Chapter 3: What do you know?

Introduction

In chapter one it was argued that implementation research should be an ongoing activity, tracking the progress of what will typically be a complex health systems intervention and attempting to build an understanding of both what is happening as the implementation evolves and, an even more difficult task, why it is happening. Interpretation of data clearly involves a reasonable degree of intelligence and an ability to think rationally about the interplay between intervention activities and the context within which they are played out. However, experience can be an equally important guide, both your own and that of the multitude of researchers and others who have gone through similar processes before you. Being able to identify, assess, assimilate and use relevant existing evidence that may provide valuable insights is one of the key attributes of a capable implementation researcher. In this chapter the focus is on the first two activities – locating relevant evidence and assessing its quality.

We can distinguish between two phases of evidence review. Initially, we will need to draw on the existing literature in the design of our research. It will help us both to refine our research questions and to develop the appropriate methodologies for data collection. A selective review of the recent literature will also be essential if, as advocated in chapter one, we seek independent funding for our research. Those offering funding will be expecting us to provide findings which will complement the existing body of knowledge on a given topic. They will need to be convinced that we are very familiar with that knowledge and that our research is targeting areas where evidence is currently lacking. The first part of this chapter describes the basic review process from this perspective.

In the second part we consider what can be seen as a natural extension of this initial phase, the undertaking of a 'systematic review'. This term is usually dated back to a book by Cochrane (1972), which argued that with limited resources available in the health sector, clinical judgements should be based on all the available evidence on treatments that had been obtained from rigorously designed evaluations. While that book, and the continuing work of the Cochrane Collaboration in this area, strongly emphasised the importance of one particular approach to evaluation – the Randomised Control Trial (RCT) (J-PAL undated) – many authors have suggested that, particularly when considering innovations not directly concerned with clinical trials, the range of material considered should be substantially expanded, while retaining two key features of the methodology: the aim of systematically compiling *all* the relevant literature; and the rigorous quality assessment of each item before incorporating its findings to the extent warranted by that assessment into a final overall synthesis.

Our suggestion here is not that every implementation researcher should conduct a systematic review, though a recent proposal goes further, arguing that, given the relative ease with which they can now be undertaken using the internet, there should be "*no new studies without adequate systematic review of existing evidence showing new research is justified*" (Lund et al. 2016:5). The article points to at least one major research funding body which has accepted this policy. Our more modest suggestion is that if researchers are going to have a long term involvement with an implementation of a given intervention, it would be advantageous to allocate some of their time to following a process similar to that required for a formal systematic review. By defining appropriate selection and assessment criteria for such a review, given the nature of the intervention with which they are engaged, it may be possible to refine their interpretation of the data they are compiling by building systematically on the experience of researchers who have addressed similar issues.

Part 1: Rapid literature reviews

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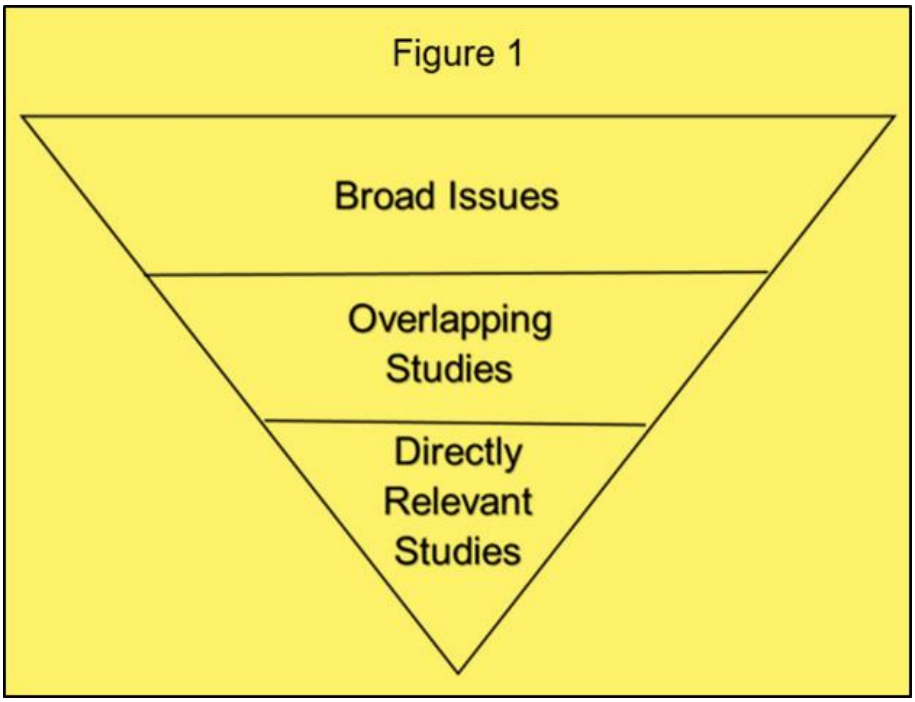
1. What is a literature review?

A literature review should include a select analysis of existing research that is relevant to what you have been asked for in the application, showing how it relates to your proposed research. It explains and justifies how your investigation may help answer some of the questions or gaps in this area of research and promote your application as a necessary area of study. A literature review is not a summary of everything available on a specific topic and it is not a chronological description of what has been discovered about a particular area. It is important to be concise, clear and selective, especially when writing a review for a funding application, bearing in mind that the people reading the application may not be experts in this issue, so avoiding any acronyms or very specific language.

If you are seeking funding, first check the donor criteria for their support and show how your project fits. Such is the competition for funds that there is no point in submitting a project, however worthy, if it does not clearly meet donor priorities. There are different types of funding applications and the amount of evidence you will need for your literature search will depend on what they are asking for so clearly read this before going any further with your search. One common way to approach the structure of a literature review is to start out by outlining the context and then become more specific, as suggested in figure 1 (University of Reading undated). First, explain the broad issues related to your research proposal; this should not be too long, just enough to explain the context. Next, focus on studies in your particular area of research, followed by those directly relevant to that research and particularly those that identify gaps in the literature.



2. Search strategies

Identify a research question

Start with a carefully thought out research question which matches what the funder is asking for. A literature search should be focused and to ensure you are efficient with your search you must be clear from the start what types of evidence will be relevant to address that question. There are many guides that can help with this (e.g. Aveyard 2007, Chapter 3). A systematic approach to searching for the literature is key. Ensuring that you follow a structure will allow you to identify the key broad texts and find the specific studies that are most relevant to your work. It may help to break the literature search into key themes with different sets of keywords, to help with organising your search as suggested in the diagram above. Make sure you record how you have approached your search and if you have been short on time and had to adapt some of these processes for speed that is fine too.

Keywords

The keywords you choose are central to shaping your search. You will know some of the appropriate words but may need to use a snowball approach and add keywords as you access the literature and increase your knowledge of the terminology being used. If you are new to the topic do an extremely brief general search to help identify your keywords. You should be as creative as possible at this stage, as this will form the basis of your search and restrict what you find. You will need to consider that there are different meanings to different words, and also consider that different spellings and different terminologies may also be used in different countries. Note that keywords need not only relate to terms in your research questions. If your searches identify authors or agencies who have regularly published in the area, you can also search using their names.

Example: Attitudes to medical abortion in India:

- Overall search (broad, context-setting)
  Keywords: abortion, India, attitudes
- Theme 1: Medical abortion in the South Asian context (relevant studies)
  Keywords: medical abortion, Asia
- Theme 2: Personal characteristics affecting attitudes to abortion (relevant studies)
  Keywords: education, socioeconomic, parity, abortion, personal characteristics (then add words in a snowball approach as you read through studies and find out what works)
- Theme 3: (specific): Attitudes to abortion in India
  Keywords: Identify keywords based on the information you have found from the other searches about what terminology is used.

Take some time to get to know the search engines and how they work; for example exploring the use of AND/OR/NOT and * commands can be very useful when conducting your search and can save you time:

- AND ensures you search for two or more specified terms;
- OR looks for any one of them;
- NOT excludes articles with specific terms; and
- * Allows any ending to be searched for, e.g. anthropo* will bring up anthropological, anthropology, anthropologist, etc.

For example, table 1, shows various ways of refining a search on the links between hand washing by staff and hospital acquired infections.

Table 1: A search on links between hand washing and hospital acquired infections

Operator	Search	Retrieves
AND	hospital acquired infection AND hand washing	Retrieves citations with BOTH terms present
OR	hospital acquired infection OR cross infection OR nosocomial infection	Retrieves citations with ANY of these terms
AND, OR	(cross infection OR nosocomial infection OR hospital acquired infection) AND hand washing	Search sets may be combined. This search locates citations with the word hand washing AND (ANY one of the terms combined with OR)
NOT	hand washing NOT masks	Retrieves citations with the term hand washing, but omits records with the term masks (Caution: the NOT operator should be used sparingly and carefully as it may omit citations relevant to a search. For example, an article about hand washing that includes the word masks might be relevant to a search on hand washing.

Source: NYU Libraries (2016)

Identify types of literature to include:

Next, decide which types of literature you will include. This will help you to narrow down your search and also decide where you might best search for information. For example, you may want to include newspaper reports if you are looking at public opinion, or definitely exclude them if you are looking for an academic evidence base. Examples of the types of literature to include for the health sector are:

1. Peer-reviewed and academic journals using relevant search engines, e.g. Google Scholar, Scienceopen, PubMed (which provides free access to the MEDLINE database), and the WHO Library & Information Networks for Knowledge Database (WHOLIS).
2. Full text versions of journal articles available for selected countries using HINARI.
3. Working papers published by established research and consultancy agencies.
4. International and national policy documents.
5. Websites of international organisations, private companies and NGOs, and grey literature (NIH 2016) - newspapers, magazines, blogs, etc., often identified using Google or other general purpose search engine.

You need to spend time thinking about the advantages and disadvantages of using different sources. Academic articles and books should have been peer-reviewed, which provides at least some guarantee of quality. However, there are often considerable delays between preparation and publication, so they may not provide the most recent data. Reports produced by an international agency may reflect the specific objectives of that agency or be influenced by political considerations – for example not wishing to provoke a country that is contributing to its budget. This may be an even more important consideration for material produced by private companies and NGOs. Grey literature typically will not have been through a process of peer review and may well be seen by some as biased, subjective and anecdotal – especially if it challenges their own views. However, it can often provide insights or at least suggest alternative interpretations of data or events that are not available elsewhere. Careful consideration of such issues will be a useful starting point to determine your inclusion/exclusion criteria.

Inclusion/exclusion criteria

When programming search engines you can usually set inclusion and exclusion criteria to ensure you are not looking through material that you will not use. Taking time to set appropriate criteria will save you time in the long run, though it may be useful to do general quick search using Google to ensure you have not missed anything important by setting these restrictions.

Example: Selection criteria relevant to a health systems intervention in Ghana
Languages: English, French
Years: 2010-2015
Publications: Journals, books, dissertations, reports of specified agencies.
Regions: West Africa

Where to search

Spend a little time researching the most appropriate databases to use for your research topic. A list is provided in part 2 of this chapter. Depending on the time available, once you have used one database, try another and see if the same information is coming up. If it is, you can be more confident that your strategy is well-focused and that you are finding the relevant literature. If you only have time to use one search engine use Google or Google Scholar (depending on your inclusion criteria) as these search most widely. If you use these search engines you may need to limit the literature you search through, for example by only reading through the first ten pages of results.

Procedure

Firstly, search for the keywords you have selected and synonyms of those keywords in your chosen databases. If you are using the approach suggested earlier, you will be undertaking a context-setting search, one or two more specific searches relevant to your research and one very specific search. As you learn more about the topic, open up the search to wider material by adding words used often in the research (for example look at the keywords in the journal articles you are bringing up). You may also want to search for more papers from key authors and journals you find, making use of 'related articles' features and using the bibliographies of relevant research. It is useful to record your search in a table such as that shown below. This will assist you in assessing the extent to which you can feel confident that you have compiled the most important material and provide others with evidence of your methods you have adopted. Note that some databases allow you to maintain a record of past searches.

Table 2: Search links between availability of hospital performance data and utilization

Database	Date	Keywords	Total hits	Relevant Studies
Science Direct	02/09/2014	Countries (list with separator OR) AND Hospitals AND (HMIS OR HIS OR Terms related to performance) AND Utilization	103	19

3. Quality-assessment of studies

The next step is to select the items identified in the search that you will use, given that there is not time for a systematic review of all of the evidence. This part of a literature search is key as it will ensure you spend your time effectively, and read in detail only the research that you

will potentially be including. There are many ways of doing this, but one way of quickly assessing studies and ensuring you select the most appropriate is to use an appropriate assessment tool that takes into account a range of factors. The aim of this procedure is to provide an indication of which studies should be seen as contributing most significantly and robustly to understanding this topic and it will also mean the evidence you present is responsibly and judiciously selected. Note that funding agencies place considerable emphasis on the need for robust evidence to informing policy and programming; including suspect or out-dated materials will not be helpful if you are seeking their support.

Quality assessment can be problematic. Katrak et al. (2004) identified a list of 121 different critical appraisal tools (e.g. Understanding Health Research 2016). They concluded that there is no 'gold standard' for appraising studies as there is a lack of information on the development and validity of these tools and only a few have been seriously evaluated. One interesting example is an approach adapted from a report prepared by the UK Department for International Development (DFID 2014). They suggest a two-part evidence assessment (single study and evidence body assessment), but here we focus on the first stage. Depending on the time available, you could simply use the general theory behind this approach without formally writing down the assessments. The procedure outlined below involves reading the abstract and methodology of each study as a basis for including or excluding them. More detail on the methods can be found in Chapter 2 of Aveyard (2007). Many search engines allow you to copy citations into a document as you proceed, such that by the end of this process you have your selected literature. If you have more time, and want to include more detail, a table such as that shown below can help you remember key aspects of each study and is a way to organise your results.

Table 3: Findings of a critical assessment process

Author/date	Related theme	Aim of paper	Type of information	Main findings	Strengths and limitations

Assessment of evidence strength

For each individual study, we can consider the research type, research design, and methodology to arrive at a quality assessment. Such a procedure can either be seen as a rough guide as you select material, or it can be undertaken more formally and the selection criteria described with multiple descriptive keys. Table 4 provides one approach to classifying studies by type, table 5 lists questions allowing assessment of various quality dimensions and table 6 provides an aggregation index based on these dimensions. For example, an assessment of (P&E; EXP;H) might mean that a study is primary and empirical, experimental and high quality.

Table 4: Classification of research studies by type

Research Type	Research Design
Primary and Empirical (P&E)	Non-Experimental (NEX)
	Quasi-Experimental (QEX)
	Experimental (EXP)
Secondary (S)	Systematic Review (SR)
	Non-Systematic Review (NSR)
Theoretical or Conceptual (TC)	N/A

Source: DFID 2014:9

Table 5: Principles for assessing the quality of individual studies

Principles of Quality	Associated Questions
Conceptual Framing	Does the study acknowledge existing research?
	Does the study construct a conceptual framework?
	Does the study pose a research question or outline a hypothesis?
Appropriateness and rigour	Does the study present or link to the raw data it analyses?
	What is the geography/context in which the study was conducted?
	Does the study declare sources of support/funding?
Appropriateness	Does the study identify a research design?
	Does the study identify a research method?
	Does the study demonstrate why the chosen design and method are well suited to the research question?
Cultural sensitivity	Does the study explicitly consider any context-specific cultural factors that may bias the analysis/findings?
Validity	To what extent does the study demonstrate measurement validity?
	To what extent is the study internally valid?
	To what extent is the study externally valid?
	To what extent is the study ecologically valid?
Reliability	To what extent are the measures used in the study stable?
	To what extent are the measures used in the study internally reliable?
	To what extent are the findings likely to be sensitive/changeable depending on the analytical technique used?
Cogency	Does the author 'signpost' the reader throughout?
	To what extent does the author consider the study's limitations and/or alternative interpretations of the analysis?
	Are the conclusions clearly based on the study's results?

Source: DFID 2014:14

Table 6: Study quality category definitions

Study Quality	Definition
High (H)	Demonstrates adherence to principles of appropriateness/rigour, validity and reliability; likely to demonstrate principles of conceptual framing, openness/transparency and cogency.
Moderate (M)	Some deficiencies in appropriateness/rigour, validity and/or reliability, or difficulty determining these; may or may not demonstrate principles of openness/transparency and cogency.
Low (L)	Major and/or numerous deficiencies in appropriateness/rigour, validity and reliability; may/may not demonstrate openness/transparency and cogency.

Source: DFID 2014a:15

4. How to synthesise your findings

The next stage is to summarise the findings of the literature search. This will provide readers with details as to your review methodology and findings. If you have broken your search up into the three areas suggested in section 1, and used a table as suggested in section 2 to note down key findings as you have been searching, this process should be fairly simple as you will have three tables summarising the key findings for the different sections of your search. The inverted triangle diagram could be used to structure your review. There are different approaches to this, and it partly depends on what you have been asked to do. You could

include several paragraphs on how you have conducted your search and use the inverted triangle diagram to summarise the results of the research. The aim is to interpret the results and consider the differences and similarities in different papers, rather than simply summarise them. This will give a new meaning to the results and identify gaps in the literature. These should be outlined to show how your research will add to the existing literature and why it is important to study this area.

If more detail is needed, a meta-ethnographic approach to synthesising information could be used. Developed by Noblit and Hare (1988), this approach involves determining keywords, phrases, metaphors and ideas that occur in some or all of the studies and interpreting these in the light of those identified in other studies (Britten et al. 2002). The aim of this is to determine the relationship between the studies so that consistencies and differences are identified. If further time was given to research or if the funder asks how you could expand your review, a meta-summary should be conducted, assigning codes to points discussed in each research paper and further sub-themes could be developed under each section (more detail can be found in Chapter 6 of Aveyard (2007)).

Finally, note that a narrative review such as this can lead to misleading conclusions and should be seen as a preliminary step towards undertaking the type of systematic literature review discussed in the second part of this chapter. It can be useful to clarify this at the end of your method statement and not interpret your findings too widely or make assertions that are not justified from the amount of time you have spent researching the issue. Do not be tempted to bend the data to show the gaps you would like them to show, to improve your argument or to align your review with stakeholder or donor perspective as this will cause problems later.

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A useful resource

The British Library for Development Studies provides a document delivery service, which can be useful if you do not have access to a particular article, http://blds.ids.ac.uk/index.cfm?objectid=D3FBAB71-4D85-11E0-A71C00016C1BDD3E (accessed 12 March 2015)

Part 2: Systematic reviews

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1. Introduction

There has been an explosion in medical, nursing and allied health care professional publishing over the last 50 years. There are perhaps 20,000 journals and as many as two million articles per year. These keep expanding in number, making it literally impossible to keep up with primary research across the health domain. Even for specific research topics, the number of published studies can run to hundreds if not thousands. Some of these may give unclear, confusing or contradictory results, or involve research methods that are not compatible with those in other studies. There has also been a huge expansion in the number of such publications available via the internet, and researchers face the challenge of building skills that will enable them to use the electronic media in ways that allow effective access to this enormous volume of information. In addition, health care professionals have a wide range of information needs (Hemingway and Brereton 2009), requiring good quality information on the relevance, effectiveness, feasibility and appropriateness of a large number of health systems and services interventions.

Traditional reviews of the literature often lacked rigour because of the self-selection of research studies and subjective interpretation of the evidence. Recommendations based on such reviews would frequently be dismissed as biased. There was a turnaround in opinion in the 1980s-90s, with many arguing that traditional approaches had largely failed to extract useful and unbiased information. What was needed was the same rigour in secondary research (research where the objects of study are other research publications) as is expected from primary research i.e. original studies. Systematic Reviews (SRs) were designed to meet this challenge. They are based on an evidence translation mechanism undertaken in a highly rigorous, transparent and independent manner with full information on each stage of the procedure made available to the reader. They follow a strict peer-review protocol, with the reviewer starting the process with an open mind (NCCMT undated).

2. Substance of a Systematic Review

A Systematic Review is a summary of existing research on a particular topic or research question. Although it is in essence a literature review it aims to use the same principles and rigour that is expected of primary research with generally accepted approaches and methods. This means that readers can be confident that common methods have been used that are well accepted and that comparisons can be legitimately drawn between SRs. The method involves interrogating multiple databases and search bibliographies for references, both published studies and also ‘grey’ material (unpublished but generally available material). SRs screen studies for relevance, appraise for quality on the basis of the research design, methods and the rigour with which each of these were applied, and synthesises the findings using predetermined formal quantitative or qualitative methods.

SRs are in a period of rapid development (Hemingway and Brereton 2009). In the health field, many still look at clinical- and cost-effectiveness, but methods now exist for reviewers to also examine issues of appropriateness and feasibility. Note that the use of the term Systematic Review does not guarantee the quality of the study. A number of apparent SRs have been published that fail to follow the prescribed protocols or adopt procedures that are likely to deliver biased findings. Each review needs to be interrogated by asking a series of questions that can uncover deficiencies (Shea et al 2009). As indicated in the introduction to this chapter,

much of the work on formalising the SR process was undertaken by the Cochran Collaboration Their handbook (Cochran Collaboration 2011) is regarded by many as the authoritative text on how to both conduct and report the findings of SRs.

3. Steps in a Systematic Review

There are eight main steps to a SR process (Mann and Weightman 2015). The first is to identify a health care question clearly and unambiguously. Generally SRs answer specific healthcare questions and assess the effectiveness of particular interventions rather than providing general summaries of the literature on a given topic. With the example of an intervention, the review question would clearly define: the specific population or problem being investigated, the intervention being evaluated, the comparison or control under investigation and the outcome of interest.

Second, a review protocol is developed. This is a detailed description of the scope, aims and methods of the study, stating clearly the review question, how and where studies will be located, selected, appraised and synthesised. This allows any problems of bias to be addressed. In recent years, those undertaking SRs have been encouraged to include their protocols in a central database called PROSPERO. This database can be searched to locate existing SR protocols relating to specific types of intervention.

The third step is the search of the literature with the aim of identifying all relevant studies on the research topic. You may start by using a general search engines such as Google Scholar, talking to experts in the field, and looking at book reviews. This will guide the design of the comprehensive search strategy required for a SR, for example by identifying the most important journals and keywords. This search strategy must be clearly specified in the review protocol. For a health systems intervention the list of databases searched can be very extensive, as shown in table 1. Note that many of these only provide services on payment of a subscription fee, so you will need to check if your institution has access. If not, many of the same journals may be available via the HINARI initiative of the WHO.

Table 1: Detailed list of databases searched for a Systematic Review of the Integrated Management of Childhood Illness (IMCI) strategy

Database	Free (F) or Subscription (S)
Cochrane Central Register of Controlled Trials	F
MEDLINE/PubMed	F
EMBASE	S
Cumulative Index to Nursing and Allied Health Literature (CINAHL)	S
Latin American Caribbean Health Sciences Literature (LILACS)	F
WHO Library & Information Networks for Knowledge Database (WHOLIS)	F
Science and Social Sciences Citation Indices (Web of Science)	S
Population Information Online (POPLINE)	F
WHO International Clinical Trials Registry Platform (WHO ICTRP)	F
Global Health	S
Ovid	S
Scopus	S
Proquest Health Management Database	S
Proquest Public Health Database	S

Source: adapted from Gera et al. (2016)

In all fields there is a tendency to publish research with positive findings: research that shows 'no effect' may not be published but is just as important in terms of gaining an overall picture of the effect of an intervention. This 'publication bias' should be addressed by seeking out unpublished studies, which, as indicated above, are generally described as the 'grey literature' (Gray 1998). However, finding unpublished work can be very difficult because of the lack of a public record. A major initiative in this area is GreyNet International. This is a subscription based organisation but its website also provides links to a number of open access sources. It is also possible to search databases of conference proceedings (NIH 2016), higher degree dissertations (OATD undated), reports from international (e.g. WHO and UNICEF) and national donor agencies and the websites of selected schools of public health. In addition English language 'bias' should be addressed. If other languages are generally excluded (due to a lack of resources for translation), this should at least be noted, and the option of identifying and translating a small number of key articles considered. If possible, the search results should be imported into reference management databases such as Endnote or the freeware alternative, Zotero.

The fourth step is to identify relevant studies. In a formal SR, studies are assessed for their actual relevance independently by two or more researchers. The criteria for inclusion (i.e. which population, intervention and outcome measures are of interest) should be documented in the review protocol. Pre-specifying inclusion and exclusion criteria protects the review from allegations of investigator bias, where the reviewer for one reason or another becomes attached to one line of reasoning and tends to selects studies which confirm that option.

A key eligibility criterion relates to the type of research design adopted by the study. SRs were initially used for reporting on clinical trials, where double-blinded randomised controlled trials (DBRCTs), were regarded as the 'gold standard' in terms of reducing the possibility of biased findings. However, with their application to general health sector interventions, where double-blinding is typically impossible and RCTs often not feasible, it has become common to include a wide variety of experimental and non-experimental designs. For example, one recently submitted protocol for a review of economic evaluations of m-Health interventions specifies the inclusion criteria as:

> "*Randomised controlled trials (RCTs), quasi-RCTs, controlled clinical trials (CCT), controlled before-after-studies (CBA), interrupted time series (ITS) and before-after or cohort type evaluations, undertaken with formal health economic evaluations (cost-effectiveness analysis (CEA), cost-benefit analysis (CBA), cost-minimization analysis, cost-consequence analysis, and cost-utility analysis). Economic modelling studies will also be considered. Published in the English language*" (Iribarren 2014).

There will often be a trade-off between preferred research designs and the number of studies included in the review. This is well illustrated in a Cochran SR of interventions intended to reduce corruption in the health sector. The eligibility criteria in terms of research designs were described for two types of analysis:

> "*For the primary analysis, we included randomised trials, non-randomised trials, interrupted time series studies and controlled before-after studies that evaluated the effects of an intervention to reduce corruption in the health sector. For the secondary analysis, we included case studies that clearly described an intervention to reduce corruption in the health sector, addressed either our primary or secondary objective, and stated the methods that the study authors used to collect and analyse data*". (Gaitonde et al. 2016)

In the event, no studies were found that met the criteria specified for the primary analysis, while nine were accepted for the secondary. It can often be useful to categorise studies in this way and then consider how much weight to give to findings from the various types of design. A guide to research designs and their strengths and limitations in terms of potential bias can

be found in Chapter 13 of the Cochran Handbook (Cochran Collaboration 2011), and discussion of designs for public health interventions at paragraph 21.2 of that volume.

Step five is to critically appraise those relevant studies. As above, in a formal SR process it is strongly recommended that the appraisal should be performed independently by two or more researchers to avoid bias. The appraisal centres on the methodology adopted and the rigour with which the research appears to have been conducted, based on the published report. The appraisal will typically be undertaken using a formal checklist. These will vary depending on the type of study (SURE undated), in particular they will be very different for experimental (SURE 2015), observational studies (CASP 2013a) and qualitative studies (CASP 2013b).

Step six is the extraction of findings to construct a table allowing direct comparison of the main findings from each study. This is a difficult phase of the SR and one at which considerable judgement needs to be applied. It is complicated by issues such as incomplete reporting of study findings, the large range of outcomes commonly used to evaluate an intervention and the different ways in which data are reported and presented. Table 2 illustrates how such a table was constructed for a review of studies on the effects of mHealth interventions for chronic illnesses. Each blank cell indicates that a finding was not reported for the related study.

Table 2: Comparison of findings from studies of mHealth interventions

	Balsa and Gandelman	Shetty et al.	Shahid et al.	Ostojic et al.
Intervention	Health promotion & awareness		Remote monitoring & care support	
Design	RCT	RCT	RCT	RCT
Condition	Diabetes	Diabetes	Asthma	Asthma
Intervention group	195	110	220	8
Control group	193	105	220	8
Clinical outcomes				
Blood pressure	+/-		++	
HbA1c		++	++	
Coughing				++
Compliance outcomes				
Adherence to diet		+/-	++	
Adherence to exercise		+	++	
Knowledge	+/-			

Notes: +/- no difference between intervention and control groups
+ non-significant positive difference between intervention and control groups
++ significant positive difference between intervention and control groups
Source: adapted from Stephani et al. (2016):p7

The seventh step is to summarise the conclusions of the studies. The aim is to synthesise the individual studies to provide a clear and unambiguous judgment on the effectiveness of the intervention and a systematic summary of the research studies. In clinical studies, where a number of studies typically address precisely the same question, use similar populations, administer the intervention in the same manner and measure identical outcomes, it is often possible to combine the data statistically in a meta-analysis (Haidich 2010) to get an overall estimate of the effectiveness of an intervention. However this approach will rarely be appropriate for health systems interventions.

The results can often be reduced to a simple categorisation of studies that showed the specific intervention was beneficial, and those that indicated that it was not. A synthesis may also be achieved by a narrative summary supported by brief descriptions of each study in ‘evidence tables’ (Spiva 2013). Bodies of evidence should be summarised in terms of four characteristics

(DFID 2014): i) the technical quality of the studies constituting the body of evidence and the degree to which risk of bias has been addressed; ii) the size of the body of evidence; iii) the context in which the evidence is set; and iv) the consistency of the findings produced by studies constituting the body of evidence.

The final step is to document the review findings. SRs need to be promoted to inform policymakers and practitioners and so are useless unless they help fuel this objective. Report production and dissemination are crucial parts of the process, written along a focussed structure of introduction, methodology; nature of evidence identified and detailed findings, conclusions and recommendations. There needs to be a clear description of the methods so the reader can judge the validity of the techniques employed.

SRs do have some drawbacks. When well conducted they should give the best possible estimate of any true effect but such confidence may be misplaced on some occasions. First, SRs may simply be badly done. A checklist, such as that indicated below, can be used to determine the level of quality. Second, there may be inappropriate aggregation of studies that differ in terms of the nature of the intervention, the target population or types of data gathered that can lead to the drowning of important effects. For example, the effects seen in some subgroups may be concealed by a lack of effect (or even contrary effect) in other subgroups. Finally, when the findings of SRs are not in harmony with the findings from large scale single research exercises, they need to be weighed against potentially conflicting evidence from other sources.

4. An Appraisal Framework for SRs

Hemingway and Brereton (2009) suggest that some of the key questions to be addressed in relation to any systematic review are:

1. Is the topic well defined?
2. Was the search for papers thorough?
3. Were the criteria for inclusion of studies clearly described and fairly applied?
4. Was study quality assessed by blinded or independent reviewers?
5. Was missing information sought from the original study investigators?
6. Do the included studies seem to indicate similar effects?
7. Were the overall findings assessed for their robustness?
8. Was the play of chance assessed?
9. Are the recommendations based firmly on the quality of the evidence presented?

5. General Issues and the Future

The key element of SRs is impartiality, hence the requirement for independent assessment. However they are not easy, requiring enormous care and rigour with considerable attention to methodological detail and analysis. The label of ‘systematic review’ is hard earned. There are some changing trends in SRs. Increasingly health professionals cannot wait for a year or so for a full SR to produce its findings. Rapid Evidence Assessments (REAs), or Rapid Reviews (RRs) (Polisensa 2015) can provide what is already known about a topic or intervention, and take about two to six months. They use systematic review methods to search and evaluate the literature, but the comprehensiveness of the stages may be limited. The use of these approaches depends on the time frame for decisions, uncertainty about effectiveness when there has already been considerable prior research or to develop a map of evidence to determine the existing evidence and to direct future research needs.

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Resources

The Cochrane Library www.cochrane.org

The Joanna Briggs Institute www.joannabriggs.edu.au/pubs/systematic_reviews.php

The Campbell Collaboration www.campbellcollaboration.org

The Centre for Evidence-Based Medicine www.cebm.net

The NHS Centre for Reviews and Dissemination www.york.ac.uk/inst/crd

Bandolier www.medicine.ox.ac.uk/bandolier

Network of African Medical Librarians http://karibouconnections.net/medlibafrica/#cour