Care and Consumers and Communication special registers (to August 2001); the Cochrane Central Register of Controlled Trials (to August 2001); MEDLINE (1966- August 2001); EMBASE (1966-August 2001); Science Citations (to August 2001); CINAHL (1966-June 2001); Healthstar (1975-2000); AMED(1966-August 2001); the Leeds Health Education Effectiveness Database and the reference lists of articles. They found 43 studies that met the inclusion criteria. These showed considerable diversity in the targeted health issue and the aims, content and outcomes of interventions. Most were conducted in high income countries (n=35), but nearly half of these focused on low income and minority populations (n=15). Study diversity limited meta-analysis to outcomes for five subgroups (n=15 studies) (LHW interventions to promote the uptake of breast cancer screening, immunisation and breastfeeding promotion [before two weeks and between two weeks and six months post partum] and to improve diagnosis and treatment for selected infectious diseases). Promising benefits in comparison with usual care were shown for LHW interventions to promote immunization uptake in children and adults (RR=1.30 [95% CI 1.14, 1.48] p=0.0001) and LHW interventions to improve outcomes for selected infectious diseases (RR=0.74 [95% CI 0.58, 0.93] p=0.01). LHWs also appear promising for breastfeeding promotion. They appear to have a small effect in promoting breast cancer screening uptake when compared with usual care. For the remaining subgroups (n=29 studies), the outcomes were too diverse to allow statistical pooling. Authors concluded that LHWs show promising benefits in promoting immunisation uptake and improving outcomes for acute respiratory infections and malaria, when compared to usual care. For other health issues, evidence is insufficient to justify recommendations for policy and practice. There is also insufficient evidence to assess which LHW training or intervention strategies are likely to be most effective.

1.2. Range of effect sizes approach (median of medians approach)

Using the median of effects reported by eligible studies in the review provides a way of quantifying the effects of interventions without resorting to numerous assumptions. It involves the use of median in a two-stage process. First, the median effect across each study’s eligible outcomes has to be identified. For instance, in a study reporting 10 process outcomes (adherence to 10 different behaviours for a specific clinical condition) the median absolute difference in compliance between the intervention and control group should be calculated. Then, with each study represented by its median outcome, the median effect and interquartile range (IQR) across all included studies is calculated. A sensitivity analysis, repeating the procedure using best and worst outcomes from each study, could be carried out. This method was first proposed and used in a large review of strategies for implementing guidelines,(18) and since then it has been applied in a number of Cochrane reviews of interventions to improve professional practice(19-23) and other systematic reviews of quality improvement interventions.(24;25)
More detailed guidance about how to conduct this kind of synthesis could be found at the website of the Cochrane Effective Practice and Organisation of Care group (http://epoc.cochrane.org/).

**Illustrative example**

<table>
<thead>
<tr>
<th>The effects of on screen, point of care computer reminders on professional practice and health care outcomes(23)</th>
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<tbody>
<tr>
<td>Shojania et al evaluated the effects on processes and outcomes of care attributable to on-screen computer reminders delivered to clinicians at the point of care.</td>
</tr>
<tr>
<td>They searched the Cochrane EPOC Group Trials register, MEDLINE, EMBASE and CINAHL and CENTRAL to July 2008, and scanned bibliographies from key articles.</td>
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<tr>
<td>Two reviewers independently screened studies for eligibility and abstracted data. For each study, they calculated the median improvement in adherence to target processes of care and also identified the outcome with the largest such improvement. They then calculated the median absolute improvement in process adherence across all studies using both the median outcome from each study and the best outcome.</td>
</tr>
<tr>
<td>Twenty-eight studies (reporting a total of thirty-two comparisons) were included. Computer reminders achieved a median improvement in process adherence of 4.2% (interquartile range (IQR): 0.8% to 18.8%) across all reported process outcomes, 3.3% (IQR: 0.5% to 10.6%) for medication ordering, 3.8% (IQR: 0.5% to 6.6%) for vaccinations, and 3.8% (IQR: 0.4% to 16.3%) for test ordering. In a sensitivity analysis using the best outcome from each study, the median improvement was 5.6% (IQR: 2.0% to 19.2%) across all process measures and 6.2% (IQR: 3.0% to 28.0%) across measures of medication ordering.</td>
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<tr>
<td>Authors concluded that point of care computer reminders generally achieve small to modest improvements in provider behaviour. A minority of interventions showed larger effects, but no specific reminder or contextual features were significantly associated with effect magnitude.</td>
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1.3. **Vote counting**

The conventional procedure of vote counting adds up the number of positive and negative comparisons and concludes whether the interventions were effective on this basis.(26) Vote-counting could count either the number of comparisons with a positive direction of effect (irrespective of statistical significance) or the number of comparisons with statistically significant effects. Despite its intuitive appeal, the method fails to provide an estimate of the effect size of an intervention (giving equal weight to comparisons showing a 1% change or a 50% change) and ignores the precision of the estimate from the primary comparison (giving equal weight to comparisons with 100 or 1000 participants). Besides, when using statistical significance for the counting, comparisons with potential unit of analysis errors need to be excluded because of the uncertainty about their statistical significance. (27) Therefore, vote-counting does not seem to be an appropriate method and for some authors it is never a valid approach.(28)

1.4. **Narrative summary**

A narrative summary typically involves the selection, chronicling, and ordering of evidence to produce an account of it.(13) It is often used in systematic reviews when – because of different reasons – meta-analysis is not possible or the reviewers think it would not be appropriate. Its form may vary from the simple recounting and description of findings to a more interpretative and reflexive approach that includes higher levels of abstraction. The former is the way in which this approach is currently used in most systematic reviews unable to pool statistically the measures of effect and it is frequently subject to criticism.
because of its lack of transparency. The more interpretive form is closer to the narrative synthesis described below in the section regarding qualitative approaches.

### Illustrative example

<table>
<thead>
<tr>
<th>The effects of changes in the pre-licensure education of health workers on health-worker supply. (29)</th>
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<tr>
<td>Pariyo et al assessed the effect of changes in the pre-licensure education of health professionals on health-worker supply. Authors searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2007, Issue 3), EMBASE, Ovid (1980 to week 3, October 2007), MEDLINE, Ovid (1950 to week 3, October 2007), CINAHL (October 2007), LILACS (week 4, November 2007), ERIC (1966 to week 3, February 2008), and Sociological Abstracts (October 2007). Additionally WHO(WHOLIS) (February 2008), World Bank, Google Scholar, and human resources on health-related websites were searched to obtain grey literature. Key experts in human resources for health were contacted to identify unpublished studies. The reference lists of included studies were searched for additional articles. They found 2 controlled before-and-after studies on the effects of retention strategies. The heterogeneity among the studies with regard to study populations precluded meta-analysis; therefore, findings for each study were presented separately. Both studies (from the same authors) reported that an intervention comprising of a package of student support activities including social, academic, and career guidance and mentorship resulted in an increase in the number of minority students who enrolled and graduated from health training institutions. Authors concluded that the evidence to estimate the likely effects of interventions in pre-licensure education to increase health-worker supply is generally insufficient or unavailable, particularly in LMICs. However, promising innovations from a high-income country include providing financial support to health professional students or introducing mechanisms to identify and encourage potential students and offering support to 'at risk' students.</td>
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### 2. Qualitative approaches

#### Meta-ethnography

It is a method for synthesizing multiple qualitative research reports that works with metaphors or concepts as the unit for synthesis, and that was first developed for use in educational research. It seeks to do more than simply collect and review a series of accounts and instead aims at a novel synthesis, which develops a new theory to explain the range of research findings encountered. (30) Three different methods of synthesis are used in meta-ethnography. The first one involves the ‘translation’ of concepts from individual studies into one another, producing overarching concepts and metaphors (what is called ‘reciprocal translational analysis’). ‘Refutational’ synthesis involves exploring and explaining contradictions between individual studies. Lines-of-argument’ synthesis involves building up a picture of the whole from studies of its parts. (31) A particular value for policy-makers of this approach is that it could help explain seemingly divergent quantitative and qualitative study findings.

More detailed guidance about how to conduct this kind of synthesis could be found in the book by Noblit & Hare. ([http://www.amazon.co.uk/Meta-Ethnography-Synthesizing-Qualitative-Studies-Research/dp/0803930232](http://www.amazon.co.uk/Meta-Ethnography-Synthesizing-Qualitative-Studies-Research/dp/0803930232))

### Illustrative example

<table>
<thead>
<tr>
<th>Factors associated to patient adherence to tuberculosis (TB) treatment. (32)</th>
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<tr>
<td>Munro et al aimed to understand the factors considered important by patients, caregivers and health care providers in contributing to TB medication adherence</td>
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</table>
They searched 19 electronic databases (1966–February 2005) for qualitative studies on patients’, caregivers’, or health care providers’ perceptions of adherence to preventive or curative TB treatment with the free text terms ‘“Tuberculosis AND (adherence OR compliance OR concordance)”’. The study quality of included studies was assessed using a predetermined checklist and data were extracted independently onto a standard form. Authors then followed Noblit and Hare’s method of meta-ethnography to synthesize the findings, using both reciprocal translation and line-of-argument synthesis. They screened 7,814 citations and selected 44 articles that met the prespecified inclusion criteria. We identified eight major themes across the studies: organisation of treatment and care; interpretations of illness and wellness; the financial burden of treatment; knowledge, attitudes, and beliefs about treatment; law and immigration; personal characteristics and adherence behaviour; side effects; and family, community, and household support. Our interpretation of the themes across all studies produced a line-of-argument synthesis describing how four major factors interact to affect adherence to TB treatment: structural factors, including poverty and gender discrimination; the social context; health service factors; and personal factors.

2.2. Thematic synthesis
It combines and adapts approaches from both meta-ethnography and grounded theory (a systematic qualitative research methodology in the social sciences emphasizing generation of theory from data in the process of conducting research). It is possible to identify three stages in thematic synthesis: the coding of text ‘line-by-line’; the development of ‘descriptive themes’; and the generation of ‘analytical themes’. While the development of descriptive themes remains ‘close’ to the primary studies, the analytical themes represent a stage of interpretation whereby the reviewer ‘go beyond’ the primary studies and generate new interpretive constructs, explanations or hypotheses. (33)

More detailed guidance about how to conduct this kind of synthesis could be found in the Thomas and Harden’s paper previously cited in BMC Medical Research Methodology. (http://www.biomedcentral.com/1471-2288/8/45)

Illustrative example

<table>
<thead>
<tr>
<th>What is known about the barriers to, and facilitators of, healthy eating among children aged 4–10 years? (34)</th>
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<tr>
<td>The aim of the authors for this part of the analysis was to infer barriers to, and facilitators of, healthy eating and ideas for effective interventions from children’s views. They found eight qualitative studies that met their prespecified inclusion criteria. Authors examined the findings of each study in turn and assigned codes to describe relevant sentences or paragraphs. Then they looked for similarities and differences between the codes to organize these into a hierarchical tree structure centred on children’s understanding of healthy eating and the factors, in their views, that influence the food they eat. In the next stage, three reviewers independently examined the descriptive themes and their associated data in the light of the review question to infer barriers, facilitators, and implied recommendations for developing interventions. The reviewers then met to discuss their findings and to develop a set of more abstract themes. As an example, one of the themes was that children do not see their personal health as their responsibility but that of their parents. Children do not regard purchasing fruit for health reasons as a legitimate use of their pocket money. Again, that is the job of parents. Children prioritise taste over health. This theme suggested that future health promotion interventions should promote fruit and vegetables as tasty rather than healthy and any emphasis on health messages should be minimized.</td>
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</table>

2.3. Narrative synthesis
It refers to an approach to the systematic review and synthesis of findings from multiple studies that relies primarily on the use of words and text to summarise and explain the findings of the synthesis. Whilst narrative synthesis can involve the manipulation of statistical data, the defining characteristic is that it adopts a textual approach to the process of synthesis to ‘tell the story’ of the findings from the included studies.

More detailed guidance about how to conduct this kind of synthesis could be found in the Guidance on the Conduct of Narrative Synthesis ([http://cpd.conted.ox.ac.uk/healthsciences/courses/short_courses/qsr/NSguidanceV1-JNoyes.pdf](http://cpd.conted.ox.ac.uk/healthsciences/courses/short_courses/qsr/NSguidanceV1-JNoyes.pdf)) developed for a group of researchers in the UK funded by the ESRC and in the webpage of the project ([http://www.york.ac.uk/inst/crd/narrative_synthesis.htm](http://www.york.ac.uk/inst/crd/narrative_synthesis.htm)).

### Illustrative example

<table>
<thead>
<tr>
<th>Factor influencing the implementation of interventions to improve the use/functioning of domestic smoke alarms(35)</th>
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<tr>
<td>Drawing on the ‘ESRC Guidance on the Conduct of Narrative Synthesis’ and information on the implementation of domestic smoke detectors, authors presented findings from a demonstration of the tools and techniques that can be used at each step of a narrative synthesis process: i) developing a theory of how the intervention works, why and for whom; ii) developing a preliminary synthesis; iii) exploring relationships within and between studies; and iv) assessing the robustness of the synthesis.</td>
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### 3. Mixed approaches

This section describes some approaches to evidence synthesis that do not ‘fit’ into the categories previously described as they are capable of accommodating a diversity of types of evidence. In some way they may be also conceived as ‘global’ approaches to systematically reviewing evidence about a specific question with their specific methods for each stage of the review process. However, in this section a focus on the synthesis methods proposed by each of them is presented.

#### 3.1. Realist synthesis

In this approach the primary focus is on the causal mechanisms or ‘theories’ that underlie types of interventions or programmes. It aims to build explanations across interventions or programmes which share similar underlying ‘theories of change’ as to why they work (or not) for particular groups in particular contexts.(36)

More detailed guidance about how to conduct this kind of synthesis could be found in the book of Ray Pawson ‘Evidence-Based Policy. A realist perspective’. ([http://www.amazon.com/Evidence-Based-Policy-Perspective-Ray-Pawson/dp/1412910609](http://www.amazon.com/Evidence-Based-Policy-Perspective-Ray-Pawson/dp/1412910609))

### Illustrative example

<table>
<thead>
<tr>
<th>Disentangling how community health workers (CHW) interventions work(37)</th>
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<tr>
<td>The aim of this study was to explore if randomized controlled trials (RCTs) could yield insight into the working of interventions involving CHWs for improving child health. Authors searched a number of databases (PubMed, Popline, Embase, CINAHL, Cochrane Database of Systematic Reviews and CENTRAL), and references of previous reviews. From 1,218 hits initially retrieved, 137 titles and abstracts were considered potentially relevant. Twenty two of them were relevant for low and middle income countries and the full text was retrieved and reviewed, ending with 10 studies (6 RCTs and 4...</td>
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</table>
They found a number of interventions to improve CHW performance including ‘Skills based training of CHW’, ‘Supervision and referral support from public health services’, ‘Positioning of CHW in the community’. When interventions were applied in context of CHW programs embedded in local health services, with beneficiaries who valued services and had unmet needs, the interventions worked if following mechanisms were triggered: anticipation of being valued by the community; perception of improvement in social status; sense of relatedness with beneficiaries and public services; increase in self-esteem; sense of self efficacy and enactive mastery of tasks; sense of credibility, legitimacy and assurance that there was a system for back-up support. Studies also showed that if context differed, even with similar interventions, negative mechanisms could be triggered, compromising CHW performance.

Authors concluded that RCTs could yield some insight, but the hypotheses generated were very general and not well refined and they need to be tested and refined in further studies.

3.2. The “EPPI-Centre” approach

This approach typically involves a very broad review question from which separate questions are developed. These form the focus of two or more parallel systematic syntheses. They may, for example, focus on sub-questions about effectiveness, appropriateness, barriers and enablers to implementation, and the perspectives of the group targeted by the intervention. The results of the separate syntheses are then combined in a so-called ‘meta-synthesis’ aimed to address the review question in its entirety. (38;39)

More detailed guidance about how to conduct this kind of synthesis could be found at the website of the Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre) (http://eppi.ioe.ac.uk/cms/) at the Institute of Education, University of London.

Illustrative example

Young people and physical activity: a systematic review matching their views to effective interventions(40)

The objectives of the study were: i) systematically to ‘locate and characterize’ existing research literature on the barriers to, and facilitators of, physical activity among young people, especially those from socially excluded groups; ii) to prioritize a sub-set of studies to review systematically ‘in-depth’; iii) to ‘synthesize’ what is known from these studies about the barriers to, and facilitators of, physical activity among young people, and how these can be addressed; and iv) to identify gaps in existing research evidence.

Authors run highly sensitive searches across a wide range of electronic databases (e.g. The Cochrane Library, PsycINFO, ERIC and the Social Science Citation Index). A range of controlled and free-text terms for physical activity was combined with those for health promotion/determinants of health and young people. Of the total of 7048 citations identified, 96 reports (describing 90 studies) were included in the descriptive map of the literature. A sub-set of 12 trials and 16 studies of young people’s views entered the in-depth review.

Three types of synthesis were performed: i) narrative synthesis of trials; ii) narrative synthesis of views studies; and iii) synthesis of trial and views studies together. In the second synthesis, each study’s findings were considered in relation to developing interventions for promoting participation in physical activity, using four separate questions. For the last synthesis, a matrix was constructed which laid out the barriers and facilitators identified by young people alongside descriptions of the interventions included in the in-depth systematic review of trials.

Authors found that evidence for the effectiveness of the interventions was limited, with some suggestions of improvements in knowledge and possible differences according to gender. Young women in particular identified barriers to physical activity associated with certain ways of providing physical education in schools. Young people in general identified a need for increased choice and facilities within the community and emphasized physical activity’s social side. Some of the barriers and facilitators identified by young people had been addressed by ‘soundly evaluated’ effective interventions but significant gaps were identified.
where no evaluated interventions appear to have been published (e.g. initiatives explicitly addressing gender issues or the combination of sport and other leisure activities), or where there were no soundly evaluated interventions.

They concluded that rigorous evaluation is required particularly to assess initiatives that address the limited practical and material resources that young people identify as barriers to physical activity.

How to choose a specific synthesis approach?

Choice of a particular approach(es) will depend at least on: i) the underlying aim (i.e. review of the evidence base or direct contribution to a decision); ii) the specific question(s) to be addressed; and iii) the nature and balance of evidence available (e.g. whether most of the research is qualitative or quantitative). (30) In most cases the specific question(s) that the review is addressing will command both the type of evidence selected (see section on selecting the evidence) and the method used to summarize it. The Table attempts to provide some guidance on which approaches are likely to be suitable for different sorts of questions.

Table. Choosing a suitable approach to synthesis given the review question and the evidence available (adapted from Mays et al (30))

<table>
<thead>
<tr>
<th>Review question</th>
<th>Relevant types of evidence (if available)</th>
<th>Likely approach(es) to synthesis</th>
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<tbody>
<tr>
<td>Is this a problem?</td>
<td>All types including research and non-research (e.g. public &amp; stakeholder views, opinion polls, focus groups), qualitative and quantitative</td>
<td>Narrative synthesis, meta-ethnography</td>
</tr>
<tr>
<td>How big is a problem? Which groups does it affect?</td>
<td>Quantitative research and routine administrative data. Qualitative data on subjective impact</td>
<td>Quantitative synthesis, meta-ethnography</td>
</tr>
<tr>
<td>Is it changing over time?</td>
<td>Quantitative research and routine administrative data</td>
<td>Quantitative synthesis</td>
</tr>
<tr>
<td>What can be done about it (what may work)?</td>
<td>Mostly quantitative research on effectiveness</td>
<td>Meta-analysis of intervention studies</td>
</tr>
<tr>
<td>What works, for whom, in which circumstances? What factors may moderate the impact of this policy/programme?</td>
<td>Wide range of research and non-research data</td>
<td>Realist synthesis, narrative review</td>
</tr>
<tr>
<td>How acceptable will intervention/policy X be? What will the reaction be here?</td>
<td>Largely qualitative research and non-research data</td>
<td>Qualitative synthesis</td>
</tr>
</tbody>
</table>

The way ahead

Although some of the synthesis methods are relatively well-established, in the field of HPSR there is still a lot of work to be done regarding methodological development and the application of the different approaches to HPSR questions. Although some useful examples have been published, many approaches have been developed in the context of initiatives of single researchers or institutions and a more collaborative work will be welcomed. In this sense, since 2007 the Alliance of HPSR has promoted the establishment of collaborative work in the area with the funding of Centres for Systematic Reviews of HPSR in LMICs
and with the set of a workforce on the need for an international collaboration for synthesizing health system evidence. Although the future of those initiatives is not currently clear a continuous effort will have to be put in convening and promoting collaborative efforts in this area in order to achieve significant advances in the methodology of synthesis efforts in HPSR.

**Resources**

<table>
<thead>
<tr>
<th>Further reading</th>
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<tbody>
<tr>
<td>Cochrane Handbook for Systematic Reviews of Interventions (<a href="http://www.cochrane.org/training/cochrane-handbook">http://www.cochrane.org/training/cochrane-handbook</a>)</td>
</tr>
<tr>
<td>The Handbook contains methodological guidance for the preparation and maintenance of Cochrane intervention systematic reviews. Written in a clear and accessible format, it is the essential manual for all those preparing, maintaining and reading Cochrane reviews. Edited as a book, its chapters are also available on line through the Cochrane Collaboration handbook website (<a href="http://www.cochrane.org/training/cochrane-handbook">http://www.cochrane.org/training/cochrane-handbook</a>). In chapter 9 a complete description of the methods for synthesizing evidence in Cochrane reviews is presented.</td>
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<tr>
<td>Centre for Reviews and Dissemination guidance for undertaking reviews in health care (<a href="http://www.york.ac.uk/inst/crd/index_guidance.htm">http://www.york.ac.uk/inst/crd/index_guidance.htm</a>)</td>
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<tr>
<td>This publication presents independent guidance produced by the Centre for Reviews and Dissemination (CRD) for the different steps involved in the production of systematic reviews.</td>
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<tr>
<td>Health Development Agency. Integrative approaches to qualitative and quantitative evidence (<a href="http://www.nice.org.uk/niceMedia/pdf/Integrative_approaches_evidence.pdf">http://www.nice.org.uk/niceMedia/pdf/Integrative_approaches_evidence.pdf</a>). This report is an informal review of the literature on integrating qualitative and quantitative forms of evidence. It explores five key themes: i) the role of qualitative approaches in traditional trials and experimental studies, beginning with a general discussion of the rationale for multi-method research; ii) at what point in the development of a field of knowledge it is appropriate to pull qualitative and quantitative learning together; iii) the complex question of how to determine what constitutes good evidence from qualitative studies; iv) a brief discussion of whether there are hierarchies of evidence within the different types of qualitative investigation, and conclude that it is unlikely that consensus can be achieved; and v) considerations in some detail how the findings of qualitative and quantitative evidence may be synthesized. A discussion of some of the theoretical and methodological issues that remain to be resolved is presented, and the report concludes with some directions for research and development.</td>
</tr>
<tr>
<td>This guidance provides advice on the conduct of narrative synthesis in the context of systematic reviews of research evidence and describes some specific tools and techniques that can be used in the synthesis.</td>
</tr>
</tbody>
</table>
### SCIE systematic research reviews: guidelines
This document presents the SCIE updated guidelines to govern the conduct of systematic reviews it commissions.

### National Institute for Health and Clinical Excellence. Moving beyond effectiveness in evidence synthesis
([http://www.nice.org.uk/niceMedia/docs/Moving_beyond_effectiveness_in_evidence_synthesis2.pdf](http://www.nice.org.uk/niceMedia/docs/Moving_beyond_effectiveness_in_evidence_synthesis2.pdf))
This volume presents the reworked versions of the papers presented in a seminar in 2003 where a group of researchers and methodologists considered the question of evidence synthesis when that evidence is derived from diverse sources and from a variety of methodological traditions.

### Websites

**Cochrane Effective Practice & Organisation of Care Group** ([http://epoc.cochrane.org/](http://epoc.cochrane.org/))
The Cochrane Effective Practice and Organisation of Care (EPOC) Group is a **Review Group** of **The Cochrane Collaboration** – an international network of people helping healthcare providers, policy makers, patients, their advocates and carers, make well-informed decisions about human health care by preparing and publishing systematic reviews (SRs). The research focus of the EPOC Group are interventions designed to improve the delivery, practice, and organisation of health care services. The EPOC editorial base is located in Ottawa, Canada with satellite centres in **Norway**, Australia, and **England**. A number of resources related to specific synthesis methods could be found in its website, including the use of the range of effect sizes approach.

**Cochrane Public Health Group** ([http://ph.cochrane.org/resources-and-guidance](http://ph.cochrane.org/resources-and-guidance))
The Cochrane Public Health Group (CPHG), formerly the Health Promotion and Public Health (HPPH) Field, aims to work with contributors to produce and publish Cochrane reviews of the effects of population-level public health interventions. A number of resources could be found in its website including detailed guidance of synthesis methods potentially useful on conducting systematic reviews of public health topics.

The Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) is part of the Social Science Research Unit at the Institute of Education, University of London. Since 1993, they have been at the forefront of carrying out systematic reviews and developing review methods in social science and public policy. The Centre is dedicated to making reliable research findings accessible to the people who need them, whether they are making policy, practice or personal decisions. The EPPI-Centre offers support and expertise to those undertaking systematic reviews. The methods pages provide a brief description of the methods used at each stage of a systematic review. The Tools page provides information and links to various data coding and management tools and guidelines.
Cochrane Qualitative Research Methods Group
(http://www.joannabriggs.edu.au/cqrmg/about.html)

The Cochrane Qualitative Research Methods Group develops and supports methodological work on the inclusion in systematic reviews of findings from studies using qualitative methods and disseminates this work within and beyond the Collaboration's Review Groups. The Cochrane Qualitative Methods Group focuses on methodological matters arising from the inclusion of findings from qualitative studies into systematic reviews. A number of resources for assessing the quality of qualitative studies can be found in its website.

References


Ref Type: Serial (Book,Monograph)


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(37) Kane SS, Gerretsen B, Scherpier R, Dal Poz M., Dieleman M. A realist synthesis of randomised control trials involving use of community health workers for delivering child health interventions in low and middle income countries. BMC Health Serv Res 2010;10:286.

