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Systematic Review

What are the effects of interventions to improve the uptake of evidence from health research into policy in low and middle-income countries?

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Abstract

Background

The evidence-base for improving health continues to grow. However, concerns remain that the translation of this evidence into appropriate policies is partial and slow. Facilitating such translation is particularly important in low and middle-income countries that bear a disproportionate share of the global burden of ill-health.

Objectives

The primary objective of this review was to assess the effects of interventions to improve the uptake of research into health policies in low and middle-income countries. A secondary objective was to identify the barriers and facilitators to the uptake of research evidence derived from intervention and non-intervention studies.

Methods

For the main objective of the review, observational or experimental studies were eligible if they assessed any intervention aiming to facilitate the transfer of health research into health policy in low and middle-income countries. Studies had to include policy-makers as a target group, but could also include a variety of other stakeholders. The primary outcome was a change in health policies based on evidence uptake; additional outcomes included other policy-related outcomes, practice-related outcomes and health outcomes (resulting from the policy-change). For the secondary objective of the review, non-intervention studies describing policy processes and barriers and facilitators to evidence uptake into policy were also included. A wide range of electronic databases was searched; additional searching included scanning of a range of websites, reference lists of included studies, and citation searching. Two reviewers independently selected the studies. Data extraction and quality assessment of intervention studies were carried out by one reviewer and a proportion of the data was checked by a second reviewer. Data were summarised narratively, using text and tables. Frequencies of intervention components and reported barriers and facilitators to knowledge translation were computed.

Results

The final analysis included 25 intervention studies and 29 non-intervention studies describing barriers and facilitators to evidence-uptake either from observations of policy-making processes or from stakeholders' views. Most of the intervention studies were descriptive case-studies with inadequate detail on methodology and intervention design. The interventions were complex and many encompassed the whole cycle of research, policy development and implementation. All interventions had some positive effects in terms of policy-related outcomes. The most frequently cited components of interventions reporting positive effects on policy development included carrying out local research (e.g. for contextualisation), ensuring intensive stakeholder engagement and collaboration, including training and capacity-building activities, and fostering community participation. These elements were also identified in the non-intervention studies as common factors in the analysis of barriers and facilitators to evidence uptake. Few differences were seen between studies from low and middle-income countries in terms of barriers and facilitators. However, one important distinction cited was that low income countries tended to depend more on the support of large multilateral organisations, and that this dependence was also seen as a barrier to focussing on local priorities.

Conclusions

Although the intervention studies from low and middle-income countries included in this review were not of sufficient quality to provide strong recommendations, the findings are broadly consistent with the findings from high-income countries on the need for multi-faceted, tailored interventions and on the importance of contextual influences, particularly organisational. Effective interventions to increase uptake of evidence are likely to be those tailored to the context and include local research, extensive stakeholder engagement, and community participation. High-quality comparative studies reporting on a range of outcomes, with clear and comprehensive descriptions of methodology and of context, are still needed to strengthen understanding on how to improve uptake specifically in low and middle-income countries.

1. Background

The evidence-base for improving health continues to grow. However, concerns remain that the translation of this evidence or knowledge into appropriate policies and practice is partial and slow (Aaderud et al, 2005). Knowledge translation in healthcare has been defined by the Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/39033.html) as a "dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products and strengthen the healthcare system" (Strauss et al, 2009). This definition is also used by the World Health Organization (WHO, 2006).

In recent years, common factors affecting the use of evidence by policy makers and clinicians have begun to emerge, from theory (Brazil et al, 2005) and from observational or experimental studies on translation, thus creating an evidence-base itself. Graham and colleagues (2006), for example, have developed a conceptual framework called the "knowledge-to-action cycle", based on a review of 30 planned-action theories and their common elements. A wide range of potential influences and determinants have been identified from organisational to individual actor levels, and including key contextual elements, such as local leadership (Stetler et al, 2009). Aaron et al (2009) argue that organisational support is a malleable factor in facilitating the use of evidence, and that greater attention should be paid to organisational influences that can facilitate the dissemination and implementation. Most of the discourse agrees that the most effective strategies to bridge the gap between research and practice, will have at their heart, balanced academic – policy maker partnerships (Brownson and Jones, 2009). Campbell and colleagues (2009) suggest such strategies have four key components: making research findings more accessible to policy makers; increasing opportunities for interaction between policy makers and researchers; addressing structural barriers such as research receptivity in policy agencies and a lack of incentives for academics to link with policy; and increasing the relevance of research to policy. Others place most responsibility on researchers, arguing that they need to be more aware of factors influencing the demand for different types of research; to interact and work closely with key policy stakeholders, networks and local champions; and to acknowledge the roles of important interest groups (Woelk et al, 2009).

Intervening to increase the extent to which health policies are informed by research has long been one of the rationales for reforming health research systems. In recent years, the benefits of reform are reflected in: (a) growing understanding by researchers of the value of adopting a collaborative approach with policy-makers in setting research agendas; (b) the expansion of the pool of knowledge relevant for policy-making; (c) the generation of capacity to conduct systematic reviews of that evidence; and (d) the growing attention given to the policy-making structures necessary to absorb and use research evidence (Hanney and Gonzalez-Bloc, 2009). Others argue that the time-consuming nature of an evidence-based approach to policy decision-making suggests the need for more efficient production and communication processes that are quick and clean enough (Lavis et al, 2008), including for example a role for knowledge brokering. The latter has become a popular knowledge translation and exchange strategy to promote interaction between researchers and end users, as well as to develop capacity for evidence-informed decision making. Knowledge-brokering can be carried out by individuals, groups and/or organisations, as well as entire countries. In each case, the knowledge broker is linked with a group of end users and focuses on promoting the integration of the best available evidence into policy and practice-related decisions. The novelty of the knowledge broker role in public health provides a unique opportunity to assess the need for and reaction to the role and its associated activities (Dobbins et al, 2009b). Such an evaluative perspective is also warranted for other interventions aimed at improving health research uptake.

Several earlier systematic reviews have summarised policy-makers' perceptions on barriers and facilitators to knowledge translation (IDRC 2003; Innvaer et al, 2002; Mitton et al, 2007). The following table summarises the main factors identified:

Barriers	Facilitators
Individual level • Lack of experience and capacity for assessing evidence • Mutual mistrust • Negative attitude towards change and research	Individual level • Ongoing collaboration • Values research • Networks • Building of trust • Clear roles and responsibilities
Organisational level / environment • Unsupportive culture • Competing interests • Frequent staff turnover • Interest group pressure on decision makers • Issues of censorship and control • "Anti-intellectualism" in government against use of research • Importance of indigenous knowledge (religion and cultural differences)	Organisational level / environment • Provision of support and training (capacity building) • Sufficient resources (money, technology) • Authority to implement changes • Readiness for change • Collaborative research partnerships • Community pressure or client demand for research
Related to communication • Poor choice of messenger • Information overload • Traditional, academic language • No actionable message (information on what needs to be done and the implications)	Related to communication • Face-to-face exchanges • Involvement of decision makers in research planning and design • Clear summaries with policy recommendations • Tailored to specific audience • Relevance of research • Knowledge brokers • Opinion leader or champion (expert, credible sources)
Related to time or timing • Differences in decision makers' and researchers' time frames • Limited time to make decisions	Related to time or timing • Sufficient time to make decisions • Inclusion of short-term objectives to satisfy decision makers

Mitton et al. (2007) also reviewed studies implementing knowledge translation strategies. Ten of the 18 studies identified satisfied their quality criteria. Eight of these studies were from Canada and two were from the UK. The studies examined the following strategies:

- face-to-face exchange (consultation, regular meetings) between decision-makers and researchers,
- education sessions for decision-makers,
- networks and communities of practice,
- facilitated meetings between decision-makers and researchers,
- interactive multidisciplinary workshops,
- capacity building within health services and health delivery organisations,
- web-based information and electronic communications,
- steering committees (to integrate views of local experts into design, conduct and interpretation of research).

The message communicators included researchers, decision makers and knowledge brokers. However, most of the studies did not include clearly defined outcome measures and the focus of most studies was to describe the

transfer and exchange of the information rather than a formal evaluation of the knowledge translation strategy and no firm conclusions regarding the effectiveness of the strategies could be drawn. They do however summarise under "grey literature" one randomised controlled trial that has since been published in full (Dobbins et al., 2009a). In this trial, the effectiveness of three knowledge translation strategies were tested in Canadian public health decision making, in programmes related to the promotion of physical activity and healthy body weight in children. The interventions included access to an online registry of research evidence, tailored messaging, and a knowledge broker. Some evidence of a positive effect on decision-making was only seen for targeted messaging. The knowledge brokering intervention was affected by the value placed by public health organisations on research evidence. In those organisations placing less value on research evidence, knowledge brokering was more effective, whereas it was less effective in organisations already recognising the importance of evidence-based decision making.

Several systematic reviews are currently underway to address the effectiveness of knowledge translation strategies. Ciliska et al.[1] in Canada are conducting a systematic review on the effectiveness of knowledge translation strategies used to promote evidence informed decision making among public health practitioners in community or public health settings. While a strong emphasis of this review is on translation of research to public health practice, policy making at the local level is also included and outcomes include strategic changes in terms of research knowledge being transferred to public health policy and programme development. The review includes a broad range of study types (practitioner randomised controlled trials, cluster randomised controlled trials, non-randomised cluster controlled trials, controlled before and after studies, interrupted time series designs, qualitative studies) and includes studies both from high and low and middle-income country settings.

Armstrong et al.[2] in Australia are conducting a systematic review on the effectiveness of knowledge translation strategies from research to public health decision making. The review also includes a range of study designs including qualitative evidence; both studies from high and low / middle-income countries are included, but the review is not yet in the public domain.

We have not identified any systematic reviews specifically about the translation of health research into health policies in developing countries. The present review will therefore focus on knowledge translation into both local and higher-level policy decision making in low and middle-income countries only. The primary rationale for this relates to the importance of context to strategies for knowledge translation, in terms both of the wider health system and the major burden of ill-health (Nutley et al, 2007; Carden, 2009). These influences vary across the continuum from the poorest to richest country, but grouping together low and middle-income countries provides some contextual homogeneity. In global terms, these countries also bear a disproportionate share of communicable and non-communicable diseases, are those most unlikely to achieve many of the Millennium Development Goals by 2015 (UNDP, 2010), and thus represent the focus of interest for bi-lateral agencies, such as DFID, in terms of development assistance (Greco, et al 2008). Lessons from this systematic review on strategies for increasing policy uptake of evidence on effective interventions have the potential to support efforts to accelerate health improvement in low and middle-income countries.

2. Objectives

The primary objective of this review was to assess the effects of interventions to improve the uptake of research into health policies in low and middle-income countries. This included studies to:

[1] Professor at McMaster University (Hamilton, Ontario), School of Nursing and Scientific Director of the National Collaborating Centre for Methods and Tools

[2] Senior Research Fellow in knowledge translation and exchange at the School of Population Health, University of Melbourne, and Cochrane Public Health Group

- evaluate the effects in different settings and among different end-user groups, including both positive and negative effects
- explore the contextual and enabling factors most closely associated with these effects
- better understand which combination of interventions is associated with optimal evidence-informed decision-making outcomes, and whether the combination changes in different settings and among different end-users.

A secondary objective was to assess evidence on the barriers and facilitators to the uptake of research evidence derived from both intervention and non-intervention studies.

3. Inclusion criteria

3.1 Types of studies

The following types of intervention and non-intervention studies were eligible for inclusion to meet the primary and secondary objectives of the review:

- Randomised controlled trials, controlled trials
- Observational studies with a comparison group
- Prospective longitudinal before-and-after studies
- Systematic reviews
- Qualitative and quantitative case-studies of barriers and facilitators of knowledge transfer, including operational or programmatic studies

It was agreed that in the case of finding relevant systematic reviews, these would be summarised and results would be supplemented with findings from relevant primary studies not included in the reviews. In the case of systematic reviews including both studies from high and low / middle-income countries, only the evidence from low / middle-income countries would be summarised; if this was not possible and the majority of studies in the review were from high income countries (or the provenance of the studies is unclear), the review would be excluded. Of the included studies, none were systematic reviews in the strict sense, but some were non-systematic reviews and also included primary data, e.g. from interviews.

3.2 Types of interventions

An intervention was broadly defined as any action undertaken to facilitate the translation of health research evidence into health policy and policy implementation. Thus the term was not restricted to the narrower sense of an experimental intervention, such as found in the context of a randomised controlled trial. Interventions aimed at policy-making at a national and regional level were included. Conversely, policy development at the practice level by health practitioners or managers (e.g. development of hospital policies) rather than by policy-makers was excluded.

Eligible interventions included, for example:

- Education / workshops / reminders / tailored messaging for decision-makers
- Capacity building for decision-makers to access and demand for research evidence
- Deliberative processes for priority setting
- Knowledge brokers
- Establishment of networks linking research and policy
- Policy dialogues
- Platforms for exchange between decision-makers and health researchers

- Research initiatives commissioned by decision-makers aiming specifically at improving practice in a certain area of health care

We had initially planned to consider interventions in terms of the different stages of the knowledge-to-action cycle developed by Graham et al (2006) mentioned earlier. However, as many of the studies included were not reported systematically, it was not possible to assess these steps in detail.

To explore generalisability, qualitative evidence relating to the underlying factors that facilitate or hinder the effectiveness of interventions was examined.

3.3 Types of participants

Interventions were included that were aimed at those individuals involved in health policy making at local, sub-national, national or global levels in low and middle-income countries. These individuals, in turn, were expected to interact, for example, with health care professionals using health research evidence for practice, researchers generating evidence, funding agencies, knowledge brokers etc. All areas of health care relevant to public health and health policy were included.

The World Bank definition of low and middle-income countries was used (http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS).

Exclusion: studies targeted directly at clinicians and other healthcare practitioners for translation of research evidence into clinical practice.

3.4 Types of outcomes

For policy and policy implementation, a broad range of outcomes from interventions were sought along the continuum from policy-maker to population beneficiaries. To be included, studies had to report at least one policy-related outcome.

Primary outcome:
- Change in health policies based on uptake of research evidence

Secondary outcomes considered included:
- Policy-related outcomes:
    - New government directives and other policy documents
    - Increased resource commitments, financing of evidence-based health programmes
    - Planning and implementation reports for health strategies, services, and programmes
    - Mass media materials (e.g. government news releases)
    - Organisational change (either in institutions related to health practice or to health policy, e.g. establishment of public health ministry etc.)
    - Indicators of sustainability
- Practice-related outcomes:
    - Evidence-based clinical guidelines
    - Rules and regulations
    - Process indicators of availability and utilisation of new practice
- Behavioural and psychosocial outcomes:
    - Stakeholder / policy-maker knowledge and attitudes
    - Acceptability and views of policy-makers regarding interventions

- Barriers and facilitators of uptake of research into policy
- Health outcomes [only if policy changes are also reported]
    - Any health-related outcomes relevant to the policy (objective patient-oriented outcomes)
- Adverse effects of any interventions (e.g. such as disproportionate disruption of policy priorities or increased under- and misreporting of practices)

4. Methods

4.1 Search strategy

The following electronic databases were searched for relevant studies:

- WorldCat
- MEDLINE / PubMed
- EMBASE
- CINAHL
- POPLINE
- The Cochrane Library (all databases)
- Google Scholar
- Campbell Collaboration
- World Health Organisation and other UN agencies
- Database of promoting health effectiveness reviews (DoPHER)
- African Index Medicus (AIM)

Unpublished studies were identified through the following databases:

- ISI Web of Knowledge (includes Conference Proceedings, BIOSIS Previews, and Journal Citation Reports)
- ZETOC
- Databases of ongoing studies – such as http://www.ClinicalTrials.gov and http://www.who.int/trialsearch/

Other search strategies included:

- Examination of reference lists from relevant studies
- Citation searching

The International Development Research Centre (2003) has identified a range of networks that could play a role in research translation in low and middle-income countries, and their websites were searched for relevant information. These networks include (only the ones still active are listed here):

- Afro-Nets (http://www.afronets.org/)
- The Bellanet Alliance (http://www.bellanet.org/)
- The Development Gateway (http://www.developmentgateway.org/)
- Global Development Network (http://www.gdnet.org/)
- Global Knowledge Partnership (http://www.globalknowledgepartnership.org/)
- The Health Systems Trust (http://www.hst.org.za/)
- Equinet Africa (http://www.equinetafrica.org/)
- Sustainable Communications Development Network (http://www.sdcn.org/)
- Trade Knowledge Network (http://www.tradeknowledgenetwork.net/)
- Pragmatic Trials in Health Care (http://www.practihc.net)
- Different WHO programmes, e.g. the Alliance for Health Policy and Systems Research (http://www.who.int/alliance-hpsr/en/), Tropical Disease Research (http://apps.who.int/tdr/) and the Human Reproductive Programme (http://www.who.int/hrp/en/)

Other relevant networks and their websites include:

- The SUPPORT Collaboration (http://www.support-collaboration.org)
- EVIPNet (the Evidence-Informed Policy Network, http://www.evipnet.org)
- International Health Partnership (http://www.internationalhealthpartnership.net)
- Knowledge Utilization, University of Laval (http://kuuc.chair.ulaval.ca/english/index.php)
- McMaster KT+ Database (http://plus.mcmaster.ca/kt/)
- The Knowledge Brokers' Forum (http://www.knowledgebrokersforum.org/)
- Health Systems Evidence (McMaster University) (http://www.healthsystemsevidence.org/)
- J-PAL initiative (Massachusetts Institute of Technology) (http://www.povertyactionlab.org/)
- Source – International Information Support Centre (http://www.asksource.info/)
- Centre for Global Development (http://www.cgdev.org/section/topics/global_health)

The following search terms (for PubMed and adapted for use with the other databases) were combined (terms within columns combined with "OR", columns combined with "AND"):

Knowledge translation	Policy	Study type	Geographic region
best practices adoption	decision-making	trial*	"developing country"
adoption of best practices	policy	outcome*	"developing countries"
change implementation	policies	effect*	"middle-income"
dissemination	program*	evaluate	"low income"
evidence uptake	strateg*	evaluation*	"third world"
evidence-based decision-making		implement*	poverty
evidence-based policy-making		improve *	"resource poor"
evidence-informed policy-making		intervention*	"poor country"
evidence to policy		measure*	"poor countries"
implementation research		cohort	"Developing Countries"[Mesh]
implementation science		compare*	"Poverty"[Mesh]
information utilisation		comparison	"Africa"[Mesh]
information utilization		comparative	"Caribbean Region"[Mesh]
knowledge broker*		controlled	"Central America"[Mesh]
knowledge translation		randomised	"Latin America"[Mesh]
knowledge transfer		randomized	"South America"[Mesh]
knowledge transformation		qualitative	"Asia"[Mesh]
knowledge utilisation		"Clinical Trial "[Publication Type]	
knowledge utilization		"Epidemiologic Studies"[Mesh]	
knowledge exchange		"Comparative Effectiveness Research"[Mesh]	
knowledge adoption		"Comparative Study "[Publication Type]	
knowledge mobilisation		"Evaluation Studies "[Publication Type]	
knowledge mobilization		"Meta-Analysis "[Publication Type]	
knowledge to action		"Multicenter Study "[Publication Type]	
research utilization		"Validation Studies "[Publication Type]	
research utilisation		"Empirical Research"[Mesh]	
research to policy			
research transfer			
research translation			

Due to time constraints, the search was limited to studies published in English language from 1990 onwards, which was approximately when formal evidence initiatives such as the Cochrane and Campbell Collaborations became well-established. The two journals Implementation Science (2006 to Oct 2010) and Health Policy and Planning (2000 to Oct 2010) were hand-searched.

4.2 Study selection

- Stage 1: The titles and abstracts of identified studies were screened by two researchers (CC and LD) for relevance to the topic. Those studies considered not to be relevant on the grounds of topic were excluded. Studies involving the topic, but perhaps not relevant on the grounds of population were passed to the team for consideration.
- Stage 2: Full text/papers were sought for all studies appearing to meet the inclusion criteria and a final selection was made by two independent reviewers (CC and LD / SC).

A flow chart was produced to facilitate transparency of the process (Figure 1).

4.3 Data extraction

Data were extracted from the studies by one researcher (CC) using a structured data extraction form based on simple text and using the word processing package MS Word. The data were entered onto the form electronically to facilitate data summarisation and the writing of the final report. It was planned that authors of primary studies would be contacted to provide essential missing or additional data; however, this was not necessary. A second researcher (LD) independently checked a sample of the data extraction forms for accuracy and detail. Disagreements were to be resolved by consensus or by consulting a third reviewer, if necessary (however, this was not required).

It was originally planned that data would be extracted wherever possible to enable strategies for translation of health research into health policy to be considered according to the characteristics of the decision-making environment as defined by Carden (2009), including:

- The nature of the decision-making regime: 1. routine; 2. incremental; 3. fundamental.
- Type of research and policy interaction: 1. clear government demand; 2. government interest in research, but leadership absent; 3. government interest in research, but with a capacity shortfall; 4. a new or emerging issue activates research, but leaves policymakers uninterested; 5. government treats research with disinterest or hostility.
- Contingencies: 1. stability of decision-making institutions; 2. capacity of policy-makers to apply research; 3. decentralisation or tight central control; 4. special opportunities for countries in transition; 5. economic crisis and pressures on government.
- Communication and research management strategies; timing.

However, most studies did not provide enough detail to enable this analysis.

Owing to time and resource constraints, we were unable to contact any study authors about supplementary information.

4.4 Quality assessment

Study quality was assessed using the methods recommended for public health guidance by the UK National Institute for Health and Clinical Excellence (NICE, 2009), which are more appropriate to mixed quantitative and qualitative evidence than other grading schemes, such as GRADE (Guyatt et al, 2008). Quality was assessed by one reviewer (CC or SC) and a proportion of the assessments (about a quarter) were double-checked by a second

reviewer (CC or SC). Disagreements were resolved by consensus or by consulting a third reviewer, if necessary (however, this was not required).

For time reasons, study quality was only assessed for studies describing an intervention as this was the main focus of the review, and not for the non-intervention studies solely describing barriers and facilitators to evidence uptake.

Criteria for assessing quantitative intervention studies:

1. Population
    1.1. Is the source population or source area well described?
    1.2. Is the eligible population or area representative of the source population or area?
    1.3. Do the selected participants or areas represent the eligible population or area?
2. Method of allocation to intervention (or comparison)
    2.1. Allocation to intervention (or comparison). How was selection bias minimised?
    2.2. Were interventions (and comparisons) well described and appropriate?
    2.3. Was the allocation concealed?
    2.4. Were participants and/or investigators blind to exposure and comparison?
    2.5. Was the exposure to the intervention and comparison adequate?
    2.6. Was contamination acceptably low?
    2.7. Were other interventions similar in both groups?
    2.8. Were all participants accounted for at study conclusion?
    2.9. Did the setting reflect the country's usual practice?
    2.10. Did the intervention or control comparison reflect the country's usual practice?
3. Outcomes
    3.1. Were outcome measures reliable?
    3.2. Were all outcome measurements complete?
    3.3. Were all important outcomes assessed?
    3.4. Were outcomes relevant?
    3.5. Were there similar follow-up times in exposure and comparison groups?
    3.6. Was follow-up time meaningful?
4. Analyses
    4.1. Were exposure and comparison groups similar at baseline? If not, were these adjusted?
    4.2. Was intention to treat (ITT) analysis conducted?
    4.3. Was the study sufficiently powered to detect an intervention effect (if one exists)?
    4.4. Were the estimates of effect size given or calculable?
    4.5. Were the analytical methods appropriate?
    4.6. Was the precision of intervention effects given or calculable? Were they meaningful?
5. Summary
    5.1. Are the study results internally valid (i.e. unbiased)?
    5.2. Are the findings generalisable to the source population (i.e. externally valid)?

Criteria for assessing quantitative studies reporting correlations and associations:

1. Population
    1.1. Is the source population or source area well described?
    1.2. Is the eligible population or area representative of the source population or area?
    1.3. Do the selected participants or areas represent the eligible population or area?
2. Method of selection of exposure (or comparison) group
    2.1. Selection of exposure (and comparison) group. How was selection bias minimised?
    2.2. Was the selection of explanatory variables based on a sound theoretical basis?
    2.3. Was the contamination acceptably low?

2.4. How well were likely confounding factors identified and controlled?
2.5. Was the setting relevant to low and middle-income countries?

3. Outcomes
   3.1. Were outcome measures and procedures reliable?
   3.2. Were all outcome measurements complete?
   3.3. Were all the important outcomes assessed?
   3.4. Was there a similar follow-up time in exposure and comparison groups?
   3.5. Was follow-up time meaningful?
4. Analyses
   4.1. Was the study sufficiently powered to detect an intervention effect (if one exists)?
   4.2. Were multiple explanatory variables considered in the analyses?
   4.3. Were the analytical methods appropriate?
   4.4. Was the precision of intervention effects given or calculable? Were they meaningful?
5. Summary
   5.1. Are the study results internally valid (i.e. unbiased)?
   5.2. Are the findings generalisable to the source population (i.e. externally valid)?

<u>Criteria for assessing qualitative studies</u>

1. Theoretical approach
   1.1. Is a qualitative approach appropriate?
   1.2. Is the study clear in what it seeks to do?
2. Study Design
   2.1. How defensible/rigorous is the research design/methodology?
3. Data collection
   3.1. How well was the data collection carried out?
4. Trustworthiness
   4.1. Is the role of the researcher clearly described?
   4.2. Is the context clearly described?
   4.3. Were the methods reliable?
5. Analysis
   5.1. Is the data analysis sufficiently rigorous?
   5.2. Are the data 'rich'?
   5.3. Is the analysis reliable?
   5.4. Are the findings convincing?
   5.5. Are the findings relevant to the aims of the study?
   5.6. Adequacy of Conclusions
6. Ethics
   6.1. How clear and coherent is the reporting of ethics?
7. Overall assessment

Items will be rated as suggested by the NICE methodology guide.

Assessment of systematic reviews would have been based on the PRISMA statement (Moher et al, 2007):

- Inclusion criteria described (study design, participants, interventions, outcomes)
- Details of literature search given (databases, dates, keywords, restrictions)
- Study selection described
- Data extraction described
- Study quality assessment described
- Study flow shown
- Study characteristics of individual studies described
- Quality of individual studies given
- Results of individual studies shown
- Was the statistical analysis appropriate?

However, no systematic reviews were included in this review.

Many of the included studies unfortunately did not fit into these study types as they were descriptive case studies. Some of the studies had qualitative components (especially as part of the outcome evaluation) which meant that studies could score highly on the qualitative criteria but still have a poor description of any intervention components and associated methodology (e.g. outcome reporting).

4.5 Data synthesis

The types of interventions evaluated in this review were diverse in settings, mechanisms and methods of measuring outcomes. This resulted in significant heterogeneity and thus pooling was not possible. Most of the data were not numeric in nature. Findings were summarised as narrative, using text and tables. Studies were grouped according to whether they came from low or middle-income countries (or both) and whether studies examined any definite interventions (defined as any action taken to improve the transfer of health research to policy) or just summarised qualitative or descriptive data on barriers and facilitators to uptake of health research into policy (i.e. non-intervention studies). This synthesis process followed the recommended approach of tabulating study type, interventions, number of participants, summary of participant characteristics, outcomes and outcome measures. A separate table was used to record study quality / risk of bias. Data from intervention studies and from non-intervention studies reporting on health policy-making processes or stakeholder opinions were compared from different study contexts.

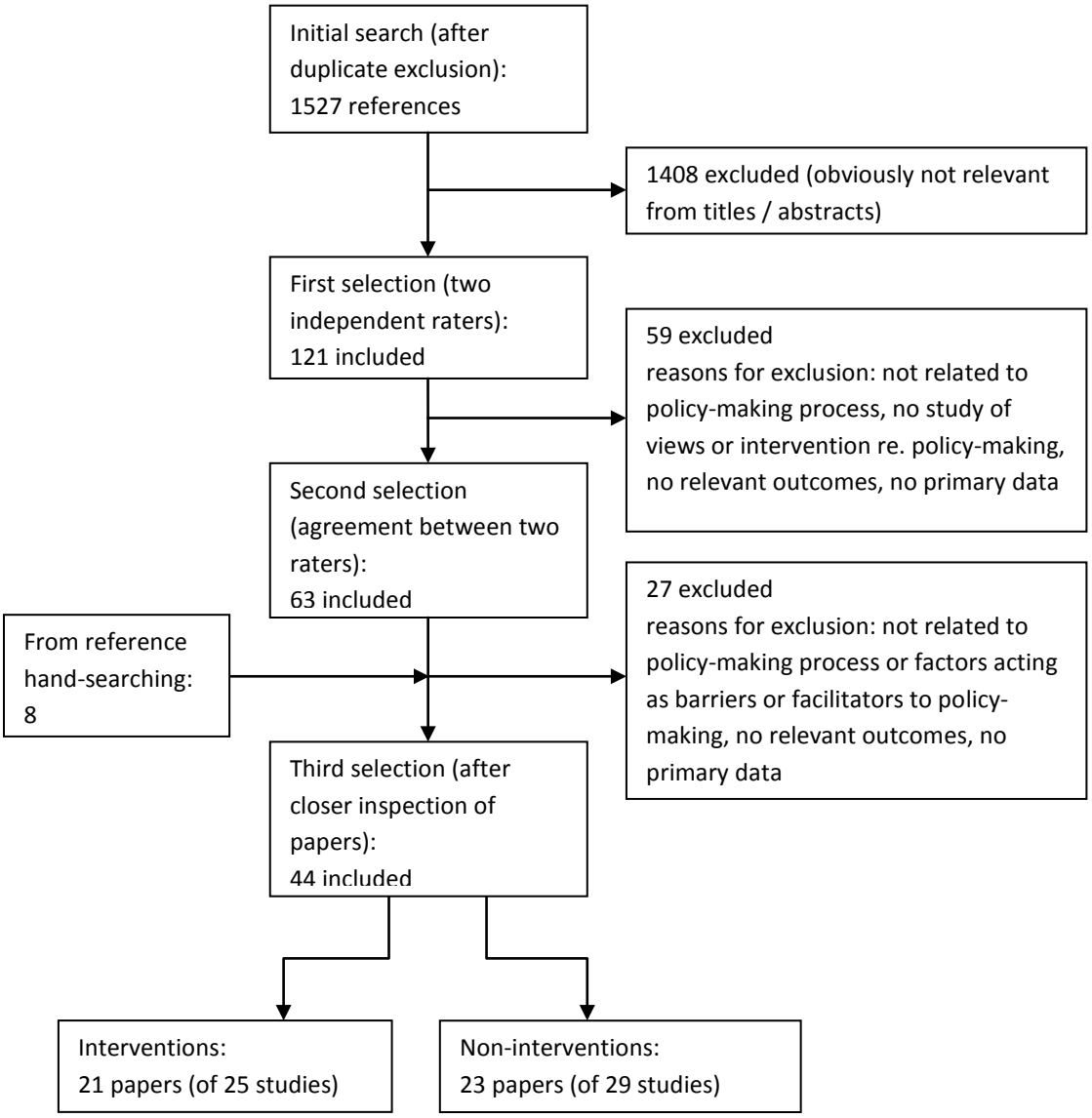
Frequencies of intervention components and reported barriers and facilitators to knowledge translation were computed. These counts and proportions should, however, only be regarded as general indications of common issues rather than robust quantification of findings.

5. Results

5.1 Search results

Figure 1 shows the results of the search strategy. The initial search identified 1527 studies. Of these, 1408 were excluded as they were obviously not relevant based on titles or abstracts. The remaining 121 studies were examined in full text; 59 were then excluded and because they were did not examine factors related to the policy-making process (e.g. they focused on translation into clinical practice), because they did not concern interventions or facilitators / barriers related to translation of health research to health policy, or because they contained no relevant outcomes or primary data. This left 73 studies potentially eligible (of which 8 were identified through additional searching). Another 27 studies were then excluded owing to similar reasons as for exclusions in the previous step (see table of excluded studies in APPENDIX I). This left 44 documents for inclusion, of which 21 were reports of interventions (describing 25 interventions), and 23 were reports of the health policy-making process or stakeholder opinions of facilitators and/or barriers (describing 29 non-intervention studies).

Figure 1 Flow chart of search results



5.2 Intervention studies

5.2. 1 Study characteristics

Table 1 shows the characteristics of studies including an intervention. Of the 25 studies, 12 came from low income countries (Africa: Kenya, Ghana, Tanzania, Uganda, West African countries, Zambia (n=2); Asia: Bangladesh, Cambodia, Nepal, Vietnam (n=2)), two described interventions both from low and middle-income countries (African countries, mainly low income), and 11 came from middle-income countries (Africa: Nigeria, South Africa (n=2); Asia: China (n=2), Iran, Philippines; Latin America: Brazil, Guatemala, Mexico). The majority were case studies with extremely limited description of methodology. One study was described as a randomised controlled trial (RCT), and two others included RCTs as part of the policy-making process (but those were not described in detail and were RCTs related to medical interventions rather than policy-making). While the RCT was described as a "policy-making intervention", the main focus was on comparing different ways of financing health care / improving access to health care, rather than on facilitating uptake of evidence into policy. In terms of describing the engagement of policy-makers and facilitation of the policy-making process, the RCT was comparable to the case studies. Eight studies included a qualitative component.

In all studies, a range of stakeholders including both policy-makers and researchers were included in the intervention and (if applicable) the policy-making process. Twelve of the studies dealt with a broad area of health care (e.g. general health service improvement, health insurance coverage, health promotion), while 13 dealt with specific medical areas (e.g. a range of studies of maternal and child health and family planning; and also studies on issues like mental health, malaria, HIV, improvement of air quality).

All but one study described a complete policy-making process, and five specifically described the process of scaling-up a recommended intervention. In all but two studies, the knowledge translation intervention itself contained elements of research. Apart from one study which only consisted of a workshop on evidence based methods for a variety of stakeholders, interventions were highly complex and incorporated a number of sub-components. A summary of these is shown in Table 2. Almost all of the studies included two main sub-components: local research (e.g. for collecting local epidemiological survey data or for contextualising interventions) and extensive stakeholder involvement or collaboration with stakeholders. Over half of the studies included training activities and/or capacity-building activities for a variety of stakeholders, and about half included elements of community participation. Other intervention elements mentioned by a range studies included the use of quality assurance mechanisms, monitoring and evaluation, planned dissemination strategies, and participatory or operations research. Further examples of intervention sub-components can be seen in Table 2. There were no obvious differences in the types of intervention sub-components used in low income countries and in middle-income countries.

Most studies reported outcomes as narrative in terms of description of the policy-making process. As most studies described entire policy-making processes, they also included descriptions of implementation. Health outcomes as a consequence of the policy and practice change were only reported by very few studies.

Table 1 Characteristics of intervention studies, grouped according to study type

Study	Context	Methods	Intervention
Randomised controlled trials			
QIDS 2008 Philippines	**Middle-income**	**Design:** RCT **Participants:** policy-makers, physicians **Specificity:** intermediate / broad **Topic:** General health care delivery; focus on child health, insurance coverage **Stage of KT process:** continuous process / cycle **Research timing:** during	• Randomised controlled trial in the context of health sector reform • Expanded insurance coverage for children versus performance-based payments to hospitals and physicians versus control • Close collaboration with the Department of Health; QIDS partnered with government policy monitoring and evaluation • Formal partnerships to codify the experimental design directly into the existing infrastructure
Qualitative intervention studies			
FRONTIERS Guatemala 2007	Middle-income	**Design:** review of operations research studies **Participants:** health service staff, civil society organisations, service providers **Specificity:** specific **Topic:** Reproductive health / family planning **Stage of KT process:** continuous process / cycle **Research timing:** during	• Operations research with Mayan populations
Harpham 2006 Vietnam	Low income	**Design:** case study; qualitative stakeholder analysis **Participants:** policy-makers, researcher **Specificity:** specific **Topic:** mental health **Stage of KT process:** continuous process / cycle **Research timing:** beforehand	• Initiative by local NGO involving scientific meeting, feedback from politicians, presentation of action plan, article on mental health published in national daily newspaper, links with the government / policy-makers established
Ir 2010 Cambodia	Low income	**Design:** case study; key informant interviews **Participants:** policy-makers, researchers, managers from various institutions **Specificity:** general; health funding **Topic:** broad **Stage of KT process:** continuous process / cycle **Research timing:** during	• Implementation of the Cambodian Health Equity Funds; evaluation of pilot schemes • Community participation • Scaling up

Study	Context	Methods	Intervention
Manandhar 2008 Zambia	Low income	**Design:** case study; qualitative interviews **Participants:** researchers, policy-makers, civil society **Specificity:** specific **Topic:** safe motherhood **Stage of KT process:** continuous process / cycle **Research timing:** during	• Operations research (Participatory Ethnographic Evaluation and Research (PEER)) • Intersectoral dialogue with key stakeholders and policy-makers at the local, provincial and central level • Dissemination (dissemination forums) and advocacy
Majdzadeh 2010 Iran	Middle-income	**Design:** case study; qualitative interviews **Participants:** policy-makers, researchers, medical practitioners **Specificity:** broad **Topic:** General provision of health services **Stage of KT process:** continuous process / cycle **Research timing:** during	• Integration of medical and health education into health services, forming the new Ministry of Health and Medical Education (MOHME)
WHO 2007 Brazil	Middle-income	**Design:** case study; qualitative interviews **Participants:** policy-makers, researchers **Specificity:** specific **Topic:** family planning **Stage of KT process:** continuous process / end (scaling up) **Research timing:** beforehand and during	• Pilot municipality initiated a systematic process of dealing with constrained family planning and poor quality care; including participatory process with community involvement; comprehensive training; NGO resource team • Scaling up in context of WHO Strategic Approach to Strengthening Reproductive Health Policies and Programmes • Reprolatina Project – larger scale scaling up to other municipalities in Brazil; development of training capacity; active networking and use of information technology
Other intervention studies: descriptive case studies			
Ashford 2006 Kenya	Low income	**Design:** case study; no details on methodology **Participants:** policy-makers, health service staff, health educators **Specificity:** broad **Topic:** general health services **Stage of KT process**[3]**:** continuous process / cycle **Research timing**[4]**:** beforehand and during	• Application of model of policy-making process; agenda-setting, coalition building and policy learning • Kenyan Service Provision Assessment • Seminars about DHS and local application • Regional planning seminars

[3] Stage of the knowledge translation process, i.e. was the intervention carried out at the beginning, during the process or at the end of the knowledge translation cycle
[4] Did the health research take place before the knowledge translation process or was the research part of the knowledge translation process

Study	Context	Methods	Intervention
Campbell 2003 Nepal	Low income	**Design:** case study; no details on methodology **Participants:** policy-makers, health service staff, civil society **Specificity:** specific **Topic:** reproductive health **Stage of KT process:** continuous process / cycle **Research timing:** beforehand and during	• Application of policy-making framework: (1) collaborative planning and programming, (2) strategic assessment, (3) policy and strategy development, (4) material development, (5) management of reproductive health information and services, (6) policy review
MCH-FP 1996 Bangladesh	Low income	**Design:** case study **Participants:** researchers, policy-makers, field workers, community **Specificity:** specific **Topic:** Maternal and child health, family planning **Stage of KT process:** continuous process / cycle **Research timing:** during	• Operations research (extension project evolved from Matlab project) • Collaboration with government officers at both central and field levels • Training of field workers, qualitative research, implementation analysis
Newman 2006 West Africa	Low income	**Design:** case study; research includes RCT **Participants:** policy-makers, researchers, international organisations **Specificity:** specific **Topic:** Prevention of malaria during pregnancy, focus on intermittent preventive treatment (IPTp) with sulfadoxine-pyrimethamine (SP) **Stage of KT process:** continuous process / cycle **Research timing:** beforehand and during	• Evidence-based programme strategy clearly articulated by Expert Committee on Malaria (2000); draft of strategic framework 2002 by WHO Africa Regional Office
Orobaton 2007 Uganda	Low income	**Design:** case study **Participants:** local policy-makers, civil society organisations **Specificity:** intermediate / broad **Topic:** access and utilisation and quality of education, health and HIV/AIDS services **Stage of KT process:** continuous process / cycle **Research timing:** beforehand (and during?)	• Establishment of the Uganda Program for Human and Holistic Development (UPHOLD) and institutionalising the Lot Quality Assurance Sampling (LQAS) survey method • Grants programme • Partnerships; involvement of traditional and non-traditional stakeholders; participatory processes • Evidence-based planning and decision-making
TEHIP 2008 Tanzania	Low income	**Design:** case study **Participants:** researchers, policy-makers, implementers **Specificity:** broad **Topic:** basic health care **Stage of KT process:** continuous process / cycle **Research timing:** during	• Tanzania Essential Health Interventions Project (TEHIP) • Research and development aspects integrated into a cohesive, functional whole • Development of tools: (1) District burden of disease profile tool, (2) District health accounts tool, (3) District health service mapping tool, (4) Community voice tool: expressing needs, participatory action research, (5) Cost-effectiveness and district cost information system tool

Study	Context	Methods	Intervention
WHO 2007 Ghana	Low income	**Design:** case study; research includes RCT; focus groups **Participants:** local leaders, community, health service staff, health managers, policy-makers **Specificity:** broad **Topic:** General healthcare delivery **Stage of KT process:** continuous process / end (scaling up) **Research timing:** during	• Community-based Health Planning and Services Initiative • Stakeholder involvement • Pilot trial with social and operations research; needs assessments; involvement of traditional leaders; quarterly focus group sessions • RCT in 4 subdistricts • National dissemination conference • Validation initiative involving (1) preliminary planning, (2) community entry, (3) health compound construction, (4) procurement of essential equipment, (5) posting nurses, (6) volunteer recruitment • Nationwide expansion: policy and communication, evidence, action and training
WHO 2007 Vietnam	Low income	**Design:** case study **Participants:** policy-makers, civil society, international organisations, researchers **Specificity:** specific **Topic:** Contraception and family planning (introduction of injectable contraceptive depot-medroxyprogesterone acetate (DMPA)) **Stage of KT process:** continuous process / end (scaling up) **Research timing:** during	• Strategic assessment • Testing interventions • Scaling up • Stakeholder involvement; managerial and service delivery modifications; training
WHO 2007 Zambia	Low income	**Design:** case study **Participants:** policy-makers, health service staff, community **Specificity:** specific **Topic:** Contraception and family planning **Stage of KT process:** continuous process / end (scaling up) **Research timing:** during	• Pilots to Regional Programmes (PRP) initiative for expanding contraceptive choice • Collaboration with Ministry of Health and NGO (CARE) • Dissemination workshop • Scaling up • Forging linkages between the community and the formal health sector

Study	Context	Methods	Intervention
Stewart 2005 Zambia, Zimbabwe, South Africa, Tanzania, Swaziland, Lesotho, Mozambique	Low and middle-income	**Design:** case study; feedback from workshop participants **Participants:** policy-makers, practitioners, researchers **Specificity:** specific **Topic:** HIV prevention **Stage of KT process:** beginning **Research timing:** beforehand	• The HIV Southern Africa (HIVSA) workshops training policy-makers, practitioners and researchers from 7 southern African countries in evidence-based decision making for HIV prevention; training included accessing, critiquing and summarising research whilst remaining responsive to priorities of the participants • Mixed and participatory training and feedback sessions; training materials for the next day refined according to feedback
Varkevisser 2001 Malawi, Mozambique, Tanzania, Zambia, Zimbabwe, Botswana, Lesotho, Swaziland, Mauritius, Seychelles	Low and middle-income	**Design:** case study **Participants:** health managers, health service staff, policy-makers, researchers, community members **Specificity:** broad **Topic:** General, health system management **Stage of KT process:** continuous process / cycle **Research timing:** during	• Joint Health Systems Research (HSR) Project for the Southern African Region: (1) Inventories of HSR needs and resources at country level in terms of manpower and institutional capacity and research implemented (2) Training in HSR methodology (3) Networking between more and less experienced HSR researchers as well as policy-makers and managers who could make use of HSR, within and between countries • Supporting decision-making for health at all levels • Participatory approach, involving all different parties concerned with a specific problem from community members to health managers and policy-makers in the process of problem identification and analysis
Data for Decision Making Project (DDM) 2003 Bolivia, Cameroon, Mexico, Philippines	Low and middle-income	**Design:** case study **Participants:** health managers, policy-makers, researchers, international donors **Specificity:** broad **Topic:** General public health **Stage of KT process:** continuous process / cycle **Research timing:** beforehand and during	• Conceptual framework for evidence-based public health developed • Steps taken: (1) identification of priority health problem(s), of data-use outcomes, of competencies needed by staff and gaps in skills, of information gaps, and of organisational barriers; (2) development of work plan: setting data-use goals and objectives, developing training plan, improving health information systems; (3) implementation of work plan: training needs assessment, adapting interdisciplinary training programme curriculum, training the trainers, training target audiences, technical assistance and training for information systems; (4) evaluation

Study	Context	Methods	Intervention
Liu 2006 China	Middle-income	**Design:** case study **Participants:** researchers, government officials **Specificity:** broad **Topic:** General (health insurance and health equity) **Stage of KT process:** continuous process / cycle **Research timing:** during	• Asian Development Bank Study on China's rural health security issues
Molina 2004 Mexico	Low and middle-income	**Design:** case study **Participants:** Mexican and international engineers, researchers, policy-makers **Specificity:** specific **Topic:** Improving air quality in Mexico City to improve health **Stage of KT process:** continuous process / cycle **Research timing:** during	• 10-year integrated air quality management programme • Research on air quality and associated health problems and mortality • Active collaboration with decision makers; recommendation for research and institutional changes; adoption / implementation of recommendations • Encouragement of public participation and stakeholder input by forming working groups consisting of representatives from academia, NGOs and industries • Education and capacity building
Okonofua 2010 Nigeria	Middle-income	**Design:** case study; questionnaire study **Participants:** policy-makers, researchers **Specificity:** specific **Topic:** reduction of maternal and child mortality **Stage of KT process:** continuous process / cycle **Research timing:** during	• Implementation of free maternal and child health services • Formation of federal appointed advocacy team • Needs assessment • Meetings with state governors; dissemination activities
Scott 2008 South Africa	Middle-income	**Design:** case study **Participants:** primary health care managers, researchers, nurses, community members, policy-makers **Specificity:** broad **Topic:** General; access to health services and provision of sanitation **Stage of KT process:** continuous process / cycle **Research timing:** beforehand and during	• Cape Town Equity Gauge • Use of participatory methods to study inequities in health status and health provision • Interactive workshops with health care managers • Equity Tools for Management Project: managers set the agenda and researcher were facilitators; managers held workshops with specialists in health, information systems, financing, policies and economics; criteria were set to quantify sub-district needs; identified obstacles in financing health equity; nurses were interviewed to asses quality of the care offered • Community-based water and sanitation project

Study	Context	Methods	Intervention
van den Broucke 2010 South Africa	Middle-income	**Design:** case study; interviews **Participants:** health promotion practitioners, community representatives, policy-makers, educators and various other stakeholders **Specificity:** intermediate / broad **Topic:** health promotion **Stage of KT process:** continuous process / cycle **Research timing:** during	• Overview team with a range of stakeholders (national and international) • Situation analysis / needs assessment • Local objectives and target setting in collaboration with local stakeholders • Participatory implementation • Plans for dissemination and sustainability
WHO 2007 China	Middle-income	**Design:** case study; qualitative interviews **Participants:** policy-makers, researchers, civil society organisations **Specificity:** specific **Topic:** family planning **Stage of KT process:** continuous process / end (scaling up) **Research timing:** beforehand and during	• Introduction of quality elements into family planning services: (1) informed choice, (2) information giving, (3) technical competence, (4) client-provider relations, (5) follow-up, (6) appropriate constellation of services • Stakeholder involvement • Scaling-up after successful pilot project

Table 2 Sub-components of interventions

Intervention sub-component	Frequency (max n=25)
Local research to embed evidence in local context	24
Stakeholder involvement / participation	23
Training (seminars) / capacity building	17
Community participation / bottom-up-approach	12
Scaling-up /sustainability plans	9
Quality assurance mechanisms / monitoring and evaluation	8
Dissemination (seminars)	8
Participatory / operations research	6
Planning seminars / action plan development	5
Community-based research	4
Engagement of local leaders	4
Model / cycle of policy-making followed	3
Needs assessment / situation analysis	3
Development of training capacity	3
Use of mass media / advocacy	3
Integrated system of research and development	2
Enhancement of health information systems	1

5.2.2 Study quality

Further details on the quality of the 25 intervention studies included are shown in Appendix III, and summarised below.

A. One RCT of moderate quality (QIDS 2008)

However, the RCT only included limited description of stakeholder engagement and outcome reporting was also limited. Effects on policy change were not reported.

B. Six qualitative studies (FRONTIERS Guatemala 2007, Harpham 2006, Ir 2010, Manandhar 2008, Majdzadeh 2010, WHO Brazil 2007)

- 3 Low quality (Harpham 2006, Manandhar 2008, WHO Brazil 2007)
- 2 Moderate quality (FRONTIERS Guatemala 2007, Ir 2010)
- 1 High quality (Majdzadeh 2010) (here "high quality" refers to the qualitative design of the study, not to the actual intervention design which was poorly described)

C. Eighteen were quality assessed as "other study types", which were mainly descriptive. (Ashford 2006, Campbell 2003, DDM 2003, Liu 2006, MCH-FP 1996, Molina 2004, Newman 2006, Okonofua 2010, Orobaton 2007, Scott 2008, Stewart 2005, TEHIP 2008, van den Broucke 2010, Varkevisser 2001,WHO 2007 China , WHO 2007 Ghana, WHO 2007 Vietnam, WHO 2007 Zambia)

- 8 Low quality (Ashford 2006, DDM 2003, Newman 2006, Orobaton 2007, Stewart 2005, van den Broucke 2010, Varkevisser 2001, WHO 2007 Vietnam)
- 6 Moderate quality (Campbell 2003, Liu 2006, MCH-FP 1996, Scott 2008, WHO 2007 Ghana, WHO 2007 Zambia)

- 4 High quality (Molina 2004, Okonofua 2010, TEHIP 2008, WHO 2007 China) (here "high quality" refers to the quality of description, not in terms of experimental design)

5.2.3 Study outcomes

Table 3 presents an overview of the results for intervention studies, while Table 4 in Appendix II shows detailed results for the individual studies. Although many of the studies using specific interventions to facilitate the translation of research into health policy encountered serious challenges in the process, all of the studies setting out to influence policy were successful to some extent in achieving this. Twenty studies reported progress in policy implementation, and in ten cases, interventions were successfully scaled up (from initial use in pilot studies). In two studies, interventions led to follow-up activities such as further research. Three studies reported positive changes in decision-maker attitudes, four reported improvements in service provision, health facilities or infrastructure, five reported that they achieved an improvement in decision-maker skills (with respect to research techniques and evidence-based medicine). Three studies also reported changes in health outcomes, including reductions in mortality rates and increased uptake of family planning. As interventions and outcomes were generally poorly reported it is not possible from the data provided to draw any conclusions linking intervention sub-components to size of effect.

5.3 Barriers and facilitators to uptake of health research into policy

A secondary objective of this review was to describe common lessons on barriers and facilitators to research uptake, drawing on both reports from intervention studies described earlier and from a broad range of non-intervention studies, including operational or programmatic studies.

5.3.1 Non-intervention studies

Table 4 shows the characteristics of the 29 non-intervention studies describing barriers or facilitators identified through either observations of health policy-making processes (n= 3) or according to stakeholder opinions (n=20); six studies included a mixture of both. Of all 29 studies, five came from low income countries, 10 were carried out both in low and middle-income countries, and 14 came from middle-income countries. More of these non-intervention studies were multi-country than was the case for the intervention studies. Twenty-five of the studies used qualitative interview techniques, 12 included document analysis, and three used questionnaires. As shown in Table 5, most studies addressed more than one group of stakeholders. Most of these non-intervention studies (n=21) examined specific areas of health care, although some of these explicitly used the chosen topic to illustrate more general questions about knowledge translation into policy.

5.3.2 Findings from intervention and non-intervention studies

Table 3 shows a summary of barriers and facilitators to knowledge translation as presented by both the intervention studies and the non-intervention studies; further details reported by the individual studies are shown in Table 4 in Appendix II. A wide range of barriers and facilitators were identified and, in many cases, these substituted for each other (e.g. successful stakeholder participation being cited as contributing to positive changes and lack of stakeholder collaboration or problems in this process hindering change).

The most frequent factors quoted as facilitating the knowledge translation process included (in order of frequency reported): successful collaboration with and involvement of all stakeholders (i.e. policy-makers, health care staff, researchers, civil society organisations etc.); local research conducted to embed any evidence-based recommendations into the local context; good leadership, government support and commitment; training professionals in the skills required for implementation of policies; community participation and participatory research; support by or involvement of important multilateral organisations (especially for low

income countries); specific funding; an accessible database of research (including local research, e.g. Demographic Surveillance Systems); and timeliness. Other issues mentioned in the studies can be found in Appendix II.

Many of these facilitating factors cited coincided with key sub-components of the complex interventions studied, suggesting that these are the active ingredients. This included extensive collaboration with and participation of stakeholders, community participation and participatory research, training of different groups of stakeholders, carrying out local research to verify and adapt more generic recommendations, and adequate funding and government and international support. However, data from the interview studies also suggested that in many contexts the use of these recommended strategies for health policy-making was not common.

The most frequently cited barriers to knowledge translation into health policy included (in order of frequency reported): lack of resources and funding; problems with stakeholder engagement (including communication problems between researchers and policy-makers); frequency of staff turnover (especially for policy-makers); inadequate methods of dissemination; the topic in question not being high on the policy agenda; and lack of local data or local research. Other issues mentioned in the studies can be found in Table 7.

Differences between low and middle-income studies were only evident in a few cases. Barriers owing to lack of drugs and the availability of adequate staff and facilities were, not surprisingly, more apparent from the studies in low income countries. These studies also cited dependence for support on large multilateral organisations (e.g. the WHO or UNICEF) as a barrier since priorities may not be set locally but in response to external demands.

Table 3 Overview of results of intervention studies by study type and quality

Study	Quality assessment	Context	Positive outcomes in terms of:							
			Policy development	Policy implementation	Scaling up of pilot projects	Follow-on actions	Change in decision-maker attitudes	Better service provision / facilities / infrastructure	Change in decision-maker skills	Health outcomes
Randomised controlled trial										
QIDS 2008	Moderate	Middle-income	yes	yes						yes
Qualitative intervention studies										
Majdzadeh 2010	High	Middle-income	yes	yes						
FRONTIERS Guatemala 2007	Moderate	Middle-income	yes	yes				yes		
Ir 2010	Moderate	Low income	yes	yes	yes					
Harpham 2006	Low	Low income	yes							
Manandhar 2008	Low	Low income	partial; range of recommendations discussed and agreed			yes	yes			
WHO 2007 Brazil	Low	Middle-income	yes	yes	yes					

Study	Quality assessment	Context	Positive outcomes in terms of:							
			Policy development	Policy implementation	Scaling up of pilot projects	Follow-on actions	Change in decision-maker attitudes	Better service provision / facilities / infrastructure	Change in decision-maker skills	Health outcomes
Other intervention studies: descriptive case studies										
Molina 2004	High	Middle-income	yes	yes						
Okonofua 2010	High	Middle-income	yes	only partially implemented						
TEHIP 2008	High	Low income	yes	yes	yes	yes		yes	yes	yes
WHO 2007 China	High	Middle-income	yes	yes	yes					
Campbell 2003	Moderate	Low income	yes							yes
Liu 2006	Moderate	Middle-income	yes	yes						
MCH-FP 1996	Moderate	Low income	yes	yes	yes					
Scott 2008	Moderate	Middle-income	yes	yes	yes					

Study	Quality assessment	Context	Positive outcomes in terms of:							
			Policy development	Policy implementation	Scaling up of pilot projects	Follow-on actions	Change in decision-maker attitudes	Better service provision / facilities / infrastructure	Change in decision-maker skills	Health outcomes
WHO 2007 Ghana	Moderate	Low income	yes	yes	yes					
WHO 2007 Zambia	Moderate	Low income	yes	yes	yes			yes		
Ashford 2006	Low	Low income	yes	partial; plans approved and funded						
DDM 2003	Low	Middle-income	yes	yes						
Newman 2006	Low	Low income	partial; country action plans developed						yes	
Orobaton 2007	Low	Low income	yes	yes			yes	yes		
Stewart 2005	Low	Low & middle-income					yes		yes	
van den Broucke 2010	Low	Middle-income	yes	yes	yes				yes	
Varkevisser 2001	Low	Low & middle-income	yes	yes					yes	
WHO 2007 Vietnam	Low	Low income	yes		yes					
Total frequency counts of positive outcomes			**24**	**20**	**10**	**2**	**3**	**4**	**5**	**3**

Table 4 Characteristics of non-intervention studies

Study	Design	Participants / respondents	Health field
Low income countries			
Albert 2007 Mali	Stakeholder opinions **Methods:** qualitative interviews	19 key informants from commission responsible for Mali's essential medicines list	**Specificity:** broad **Topic:** general; selection and updating of national essential medicines list
Behague 2009 Malawi, Burkina Faso, Bangladesh, Nepal, Ghana	Stakeholder opinions **Methods:** qualitative interviews	Opinion leaders, policy-makers, clinicians, public health experts, health system administrators	**Specificity:** specific **Topic:** maternal and neonatal mortality and morbidity
COHRED 2000 Burkina Faso	Observation (of policy-making processes) and stakeholder opinions **Methods:** document analysis; qualitative interviews	Decision-makers and researchers; target groups, including health centre staff, women's groups and mothers	**Specificity:** specific **Topic:** shared care programme in child health targeted at mothers
Lairumbi 2008 Kenya	Stakeholder opinions **Methods:** qualitative interviews	Policy-makers, implementers, senior representatives from national research institutions, major non-governmental organisations (NGOs) and other bodies undertaking research, bilateral bodies that help fund health reforms in Kenya	**Specificity:** specific / intermediate **Topic:** main focus on malaria (introduction of Artemesinin-based Combination Therapies (ACTs)) and prevention of pneumococcal diseases among children (Haemophilus influenzae (Hib) vaccine)
Solo 1998 Burkina Faso, Mali, Gambia, Kenya, Tanzania	Stakeholder opinions **Methods:** visit of project sites; qualitative interviews	Project staff members, key decision-makers	**Specificity:** specific **Topic:** operations research in reproductive health
Low and middle-income countries			
Lavis 2010 China, Ghana, India, Iran, Kazakhstan, Laos, Mexico, Pakistan, Senegal, Tanzania	Stakeholder opinions **Methods:** questionnaire study	researchers (clinician scientists, university professors, research managers in NGOs, civil servants with programme-evaluation responsibilities)	**Specificity:** specific / intermediate **Topic:** 4 clinical areas: prevention of malaria, care of women seeking contraception, care of children with diarrhoea and care of patients with tuberculosis
Lush 2008 sub-Saharan Africa	Stakeholder opinions **Methods:** qualitative interviews	Respondents from international agencies, academic or research institutions	**Specificity:** specific **Topic:** syndromic management of sexually transmitted infections (STIs)
Marin 2004 various middle and low income countries worldwide	Observation and stakeholder opinions **Methods:** document analysis; qualitative interviews	Programme managers and providers in service delivery organisations, policy-makers and key decision-makers, donor agency staff, researchers	**Specificity:** specific **Topic:** operations research in family planning and reproductive health services

Study	Design	Participants / respondents	Health field
Omar 2010 Ghana, Uganda, Zambia, South Africa	Stakeholder opinions **Methods:** qualitative interviews	Policy-makers, programme managers, media, medical professional associations, traditional healer unions, mental health user groups	**Specificity:** specific **Topic:** development of mental health policies
Parkhurst 2010 China, Nepal, Pakistan, Malawi, Uganda, Zambia	Stakeholder opinions **Methods:** qualitative interviews	Senior government officials (directors, coordinators, or programme managers of their relevant national disease control programme)	**Specificity:** specific **Topic:** HIV, malaria, tuberculosis
Practihc Aaserud 2005 Albania, Armenia, Bolivia, Cambodia, India, Indonesia, Iran, Nicaragua, the Philippines, Rwanda, South Africa, Yemen, Brazil, Egypt, Pakistan, Uganda	Stakeholder opinions **Methods:** survey, group interview	RCT collaborators, WHO drug information officers, regulatory officials, obstetricians	**Specificity:** specific **Topic:** use of magnesium sulphate to treat pre-eclampsia
Practihc Woelk 2009 Mozambique, South Africa, Zimbabwe	Stakeholder opinions **Methods:** document analysis; qualitative interviews	Policy-makers, civil society organisation, clinicians, researchers, international/bilateral agencies	**Specificity:** specific (exemplary) **Topic:** use of magnesium sulphate ($MgSO_4$) in the treatment of eclampsia in pregnancy (a clinical case); and use of insecticide treated bed nets and indoor residual household spraying for malaria vector control (a public health case)
Rutherford 1997 32 countries	Observation and stakeholder opinions **Methods:** file review of 53 IDRC-supported projects ; site visits and qualitative interviews	Researchers	**Specificity:** specific **Topic:** occupational health and safety
Middle-income countries			
Bedregal 2001 Chile	Stakeholder opinions **Methods:** qualitative interviews and questionnaires	Stakeholders from various backgrounds (policy-makers, clinicians, researchers)	**Specificity:** specific (exemplary) **Topic:** ambulatory care for acute lower respiratory tract infection in children (pneumonia and obstructive bronchitis), prevention of stroke (both defined a priori), change from health centre to family health centre (identified by stakeholders)
COHRED 2000 Brazil	Stakeholder opinions **Methods:** field survey; qualitative interviews	Leading agents in the fields of health science and technology and health policy	**Specificity:** specific **Topic:** vaccine research, development and production
COHRED 2000 Indonesia	Stakeholder opinions **Methods:** document analysis; meetings /	Policy-makers, researchers	**Specificity:** broad **Topic:** reaching vulnerable groups and maintaining the delivery of essential health services to the poor

Study	Design	Participants / respondents	Health field
	workshops; qualitative interviews		
COHRED 2000 Lithuania	Observation **Methods:** document analysis	Policy-makers, researchers	**Specificity:** broad **Topic:** reducing health inequalities
COHRED 2000 South Africa	Observation and stakeholder opinions **Methods:** document analysis; qualitative interviews	Policy-makers, researchers	**Specificity:** specific **Topic:** vitamin A deficiencies
COHRED 2000 Uruguay	Observation **Methods:** document analysis	Policy-makers, researchers	**Specificity:** specific **Topic:** Chagas disease
COHRED 2000 Pakistan	Observation and stakeholder opinions **Methods:** document analysis; qualitative interviews	Policy-makers, researchers	**Specificity:** intermediate / broad **Topic:** Child health
Colón-Ramos 2007 Costa Rica	Stakeholder opinions **Methods:** document analysis; qualitative interviews	Policy-makers, researchers, industry representatives	**Specificity:** specific **Topic:** trans fatty acid research and nutrition policy
Cordero 2008 Brazil, Colombia, India, the Philippines, South Africa, Thailand	Stakeholder opinions **Methods:** qualitative interviews	Key informants from national and international funding agencies	**Specificity:** broad **Topic:** general health research
Fiestas 2009 13 Latin American countries	Stakeholder opinions **Methods:** qualitative interviews	Researchers, stakeholders, multiple role actors	**Specificity:** specific **Topic:** mental and neurological health
Mahoney 2004 Indonesia	Observation **Methods:** document analysis and interview	Researchers, policy-makers	**Specificity:** specific **Topic:** hepatitis B vaccine introduction
Practihc Daniels 2008 South Africa	Observation and stakeholder opinions **Methods:** document analysis; qualitative interviews	Researchers (many involved in policy-making)	**Specificity:** specific **Topic:** use of magnesium sulphate to treat eclampsia and pre-eclampsia
Trostle 1999 Mexico	Stakeholder opinions **Methods:** qualitative interviews	Researchers, officials from different hierarchies	**Specificity:** specific (exemplary) **Topic:** 4 vertical programmes (AIDS, cholera, family planning, immunisation)

Study	Design	Participants / respondents	Health field
Yousefi-Nooraie 2009 Iran	Stakeholder opinions **Methods:** questionnaire study	Participants of systematic reviews workshop for researchers, health managers, policy-makers	**Specificity:** broad **Topic:** general health care

Table 3 Overview of facilitators and barriers to uptake of health research into policy reported by intervention and non-intervention studies

Facilitators	Frequency reported	Barriers	Frequency reported
RESOURCES			
Coordinated funding and management	1	Lack of resources / funding / investment in health sector	19
Additional funding / specific funding	6	Donor dependency	1
Financial support for pilot research	1	Limited access to online resources	1
Financial support for scaling up	1	Limited capacity for finding research information	1
Cost-effectiveness	2	Lack of time to read lengthy documents	1
Equal shouldering of costs by collaborating entities or resources provided by neutral outside source	1	Lack of availability of personnel and hospitals / lack of human resources	3
Funding agencies involved in promoting knowledge translation / acting as knowledge brokers	1		
PERSONAL FACTORS			
Provider motivation	1	Limited motivation for extra work / relocation	2
		Narrow professional interests	1
STAKEHOLDERS / COLLABORATION			
Stakeholder involvement / collaboration / participation / networks	32	Problems with stakeholder engagement / collaboration / communication between stakeholders	13
Integrated system of research and development	2	Not enough community / staff participation	4
Community participation / involvement of local leaders / voluntary participation / operations research	6	National elites alienated from local realities / policy-makers distant from poor areas	2
Local / stakeholder / government ownership	4	Lack of sense of ownership by policy-makers / desire of different parties to own the process	2
Support by / authority of important multilateral organisation	6	International organisations not actively involved in promotion	1
Strong interdistrict linkages	1	Perceived distrust and disparate attitudes between sectors (research, government and industry) / competition between stakeholders	2
Charismatic leadership / high level champions / local champions / commitment and leadership / government support	8		
Policy-makers having sense of ownership and trust	1		
Contact with international organisations / donor agencies facilitating collaboration	4		
Researchers acting as policy-makers / researchers involved in policy-making	3		
Stakeholder analysis	1		

Facilitators	Frequency reported	Barriers	Frequency reported
Bottom-up approach	1		
Link between science and production (drugs)	1		
Interest group equilibrium	1		
Establishing fora and clearing house functions for specialists to advise government	1		
SUSTAINABILITY			
Plans for scaling up	2	Problems with continuity / sustainability / lack of commitment	5
RESEARCH CULTURE			
Clear evidence-based programme strategy	2	Problems with utilisation of clinical protocols / operational guidelines	1
Internationally endorsed EB-policies creating pressure for change	1	Lack of a strong evidence-based culture in policy development / low awareness of EBM	2
Continuity of research, even in absence of immediate solutions	1	Limited quality / skills re in-country research	3
Office within MOH to coordinate research initiatives and translation of results	1	Lack of skills to do EBM	3
High quality evidence / research / focus on study quality	4		
Incentives for researchers for translation work	3		
ORGANISATION			
Flexibility to adjust programmes / bureaucracy open to change	3	Time pressures of high ranking officials (and others)	2
Feasible design / interventions relevant and implementable / sustainable	4	Government / staff turnover	10
Easy to use materials	1	Policy threatening power relations	1
Empowerment of personnel / existing relevant (research / medical) institutions	3	Provider resistance to change	2
Enhancement of working with teams	1	Managerial problems (internal competition, hierarchies, DOH infrastructure, bureaucracy)	3
		Lack of planning / systematic approach	2
		Inadequate plans for implementation	2
		Lack of powerful institutional structure	1
		Policy-makers not providing support (e.g. for implementation)	2
		Lack of coordination between different ongoing studies / dispersion and fragmentation of research	3
		Lack of consensus or information about policy options	1
		Poor implementation	1

Facilitators	Frequency reported	Barriers	Frequency reported
RESEARCH BASE			
Demographic Surveillance System / solid accessible database of research (also including e.g. maternal death reviews) / central depository for health research outputs	6	Lack of local data / research	7
Access to international databases	1	Lack of needs assessment	1
Research commissioned by policy-makers	1	Lack of tools for knowledge translation	1
		Limited sample size	1
		Evidence-based medicine often just used to confirm rather than inform or contest global policy directives	1
SKILLS / KNOWLEDGE / TRAINING			
Training professionals / flexible training	7	Lack of awareness of existing / local data	2
Building training capacity / capacity strengthening of human resources	2	Lack of knowledge re programme	1
Development of EBM skills	2	Lack of technical skills of health staff	3
Training in research / EBM methods for policy-makers	3	Lack of continuity in education	1
Local discussion groups for professionals	1	Lack of trained researchers	1
COMMUNICATION / DISSEMINATION			
Raising public awareness / media involvement	4	Inadequate dissemination / weak mechanisms of sharing information	9
Wide dissemination (conferences / peer reviewed journals)	4	Lack of formal communication channels	2
Research published in renowned journal	1	Limited access to research outputs (policy-makers)	1
Research published in national and regional journal	1	Research jargon / reports difficult to read / different language	4
Advocacy / knowledge brokers	2		
Development of detailed guidance documents	1		
Clinical practice guidelines; EB international guidelines	2		
Short and concise research documents / better packaging of results	3		
TECHNICAL / INFRASTRUCTURE			
Adequate infrastructure funding / infrastructure improvement	2	Concerns re drug	1
Widespread availability / continued supply of drug	2	Inadequate access to drug	1
RELEVANCE			
Timeliness	5	Lack of research relevance / unrealistic research recommendations	5
Local and policy-relevant research / embed policy in existing context	9	Selected EB-policies undermining comprehensive approach	1

Facilitators	Frequency reported	Barriers	Frequency reported
High priority topic / priority problems identified by researchers and decision-makers	2	Agenda set by donors / difference in priorities	3
Research recommendations specific and concrete	1	Difference in objectives between policy-makers and researchers	1
Policy-makers identifying research priorities	1	Controversial topic	3
		Topic not high priority / precedence of other programmes or public demand	8
EXTERNAL ENVIRONMENT			
Democracy and accountability / favourable political climate / positive attitude to research utilisation	3	Difficult macro-level social and political context	3
Formalisation and legalisation of policy interventions into existing health system	3		

6. Discussion

The primary aim of this systematic review was to assess the state of the evidence-base on interventions to increase the uptake of research findings into health policies in low and middle-income countries. A secondary aim related to identifying barriers and facilitators of research uptake, and for this element we also included evidence from non-intervention studies. Lessons have been learnt regarding both the substantive issue of research uptake as well as the challenges of applying systematic review methods to the important topic of knowledge transfer.

6.1 Substantive findings

Overall this review included 54 studies relevant to the topic focus, reported in 44 papers. Twenty-five studies included a multi-faceted intervention to improve the uptake of research findings, and the remaining 29 non-intervention studies reported barriers and facilitators to uptake from observations of policy-making processes and/or stakeholder opinions. Many of the non-intervention series were operational or programmatic studies, and presented a particular challenge in terms of placing in a "study design" category.

In terms of the primary aim of the review, we took a wide definition of "intervention" to include any action undertaken to facilitate the translation of health research evidence into health policy and policy implementation. This broad interpretation led to the inclusion of a more diverse range of studies than if we had adopted the narrower perspective of an experimental intervention. Among the 25 intervention studies, there was only one RCT, which was of moderate quality. By conventional methods of grading according to study design and other quality criteria, this review has found mostly low quality studies and thus recommendations on "what works" to increase the uptake of research are weak according to the GRADE system (Guyatt et al, 2008). This not only reflects a lack of robust studies by grading criteria based primarily on study design, but also raises questions about the suitability of such standards, as discussed further below. Such questions are not in fact peculiar to this topic of research uptake and have been raised for a wide variety of other health-related issues (Dobbins et al, 2008; Nutley et al, 2007).

In terms of types of interventions, the review found an array of activities across the 25 studies, but with a consistency as regards almost all being composite or complex interventions. The most frequently cited components of interventions reporting positive effects on policy development included carrying out local research (e.g. for contextualisation of international recommendations or for collecting epidemiological data), ensuring intensive stakeholder engagement and collaboration, including training and capacity-building activities (for a variety of stakeholders), and fostering community participation. This is broadly consistent with research from a high-income setting which emphasised local relevance and effective interaction between researchers and policy-makers as two of the four key components of effective strategies to improve uptake, along with better access to evidence and removal of organisational barriers to use (Campbell et al, 2009).

As regards outcomes, all the intervention studies reported positive influences on policy development or implementation, although once again the lack of high quality research amongst this series must be emphasised. Effects were mostly described in narrative and not quantified and thus magnitude of change cannot be gauged.

In terms of optimal timing of interventions to improve uptake, the studies in this review confirm the conclusion of other authors (Aaron et al, 2009; Carden, 2009) in that interventions should be planned from the beginning and that those added as an afterthought are often not as effective. However, it is also important to acknowledge that opportunities to influence policies, particularly at a national scale, are not continuously available but dependent on policy-making cycles and thus the timeliness of research findings is crucial but hard to guarantee (Nutley et al, 2007) .

Across the whole range of 54 intervention and non-intervention studies considerable emphasis is given to barriers and facilitators to uptake of research evidence. Most of these draw upon stakeholders' opinions but some are based on observations of the policy-making process. Few differences were seen between studies from low and middle-income countries as regards barriers and facilitators. However, one important difference cited was that low income countries tended to depend more on the support of large multilateral organisations, and that this dependence was also seen as a barrier to focussing on local priorities.

The most frequently-cited components of interventions reporting positive effects on policy development found in this review and described earlier (local research, stakeholder engagement and community participation) were also identified as common factors in the analysis of barriers and facilitators to evidence uptake. Further, it is interesting to note that across the 54 studies, there was generally inadequate description of context, thus making it difficult to begin to identify what circumstances provide an enabling rather than disabling environment for uptake. The need for improved conceptual models and tools to understand and capture context is widely-acknowledged in the global health arena (Mitton et al, 2007). The importance of understanding, for example, the organisational research culture or context in order to identify appropriate interventions was highlighted by a randomised trial of interventions to improve uptake conducted in a high-income setting (Dobbins et al, 2009).

6.2 Methodological findings in relation to intervention studies

The challenges of undertaking systematic reviews of evidence on complex or composite interventions are increasingly being acknowledged (Shepperd et al, 2009). During this review, particular difficulties were experienced owing to the lack of detailed specification of interventions and their sub-components in the 25 selected studies. Interestingly, similar inadequacies have been highlighted in a recent assessment of so-called "avoidable waste" of research evidence which noted that over 30% of trial interventions were not sufficiently

described and 50% of planned study outcomes were not even reported (Chalmers and Glasziou, 2009). In our review, we also faced challenges in synthesizing the findings. Again this is a generic problem. In the absence of accepted or standardised methods for synthesising predominantly descriptive and qualitative evidence, we sought to highlight common themes using simple frequency counts. Although the initial intention had been to organise findings using a theory-driven approach, as that used by Graham et al (2006), again there was insufficient detail in the study reports to enable this. In addition, the crucial element of all systematic reviews – the quality assessment – encountered challenges.

6.2.1 Quality assessment

This review encountered challenges in assessing the quality of the intervention studies included, which has implications for the strength of recommendations. These difficulties arise not only from the composite nature of the interventions, but also the lack of detail in some study reports which, in turn, made it hard judge quality against selected criteria. Interestingly, it is noted elsewhere that methods for the assessment of quality in systematic reviews are still in their infancy and there is substantial room for improvement (Moja et al, 2005).

The assumed gold-standard design – a RCT – was found in only one of the 25 intervention studies but was itself of only moderate quality. This moderate grading was due to its very limited reporting of any formal analysis of the trial data. Given the composite nature of interventions to improve research uptake, it is debateable whether a randomised design should be regarded as the gold standard in this field (Dobbins et al, 2009). For 19 of the remaining intervention studies, these were assessed as low or moderate quality primarily owing to their lack of methodological details in terms of participants, interventions, analytical framework and formal analysis. Conversely, the 5 studies assessed as high quality, which were either qualitative (n=1) or descriptive case-studies (n=4), provided clear information on the intervention and on the research methods used – including tools and outcomes measures. It would appear therefore that the studies in this review were graded primarily on the basis of providing sufficient detail to fit the criteria in the assessment tool rather than on the basis of their intrinsic scientific quality. The quantitative and qualitative studies were simpler to assess as they fitted well into the information required by the NICE assessment tool, whereas this was not true for the descriptive case-studies where more of a critical appraisal process was necessary rather than a quality evaluation.

6.2.2 Future research needs

There is a clear need for high quality studies of interventions to improve research uptake and, in turn, health outcomes. These should ideally be comparative cohort studies or cluster randomised controlled trials wherever possible, and follow accepted quality criteria for reporting (in accordance with the relevant CONSORT guidance) and methodology.

Future studies should include:

- more systematic reporting, with clear description both of methodology for intervention development and of outcomes;
- process assessments;

- a wider range of outcomes, including details of implementation, change in stakeholder attitudes, health outcomes;
- a comparison of interventions varying in degree of complexity so that individual components contributing to effectiveness can be more easily defined;
- systematic reporting of underlying frameworks , models or theories;
- systematic reporting of contextual factors (including the nature of the policy-making environment and its readiness for change).

7. Conclusions

Although the intervention studies from low and middle-income countries included in this review were not of sufficient quality to provide strong recommendations, the findings are broadly consistent with the findings from high-income countries on the need for multi-faceted, tailored interventions and on the importance of contextual influences, particularly organisational. Effective interventions to increase uptake of evidence are likely to be those tailored to the context and include local research, extensive stakeholder engagement, and community participation. High-quality comparative studies reporting on a range of outcomes, with clear and comprehensive descriptions of methodology and of context, are still needed to strengthen understanding on how to improve uptake specifically in low and middle-income countries.

Key messages

- The uptake of findings into policy could be improved in low and middle-income countries through multi-faceted, tailored interventions, so increasing value-for-money from health research.
- A wide range of activities have typically been undertaken in such composite interventions, with local research, extensive engagement with stakeholders and community participation as the three most common components.
- Improving research uptake is a process rather than a discrete event, and there is some evidence to suggest that early planning is more likely to lead to success as well as acknowledging important contextual influences, particularly organisational.
- There is a wealth of reported lessons on barriers and facilitators to uptake of research evidence. Important barriers are similar for studies from low and middle-income countries, and include lack of funding and resources, frequency of staff turnover, inadequate dissemination, and the topic not being a high priority topic on the policy agenda. However, one important distinction cited is that low income countries tend to depend more on the support of large multilateral organisations, and this dependence is also seen as a barrier to focussing on local priorities.
- Overall, however, there is a lack of intervention studies of sufficient quality to provide a solid evidence-base for strong recommendations on “what works.” In particular, inadequate reporting of methodological details is common, so contributing to avoidable waste of research evidence.
- High-quality comparative studies reporting on a range of outcomes, with clear and comprehensive descriptions of methodology and of context, are still needed to strengthen understanding on how to improve uptake specifically in low and middle-income countries.

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APPENDIX I – Table of excluded studies

Authors	Title	Reasons for exclusion
Ashley 2008 – Jamaica	Integrating Research into Policy and Programmes: Examples from the Jamaican Experience	review; role of research in the policy-making process unclear
Butler 2005 – South Africa	South Africa's HIV/AIDS policy, 1994-2004: How can it be explained?	review; role of research in the policy-making process unclear
Chaloupka 2003 – various countries	Global Efforts for Reducing the Burden of Smoking	does not analyse policy process or factors acting as barriers or facilitators to policy-making
Clemens 2004 – various countries	Translational research to assist policy decisions about introducing new vaccines in developing countries	not relevant to policy-making process
Court 2003 – various countries	Bridging Research and Policy: Insights from 50 Case Studies	only one case relevant to healthcare, but no details given
DeRoeck 2005 – Bangladesh, China, India, Indonesia, Pakistan, Thailand and Vietnam	Policymakers' views regarding the introduction of new-generation vaccines against typhoid fever, shigellosis and cholera in Asia	very content-specific and not policy-specific
Draper 2009 – South Africa	Mental health policy in South Africa: Development process and content	talks about policy process but not about research and facilitating research transfer to policy
Ebener 2006 – Philippines	Knowledge mapping as a technique to support knowledge translation	no concrete outcomes
Fajans 2008 – various countries	Opportunities and demands in public health systems. Helping public sector health systems innovate: the strategic approach to strengthening reproductive health policies and programs	not really about policy-making process
Gilson 2008 – South Africa	The interface between research and policy: experience from South Africa	a) non-systematic secondary analysis, b) the SAZA study that it is based on is also just an observation of a reform of health financing, so not really related to health research
Guindon 2010 – various countries	Bridging the gaps between research, policy and practice in low- and middle-income countries: a survey of health care providers	practice, not policy-making
Hanney 2003 – various countries	The utilisation of health research in policy-making: Concepts, examples and method of assessment	review; main studies quoted included
Hornby 2002 – Sri Lanka	A development framework for promoting evidence-based policy action: drawing on experiences in Sri Lanka	no primary data / outcomes reported
Jha 2006 - various countries	Reducing the burden of smoking world-wide: Effectiveness of	does not analyse policy process or factors acting as barriers or

Authors	Title	Reasons for exclusion
	interventions and their coverage	facilitators to policy-making
Jirawattanapisal 2009 – Thailand, South Korea, Taiwan	Evidence-based decision-making in Asia-Pacific with rapidly changing health-care systems: Thailand, South Korea, and Taiwan	not all the relevant to health; does not really describe the policy-making process
Khan 2006 – Bangladesh	Strategies for achieving research utilization in the Bangladesh population program: Implications for health education	no link of concrete research projects to concrete outcomes
Khanna 2010 – India	Health research strengthening and operational research needs for improving child survival in India	Gadchiroli example about practice, the rest is mainly research questions rather than outcomes
Krishnan 2009 – various countries	A role for INDEPTH Asian sites in translating research to action for non-communicable disease prevention and control: a case study from Ballabgarh, India	no information on policy process
Lubben 2002 – various countries	Reproductive health and health sector reform in developing countries: Establishing a framework for dialogue	review, relevant primary papers not available
Pittman 2006 – South Africa, Chile	Beyond the sound of one hand clapping: experiences in six countries using health equity research in policy	not enough details / primary data
Samms-Vaughan 2008 – Jamaica	Comprehensive Longitudinal Studies of Child Health, Development and Behaviour in Jamaica: Findings and Policy Impact	does not describe the policy process
Sauerborn 1999 – Thailand	Strategies to enhance the use of health systems research for health sector reform	no primary data / relevant references
Syed 2008 – various countries	Exploring evidence-policy linkages in health research plans: a case study from six countries	work in progress / no relevant outcomes
Thapa 2004 – Nepal	Abortion law in Nepal: The road to reform	review / not clear about policy process or outcomes
Thatte 2009 – India, Pakistan, Malaysia, Philippines	Evidence-Based Decision on Medical Technologies in Asia Pacific: Experiences from India, Malaysia, Philippines, and Pakistan	nothing on the policy-making process and ways to improve evidence-based policy-making
van Kammen 2006 – East Africa	Using knowledge brokering to promote evidence-based policy-making: The need for support structures	describes briefly the process of developing a knowledge brokering initiative in East Africa but there are no outcomes of the initiative itself (ongoing)
van Kerkhoff 2006 – various countries	Linking local knowledge with global action: examining the Global Fund to Fight AIDS, Tuberculosis and Malaria through a knowledge system lens	details / primary data sparse

APPENDIX II – Detailed tables of included studies

Table 4 Detailed results of intervention studies

Study / Intervention	Results
Low income countries	
Ashford 2006 – Kenya General health services **Intervention** • Application of model of policy-making process; agenda-setting, coalition building and policy learning • Kenyan Service Provision Assessment • Seminars about DHS and local application • Regional planning seminars • Stakeholder involvement	• Progress in the different areas of the process (capacity building, coalition building, policy learning, agenda setting) • Development of 70 evidence-based health plans – most plans approved and funded by the Kenyan Ministry of Health in 2002 • Substantial investment and effort are needed to bring stakeholders together to work towards policy change
Campbell 2003 – Nepal Reproductive health **Intervention** • Application of policy-making framework: (1) collaborative planning and programming, (2) strategic assessment, (3) policy and strategy development, (4) material development, (5) management of reproductive health information and services, (6) policy review	• Progress achieved in all areas of the framework • Some problems with utilisation of some of the knowledge tools due to extra work involved and lack of resources • Improvement in health outcomes (increase in family planning, small drop in fertility rates, increase in antenatal coverage and assisted delivery)
Harpham 2006 – Vietnam Mental health **Intervention** • Initiative by local NGO involving scientific meeting, feedback from politicians, presentation of action plan, article on mental health published in national daily newspaper, links	• Strategy resulted in policy changes (national plan of action proposed to screen pregnant women and children for mental; education about mental health to be incorporated into early childhood development programmes; community based intervention programme to treat people with mental illness to be piloted)

Study / Intervention	Results
with the government / policy-makers established	
Ir 2010 – Cambodia General (health insurance and health equity) **Intervention** • Implementation of the Cambodian Health Equity Funds; evaluation of pilot schemes • Community participation • Scaling up	• Health Equity Funds improved access to referral services and hospital services for the poor • Health Equity Funds may help prevent poverty by reducing time lost and avoiding selling assets or taking a loan • Health Equity fund model pilots replicated in other places with some design modifications • Participation of the local community in the design, implementation, monitoring and evaluation reduced cost and enhanced sustainability • Successful scaling up: Health Equity Funds became an integral part of the national Health Sector Strategic Plan and the Poverty Reduction Strategy • By 2008, there were 50 HEF schemes, including 15 government subsidy schemes, based in 51 hospitals and 120 health centres in Cambodia, providing coverage for over 50% of the total population in Cambodia
Manandhar 2008 – Zambia Safe motherhood **Intervention** • Operations research (Participatory Ethnographic Evaluation and Research (PEER)) • Intersectoral dialogue with key stakeholders and policy-makers at the local, provincial and central level • Dissemination (dissemination forums) and advocacy	• Increase in understanding and debate • As a result of debate at the meetings, four civil society organisations entered the area, and are working with the newly empowered PEER researcher women to conduct assessments and bring in interventions • The District health system was using the ethnographic research to inform the planning cycle and communication activities, the and has also increased its attention to the area, broadening consultation activities to include the PEER researcher women in addition to the male members of the original Neighbourhood Health Committee, and liaising with the civil society organisations now operational there • In the presence of high ranking government officials, a number of recommendations for follow-up action were discussed and agreed in Lusaka: o Senior policy makers/implementers to convene and define specific actions, timeframes and responsibilities o Combine PEER method with Ministry's Maternal Deaths Review o Urgently undertake a comprehensive review of current gaps and shortcomings in policies o Shift focus away from directive health education and IEC to more strategic and culturally compelling behaviour change communication for different ethnic population groups o Raise these discussions at all other national Forums o Conduct a national baseline study on prevalence of early marriage across the country and links with the education of the girl child o Undertake a comprehensive review of all customary laws across the country, with an emphasis on the impact on the girl child o Increase public spending commitment in the health sector to 15%
Maternal and Child Health – Family Planning Extension Project (MCH-FP) 1996 – Bangladesh Maternal and child health, family planning **Intervention** • Operations research (extension project evolved from Matlab	**Moving from pilot test to the field** • No single model adequately describes how innovation leads to implementation – a consistent sequencing of research, decision, and implementation has not been found; innovations tested in field trials were rarely exactly the ones that were originally proposed for the test; if researchers insisted on adhering to a test's original design, the goal of increasing the sense of ownership of the research by its intended audience was lost, and the test was doomed to failure – field trials should not be overspecialised **Involvement of researchers in implementation** • Involvement of the outside research organisations likely limited corruption in hiring but came at the expense of diverting

Study / Intervention	Results
project) • Collaboration with government officers at both central and field levels • Training of field workers, qualitative research, implementation analysis	project leaders' time and attention; employing outside facilitators eased incorporation of the program into the routine practice of the large organisation followed by the reduction and elimination of the role of the outsider **Communication with policy makers** • Effective communication between researchers and policymakers often required mediation – i.e. researchers who are on advisory boards and independent research institutions that are trusted to convey information accurately • One of the most effective methods of communication was researchers' joint visits to project sites with high-ranking officials from the government or from the donor agencies • High political turnover caused set-backs • Integration of services were problematic (e.g. health with family planning) – the danger was an over-generalisation of concerns
Newman 2006 – West Africa Prevention of malaria during pregnancy, focus on intermittent preventive treatment (IPTp) with sulfadoxine-pyrimethamine (SP) **Intervention** • Evidence-based programme strategy clearly articulated by Expert Committee on Malaria (2000); draft of strategic framework 2002 by WHO Africa Regional Office	• Local research carried out and disseminated (national meeting involving a range of stakeholders); workshop on malaria prevention during pregnancy organised in collaboration with WHO / UNICEF • Action plans developed by country teams; six countries committed to conducting pilot interventions of IPTp with SP (Benin, Burkina Faso, Côte d'Ivoire, Mali, Senegal and Togo), and three of these countries (Mali, Senegal and Togo) decided to initiate policy change to IPTp with SP
Orobaton 2007 – Uganda Access and utilisation and quality of education, health and HIV/AIDS services **Intervention** • Establishment of the Uganda Program for Human and Holistic Development (UPHOLD) and institutionalising the Lot Quality Assurance Sampling (LQAS) survey method • Grants programme • Partnerships; involvement of traditional and non-traditional stakeholders; participatory processes • Evidence-based planning and decision-making	• Through engagement with local leaders, a malaria epidemic-prone Ugandan district (Bushenyi) improved its insecticide-net coverage among children aged 5 years or less from 4.2% in 2004 to 31.4% in 2006 • Dissemination of the home-based management of fever strategy, developed by Uganda's Ministry of Health: among fevered children under 5 years 30.7% in 2004 increased to 39.7% in 2005 who received appropriate treatment within 24 hours of fever onset • "Synergetic partnerships" between local governments and CSOs increased access and utilisation of HIV/AIDs services in UPHOLD support districts: the number of service and outreach outlets were increased and people were mobilised to public service outlets • Civil Society Organisation sites contributed to 74% of Prevention of Mother-to-Child Transmission of HIV services in 2005 where such services were the domain of local government only • Changes in institutional behaviour: district and national government have indicated their support for LQAS as a source of good planning information
TEHIP 2008 – Tanzania	• Capacity-building in management and administration • Integrated Management Cascade; innovations in communication and transportation (radio communication, motor cycle); results:

Study / Intervention	Results
Basic health care **Intervention** • Tanzania Essential Health Interventions Project (TEHIP) • Research and development aspects integrated into a cohesive, functional whole • Development of tools: (1) District burden of disease profile tool, (2) District health accounts tool, (3) District health service mapping tool, (4) Community voice tool: expressing needs, participatory action research, (5) Cost-effectiveness and district cost information system tool	o Actual supervision of peripheral facilities with time for supervisors to directly observe patient care o More coherent laboratory specimen collection and diagnostic laboratory reporting functions o Timely delivery of drugs, equipment, and supplies o Coordination of referrals of patients to the district hospital o Emergency epidemic support, such as during cholera outbreaks o Routine collection of health information and data o Notification of arrival of staff salaries (resulting in reduced closure of health facilities as health workers travel to collect salaries too soon and have to wait before returning) o Improved maintenance of facilities and equipment, and replenishment of stationary, registers, etc. o Improved linkages and communication with communities o Locally conducted capacity-building workshops, technical training, and refresher courses o Posting of replacement health staff when regular personnel are ill or have died • Health facility renovations • Development of national package of essential health interventions (based on DSS results, priorities) • Integrated Management of Childhood Illnesses ("syndromic" approach, considering a range of possible diseases at once, rather than one by one); resulted in significant increase in quality of child health services (no details given) and increase in utilisation • Scaling up of activities • Nigeria Evidence-based Health System Initiative initiated **Health-related outcomes:** in the 5 years following the introduction of evidence-based planning • Child mortality fell by over 40% in Rufiji and Morogoro • Death rate for Rufiji adolescents and adults between 15 and 60 years old declined by 18%
WHO Scaling-Up Health Service Delivery 2007 Ghana General healthcare delivery **Intervention** • Community-based Health Planning and Services Initiative • Stakeholder involvement • Pilot trial with social and operations research; needs assessments; involvement of traditional leaders; quarterly focus group sessions • RCT in 4 subdistricts • National dissemination conference • Validation initiative involving (1) preliminary planning, (2) community entry, (3) health compound construction, (4) procurement of essential equipment, (5) posting nurses, (6)	• RCT showed that community-based care could be achieved and improved immunisation coverage, service accessibility and quantity of maternal and family planning care; childhood mortality reduced; community trust in nurses grew • Success in validation effort • Progress in scaling up, but some constraints: (1) knowledge gap: Community-based Health Planning and Services meaning different things to different people, nurses concerned about challenges of relocation, (2) resource gap, (3) technical gap; processes for dealing with constraints developed

Study / Intervention	Results
volunteer recruitment • Nationwide expansion: policy and communication, evidence, action and training	
WHO Scaling-Up Health Service Delivery 2007 Vietnam Contraception and family planning (introduction of injectable contraceptive depot-medroxyprogesterone acetate (DMPA)) **Intervention** • Strategic assessment • Testing interventions • Scaling up • Stakeholder involvement; managerial and service delivery modifications; training	• Pilot study results: (1) the one-year continuation rate for DMPA use in the 3 pilot project areas was considerably higher than the rates experienced in earlier small trials in Vietnam; (2) qualitative studies results suggested improvement in many of the dimensions of quality of care in the provision of all methods • End-of-pilot workshop revealed the following: (1) infection control were better, providers' knowledge of contraceptive methods increased and provider bias diminished; (2) providers paid more attention to clients' privacy and showed greater respect for clients' wishes; (3) abortion clients were more likely to receive post-abortion contraception; (4) gaps remained, however, particularly in the quality of counselling for methods other than DMPA and for other related reproductive health services such as abortion care and the management of reproductive tract infections; (5) the more comprehensive package of interventions tested in the pilot project yielded better results than the modifications implemented in the DMPA-only provinces • Scaling up: less improvement of quality of care than in the pilots, systems to monitor quality of care indicators not fully implemented; lack of collaboration between key stakeholders in some of the provinces; lack of training for field motivators Three key interrelated variables must be considered when planning and implementing strategies for scaling up: • The degree of change that the innovation implies for the user organisation – full implementation called for much more than increasing provider knowledge and skills related to a particular technical issue: it required stronger programme and managerial capacities to support changes and a system-wide reorientation towards a client centred approach • The pace of expansion – fuller replication of the package of interventions in 21 provinces might have been feasible with a more gradual process because of the extensive modifications in service delivery entailed in the innovation • The resources available – resources for technical support decreased as expansion proceeded
WHO Scaling-Up Health Service Delivery 2007 Zambia Family planning **Intervention** • Pilots to Regional Programmes (PRP) initiative for expanding contraceptive choice • Collaboration with Ministry of Health and NGO (CARE) • Dissemination workshop • Scaling up • Forging linkages between the community and the formal health sector	• **Results of pilot project:** (1) trained healthcare personnel in the provision of family planning services; (2) provided more specialised training in IUD insertion and the screening and treatment of sexually transmitted infections (STIs); (3) improved counselling tools and strengthened providers' counselling skills; (4) established referral systems; (5) introduced three new contraceptives – DMPA, the female condom and emergency contraception; (6) furnished the centres with new supplies and equipment; (7) successfully mobilised villages to play an active role in the delivery and management of reproductive health services • Successful scaling up; elements contributing to this were extensive training programmes, local ownership, strong interdistrict linkages and collaboration

Study / Intervention	Results
Both low and middle-income countries	
Stewart 2005 – Zambia, Zimbabwe, South Africa, Tanzania, Swaziland, Lesotho, Mozambique HIV prevention **Intervention** • The HIV Southern Africa (HIVSA) workshops training policy-makers, practitioners and researchers from 7 southern African countries in evidence-based decision making for HIV prevention; training included accessing, critiquing and summarising research whilst remaining responsive to priorities of the participants • Mixed and participatory training and feedback sessions; training materials for the next day refined according to feedback	• Access to research – HIVSA improved participants' awareness of research evidence and addressed concerns that accessing research was a time and resource-consuming exercise. Success was varied – not all had skills to search internet or assess quality of the research and time was not available to teach them these new skills; lack of communication between policy-makers and practitioners was cited as a barrier to accessing research • Understanding research – many participants were frustrated with the concept of research – they wanted quick solutions now; they were also frustrated that the jargon used in research papers excluded non-research readers; in the end, many felt they were more research-literate • Relevance and application of research – policy-makers and practitioners noted that much of the research focus was too narrow to be relevant
Varkevisser 2001 – Malawi, Mozambique, Tanzania, Zambia, Zimbabwe, Botswana, Lesotho, Swaziland, Mauritius, Seychelles General, health system management **Intervention** • Joint Health Systems Research (HSR) Project for the Southern African Region: (1) Inventorisation of HSR needs and resources at country level in terms of manpower and institutional capacity and research implemented (2) Training in HSR methodology (3) Networking between more and less experienced HSR researchers as well as policy-makers and managers who could make use of HSR, within and between countries • Supporting decision-making for health at all levels • Participatory approach, involving all different parties concerned with a specific problem from community members to health managers and policy-makers in the process of problem identification and analysis	• Over time, many participating countries established an HSR unit within the Ministry of Health; the other countries had focal points for HSR • Training courses in HSR methodology run, resulting in ~200 studies • Of the roughly 150 recommendation resulting from these studies, 111 were fully or partially implemented; 7 out of 20 respondents (mainly research team leaders) interviewed had developed a new protocol after completing the HSR training, respondents appreciated the improved capacity and motivation to analyse and solve management problems met in their working environments • In-depth analysis of 33 studies: 90% involved policy-makers at some stage of the research process and resulted in practical and specific recommendations; for 40% of the studies the bulk of recommendations needed to be implemented at a level higher than the district
Middle-income countries	
DDM (Data for Decision-Making) Project (Pappaioanou 2003) –	• In all countries involved, progress was made in health information system development, training, development of tools

Study / Intervention	Results
Bolivia, Cameroon, Mexico, Philippines General public heath **Intervention** • Conceptual framework for evidence-based public health developed • Steps taken: (1) identification of priority health problem(s), of data-use outcomes, of competencies needed by staff and gaps in skills, of information gaps, and of organisational barriers; (2) development of work plan: setting data-use goals and objectives, developing training plan, improving health information systems; (3) implementation of work plan: training needs assessment, adapting interdisciplinary training programme curriculum, training the trainers, training target audiences, technical assistance and training for information systems; (4) evaluation	(e.g. for training, software etc.) • In all countries, positive health-related impacts were seen resulting from the project
FRONTIERS Guatemala (Bertrand 2001 / Brambila 2007) – Guatemala Reproductive health / family planning **Intervention** • Operations research with Mayan populations	• More culturally appropriate health education programmes developed • Health services restructured, public service providers empowered to identify problems and develop solutions • NGOs strengthened and increase in family planning seen, as well as in use of prenatal, birthing and postpartum care • Service providers trained in contraceptive technology and integrated maternal and child health
Liu 2006 – China General (health insurance and health equity) **Intervention** • Asian Development Bank Study on China's rural health security issues	• The Asian Development Study recommended three different insurance models for different regions of China (based on income): a medical assistance system for the low income region, an enhance Rural Cooperative Medical System for the middle-income region, and a hospital insurance system for the high income region • The China National Rural Health Conference (2002) established a new rural health financing policy to provide health insurance for its rural populations, financed by a matching fund with contributions from central and local governments, as well as from individual households
Majdzadeh 2010 – Iran	**Positive aspects of integration:** Medical interviewees:

Study / Intervention	Results
General provision of health services **Intervention** • Integration of medical and health education into health services, forming the new Ministry of Health and Medical Education (MOHME)	• expansion of specialised human resources resulting from increased admissions to medical university • created an interactive environment between researchers and decision makers • establishment of medical universities in rural areas dispersed faculty and researchers to these areas • community-based research became the norm • unified management for service delivery and research has improved management quality Non-medical interviewees: • helped executive sector use research for action through unified management • increased admissions **Negative aspect of integration** Medical interviewees: • increased university workload and responsibilities that have diverted resources away from education – universities spend more time on service delivery; this was considered destructive to knowledge and science Non-medical interviewees: • selected topics for research were not based on needs assessment • research funds were not spent correctly • quality of research had declined
Molina 2004 – Mexico Improving air quality in Mexico City to improve health **Intervention** • 10-year integrated air quality management programme • Research on air quality and associated health problems and mortality • Active collaboration with decision makers; recommendation for research and institutional changes; adoption / implementation of recommendations • Encouragement of public participation and stakeholder input by forming working groups consisting of representatives from academia, NGOs and industries • Education and capacity building	• A range of the recommendations resulting from the research were implemented (e.g. tougher car emission control standards, extended public transport system etc.) • Workshops and seminars for a range of stakeholders held
Okonofua 2010 – Nigeria Maternal and child mortality	• Successful in building the commitment of high-level government officials at addressing maternal and child health in Nigeria • President declared a policy of free treatment for pregnant women and children at all tertiary health institutions in Nigeria although, as of May 2007, this has yet to be implemented fully; as of Dec 2009, 24.4% (13.6% increase) of states offered

Study / Intervention	Results
Intervention • Implementation of free maternal and child health services • Formation of federal appointed advocacy team • Needs assessment • Meetings with state governors; dissemination activities	comprehensive free treatment for pregnant women and under 5 children, 37.8% (8.1% increase) offered partial treatment, and 37.8% (21.7% decrease) were not offering free medical services • There were no results as yet on the effects of free maternal child health care on either reducing maternal mortality or the quality of health services provided
Quality Improvement Demonstration Study (QIDS) 2008 – Philippines General health care delivery; focus on child health **Intervention** • Randomised controlled trial in the context of health sector reform • Expanded insurance coverage for children versus performance-based payments to hospitals and physicians versus control • Close collaboration with the Department of Health; QIDS partnered with government policy monitoring and evaluation • Formal partnerships to codify the experimental design directly into the existing infrastructure	• Evidence that there were larger health status improvements in patients at interventions sites than in patients at control sites • The insurance intervention resulted in 5 additional children in 100 not delaying going to the hospital (p =0.02) (with evidence shown that delays lead to worse health outcomes) • Policy Navigators improved enrolment in health insurance between 39% and 102% compared to the controls and were cost-effective at 0.86 USD per enrolee
Scott 2008 – South Africa General; access to health services and provision of sanitation Intervention • Cape Town Equity Gauge • Use of participatory methods to study inequities in health status and health provision • Interactive workshops with health care managers • Equity Tools for Management Project: managers set the agenda and researcher were facilitators; managers held workshops with specialists in health, information systems, financing, policies and economics; criteria were set to quantify sub-district needs; identified obstacles in financing health equity; nurses were interviewed to asses quality of	• Presenting evidence-based research to district health managers galvanised them into becoming advocates for health equity • Managers became key decision makers in addressing health inequity in their district • Some equitable relocation of nurses and other health workers to under-staffed sub-districts; the Health Department has agreed to integrate the measurements completed by the project into mainstream data collection – ensuring sustainability of the process • In the Water and Sanitation Project, community players were highly involved but public sector officials did not embrace the solutions; lack of financial support forced the extended pilot to install shared toilets (unsuccessful due to overuse or conflicts) which countered the results of the first pilot where single household toilets was considered the main reason for the pilot's success

Study / Intervention	Results
the care offered • Community-based water and sanitation project	
van den Broucke 2010 – South Africa Health promotion **Intervention** • Overview team with a range of stakeholders (national and international) • Situation analysis / needs assessment • Local objectives and target setting in collaboration with local stakeholders • Participatory implementation • Plans for dissemination and sustainability	• Good results on planning quality and process evaluation • Significant (health promotion related) capacity increases with respect to network partnerships, knowledge transfer, problem solving and infrastructure • Health promotion has been integrated in both national and provincial health plans
WHO Scaling-Up Health Service Delivery 2007 Brazil Family planning **Intervention** • 1995-1997: a pilot municipality, Santa Barbara d'Oeste, initiated a systematic process of dealing with constrained family planning and poor quality care; including participatory process with community involvement; comprehensive training; NGO resource team • Scaling up in context of WHO Strategic Approach to Strengthening Reproductive Health Policies and Programmes • Reprolatina Project – larger scale scaling up to other municipalities in Brazil; development of training capacity; active networking and use of information technology	• Pilot project successful but spontaneous scaling up did not occur as Brazil had over 5500 municipalities – active support from a team was required but demand exceeded their capabilities; funds for Reprolatina Project allowed scaling up to continue • Decentralisation of municipalities led both to advantages (e.g. greater autonomy and flexibility) and disadvantages in scaling up (e.g. lack of coordination, problems with collaboration between municipalities, lack of central support) • Political challenges: family planning was not a high priority subject on the agenda, religious sensitivities, funding

WHO Scaling-Up Health Service Delivery 2007 China Family planning **Intervention** • Introduction of quality elements into family planning services: (1) informed choice, (2) information giving, (3) technical competence, (4) client-provider relations, (5) follow-up, (6) appropriate constellation of services • Stakeholder involvement • Scaling-up after successful pilot project	• **Results from the evaluation of initial pilots:** (1) stable low fertility was maintained; (2) women enjoyed greater freedom in choosing a contraceptive method; (3) relations between clients and providers had improved, as had those between family planning programme managers and the local population; (4) women reported that they felt more respected and cared for; (5) local leaders indicated that tensions were eased; (6) the introduction of informed choice in some counties showed populations moved away from sterilisations and towards condoms; (7) as the quality-of-care index increased, abortions decreased significantly in one survey of 200 women; (8) there was little change in the pressure to abort out-of-plan births; (9) focus shifted from top-down implementation to a more client-need driven and more user-friendly services • Project successfully scaled up **Lessons learned about scaling up** • Foster government ownership: within China, the government is the main actor in service delivery and policy formulation; little is accomplished without government ownership and endorsement • Choose pilots carefully to ensure success and local ownership: starting small, and choosing their original project sites strategically to ensure success, allowed project leaders to make a case for expansion; movement for change built from the bottom up, by allowing other interested counties to participate freely in training and workshops and encouraging them to visit pilot sites; demand from below and careful pilot testing and replication, though locally adapted and owned, was a central feature of the China experience • Cultivate powerful allies and be willing to transfer project management to new leaders: attracting the attention of the senior State Family Planning Commission leadership expanded the base of support • Use research and technical assistance to define expansion needs • Adapt concepts to make them locally meaningful – project innovators applied many of the strategies that the literature suggests are important in effective scaling up: (1) recognised policy windows and cultivated ownership for the experiment among their leaders, (2) recognised and encouraged demand for the reforms from lower levels, (3) carried out the reforms using phased implementation, adaptation and learning

Table 7 Further details on barriers and facilitators to uptake of health research into policy

	Facilitators / positive aspects	Barriers / perceived needs
Low income		
Albert 2007 – Mali Interviews with policy-makers involved in selecting and updating Mali's essential medicines list	• Contacts with e.g. experts, international organisations facilitated access to information • Policy-makers able to commission research found this to be most relevant and trustworthy; research more trusted if it had sections dedicated to methodology and references; importance of journals that the research is published in (i.e. well-known journals such as the Lancet etc. more trustworthy); also research supplied by trusted international organisations like the WHO more likely to get used • Researchers acting as policy-makers seen as facilitator to research utilisation as the can both provide research findings and training in research methods • Training in research methods generally considered important both for improving understanding of research and importance placed on research	• Problems with access to information: access to online resources, limited capacity, much information only available in English (for French-speaking country) • Policy-makers felt that much research produced was irrelevant to policy-making and proposed that collaboration between researchers and policy-makers could allow policy-makers to give some input into the research process • Some policy-makers stated that they did not have time for the lengthy process of research utilisation; recommendation that researchers should provide short and concise documents
Behague 2009 – Malawi, Burkina Faso, Bangladesh, Nepal, Ghana Interviews on evidence-based policy-making in maternal and neonatal health	• Recent emergence of the evidence-based framework has increased pressures on national governments to adopt internationally-endorsed evidence-based policies • Evidence-based policy-making helping to keep neglected health issues on the agenda • Evidence-based medicine could be used as a tool to enlighten regional-level medics, public health workers and community leaders and to counter the effects of 'local cultural traditions and belief system' and 'lack of formal education' on poor health	• Danger that selected evidence-based policies undermine a comprehensive approach • Research activities needed to facilitate contextualisation of recommended (international) policies are often given too little attention • National elites controlling research and policy agendas are often alienated from the local realities and therefore support internationally-led policies and projects uncritically, without attention to adequate contextualisation • Lack of locally applicable research • Evidence-based medicine often just used to confirm rather than inform or contest global policy directives
Campbell 2003 – Nepal Application of 6-stage policy-making framework in reproductive health		• Lack of resources

	Facilitators / positive aspects	**Barriers / perceived needs**
COHRED 2000 Burkina Faso Shared care programme in child health; interviews and focus group discussions	Recommendations • stakeholder analysis should be conducted as early as possible • ownership by the stakeholders should be encouraged • embed the policy in the existing context • communication has to be two-sided	• Lack of defined strategy of how to proceed • Lack of sense of institutional ownership by the ministry of health • Policy-makers did not provide any active support for implementation of the concept • *Shared care* was competing with other internationally-backed programmes • Provincial staff, health centre staff, women groups, and the mothers were not included in the decision-making process: it was also not clear if the health staff accepted mothers as partners • International organisations were not actively involved in promotion • The research agenda was perceived as monopolised by the researchers
Harpham 2006 – Vietnam NGO initiative in mental health	• different levels of government engaged with researchers (provincial and national)	Perceived need: • Training professionals with respect to mental health • Raising public awareness
Ir 2010 – Cambodia Implementation of the Cambodian Health Equity Funds	• Participation of the local community in design, implementation, monitoring and evaluation • Wide active dissemination through conferences and peer-reviewed journals • Timeliness • Collaboration between policy-makers, community, local health authorities and NGOs	

	Facilitators / positive aspects	Barriers / perceived needs
Lairumbi 2008 – Kenya Collaborative partnerships in health priority setting dissemination of research findings to aid policy-making and implementation		• Policy implementers felt they were not meaningfully involved in the process of policy-making • Clear feeling among some policy-makers and institute-based researchers that the national priorities for health, which ultimately shaped the agenda for research, were decided with heavy input from those funding health reforms in the country; relative lack of power of national actors • Some form of networking with policy-makers often reported, often long before completion of the study; however, local stakeholders including policy-makers and implementers were rarely involved while designing the study and therefore there was no guarantee that the resultant research findings addressed issues of relevance to them; also, these mechanisms were based on acquaintances, thereby locking out actors who are as yet not well known in the field; absence of formal structures to govern such relationships made them cumbersome and unreliable; difficulties reported in trying to nurture and maintain informal networks beyond the life of a project or in the wake of staff turn over • More formal mechanisms for dissemination used by researchers included presentation of brief reports to policy-makers or use of dissemination seminars with a specific invitation list including fellow researchers, policy-makers and sponsors, and the establishment of project steering committees involving policy-makers; but lack of resources • Concerns expressed by policy implementers that researchers did not share findings with participants or even, where relevant, the facilities where research was conducted (except when policy implementers were co-opted into research projects) • Policy-makers felt that research evidence should play an important role in supporting policy implementation, but this was not matched by practice: no specific initiative was reported to be in place for delivering research evidence to policy implementers to support a policy action • Evidence of delays in implementation due to: weak mechanisms of sharing information, lack of local data
Maternal and Child Health-Family Planning (MCH-FP) Extension Project (Haaga 1996) – Bangladesh Operations research in maternal and child health	• Communication between researchers and policy-makers; joint field visits • Flexibility to adjust programmes as necessary	• Difficult to implement policy advice that threatens long-established power-relations • High turnover of policy-makers

	Facilitators / positive aspects	Barriers / perceived needs
Newman 2006 – West Africa Evidence-based programme strategy for malaria prevention in pregnancy	• Clear, evidence-based programme strategy strongly articulated by an important multilateral organisation (in this case WHO) • Sub regionally generated evidence (data) to support the proposed strategy • Subregional forum for dissemination of data and discussion regarding the proposed policy changes (in this case the West African Network against Malaria during Pregnancy) • Widespread availability (as a second line treatment drug) of the proposed intervention drug (SP) • Technical support from reputable and respected institutions in drafting new policies and planning for implementation • Donor support for pilot experiences in integrating proposed policy change into a package of preventive services (in this case particularly from the UNICEF-funded Accelerated Child Survival and Development project and from USAID) • Financial support for scaling up the proposed interventions (in this case from the Global Fund to Fight AIDS, Tuberculosis and Malaria)	Challenges: • Lack of published data generated in the sub region (RCT only published in 2005) • Lack of awareness of existing data (among policy-makers) • Gaps between ministries of health and research institutions • Inadequate dissemination of strategy documents • Drug safety concerns • Concerns regarding rising rates of resistance to SP • Inadequate collaboration between malaria and reproductive health departments
Orobaton 2007 – Uganda Establishment of the Uganda Program for Human and Holistic Development	• Collaboration and trust-building • Additional funding	
Solo 1998 – Burkina Faso, Mali, Gambia, Kenya, Tanzania Use of information from operations research in reproductive health; project review and interviews	• Operations research was more likely to be utilised if: o problem was identified by implementing organisation o problem involved service delivery • Participation/collaboration in all aspects of the study contributed to utilisation • to improve research quality: o shorten the questionnaires o choose a population that is more ethnically diverse o either restrict the amount of data collected or allow more time for data analysis • Researchers played an important role in utilisation of research e.g. technical assistance to maximise the use of the findings • Even highly effective research had to be feasible for organisations to continue and/or expand the intervention – donor funding made it possible and this required good donor coordination	• Staff turnover led to a loss of interest and lack of follow through – emphasising the importance of planning by committee and providing a module on how to use study results • Utilisation was influenced by other studies – lack of coordination between the different studies led to problems in interpretation, and ultimately utilisation of the results • In cases where dissemination activities were minimal, utilisation was also lower – specific efforts were needed to promote the utilisation of study findings

	Facilitators / positive aspects	Barriers / perceived needs
TEHIP 2008 – Tanzania Tanzania Essential Health Interventions Project (TEHIP)	• Integrated system of research and development – developing synergies • Training and retraining; continuing education • Adequate funding for infrastructure • Locally owned evidence-based plans • "Exit strategy" for sustainability • Demographic Surveillance System as evidence base	
WHO Scaling-Up Health Service Delivery 2007 Ghana Community-based Health Planning and Services Initiative		• Knowledge gap – Community-based Health Planning and Services meaning different things to different people, nurses concerned about challenges of relocation • Resource gap – many were reluctant to engage in "community entry" activities that aroused public interest in services they were ill-equipped to launch and sustain • Technical gap – district health management teams were reluctant to launch programmes that required technical skills not yet in place
WHO Scaling-Up Health Service Delivery 2007 Vietnam Contraception and family planning (introduction of injectable contraceptive depot-medroxyprogesterone acetate (DMPA))		Three key interrelated variables must be considered when planning and implementing strategies for scaling up: • The degree of change that the innovation implies for the user organisation – full implementation called for much more than increasing provider knowledge and skills related to a particular technical issue: it required stronger programme and managerial capacities to support changes and a system-wide reorientation towards a client centred approach • The pace of expansion – fuller replication of the package of interventions in 21 provinces might have been feasible with a more gradual process because of the extensive modifications in service delivery entailed in the innovation • The resources available – resources for technical support decreased as expansion proceeded

	Facilitators / positive aspects	Barriers / perceived needs
WHO Scaling-Up Health Service Delivery 2007 Zambia Pilots to Regional Programmes (PRP) – expansion of the range of contraceptive methods available at health facilities	• Coordinated funding and management • Strengthened local transport • Training approach: traditional classroom approach for training of trainers, and an on-site self-directed learning programme that enabled providers to follow a more flexible, independent course of readings and exercises • Phased intervention approach with possibilities for local adaptation and flexibility • Strong interdistrict collaboration • Ongoing support from project manager • Strengthening of interdistrict linkages encouraged districts to pool assets and exchange material resources such as transport, training facilities, equipment and supplies • Involvement of key community members, including traditional authorities and other cultural leaders	
Both low and middle-income		
Hennink 2004 – Malawi, Tanzania, Pakistan, India General health care; interviews	• Communication forum would enable effective dialogue as would inclusion of researchers on Ministerial advisory boards to identify priorities • Collaborative research • Important for policy-makers to have a sense of ownership over research and trust between researchers and policy community • Research results should be presented to policy-makers in a format they can easily use (e.g. clear and concise, clear recommendations) – appropriate "packaging"; maybe use of knowledge brokers • Effective communication between researchers, policy-makers and community affected by the change; role for donor agencies in facilitating collaboration	• Disparate strategies for disseminating non-commissioned research; lack of dissemination skills • Lack of a strong evidence-based culture in policy development; lack of understanding how policy-makers can use research to inform policy-making • Lack of resources; lack of investment in local research sector • Common disparity between health issues investigated by international donor agencies and priority areas of national policymakers • Research by international agencies based outside study countries often has limited time to refine research proposals that embrace local research needs • Limited access to research outputs; lack of central source of research outputs • Quality of in-country research (perceived to be inferior due to lack of skills) discourages use of local research outputs and leads to use of international agencies • Lack of formal communication channels • Other political priorities

	Facilitators / positive aspects	Barriers / perceived needs
Hyder 2010 – Argentina, Egypt, Iran, Malawi, Oman, Singapore Perspectives and attitudes of policy-makers towards the use and impact of research in the health sector	Recommendations: • Improving technical capacity of policy-makers • Improving packaging of results • Establishing fora and clearinghouse functions whereby specialists critically analyse research results and advise governments • A more cohesive relationship between all actors linking research to policy • Implementing incentives for researches	• Perceived differences in objectives between policy-makers and researchers • Lack of formal channels to communicate research evidence; need for a systemic process not reliant upon personal preferences; packaging and language of research needs to be addressed; suggestion that researchers need to be trained to bridge existing communication gaps • Policy-makers highlighted lack of own technical capacity; need for technical training on how to formulate policies on technical matters in health and recognition of limited capacity and funding for research with direct policy implications
Lavis 2010 – China, Ghana, India, Iran, Kazakhstan, Laos, Mexico, Pakistan, Senegal, Tanzania Bridging the gaps between research, policy and practice; interviews with various stakeholders	Statistically significant predictors of respondents' (researchers) engagement in bridging activities: • the existence of structures and processes to link researchers and their target audiences predicted both the provision of access to a database (odds ratio [OR] 2.62, 95% CI 1.30–5.27) and the establishment or maintenance of partnerships (OR 2.65, 95% CI 1.25–5.64) • stability in their contacts predicted the provision of systematic reviews (OR 2.88, 95% CI 1.35–6.13), and • having managers and public (government) policy-makers among their target audiences predicted the provision of both systematic reviews (OR 4.57, 95% CI 1.78–11.72) and access to a database (OR 2.55, 95% CI 1.20–5.43)	• Engagement in a variety of promising bridging activities was reported by less than half of the surveyed researchers • Targeted dissemination of research products and the development of the capacity of target audiences to find and use research were rarely undertaken
Lush 2008 – sub-Saharan Africa The process of policy transfer for treating sexually transmitted infections (STIs); interviews with respondents from international agencies involved in STI policy	• Growing AIDS pandemic provided window of opportunity • Interaction between research and policy communities • Funding, attention of international agencies; global nature of events • Advocacy (e.g. of international women's groups at high profile conferences; media coverage); development of technical guidelines and associated training manuals for health workers; sponsoring of international meetings; regional dissemination workshops; publication in international journals • Need for local epidemiological data	

	Facilitators / positive aspects	Barriers / perceived needs
Marin 2004 – various middle and low income countries worldwide Operations research projects in family planning and reproductive health services; documents and interviews with a range of people involved	• High priority topic • Compelling results (demonstrating intervention is feasible, effective and sustainable) • Collaborative relationship • Organisational commitment and leadership	• Unsatisfactory results (negative results or insufficient data) • Partner characteristics, e.g. staff turnover, provider resistance to change, internal competition, rigid hierarchies and other managerial issues • Inadequate transfer of responsibility (i.e. hindering sustainability) • Macro-level social and political context
Omar 2010 – Ghana, Uganda, Zambia, South Africa Development of mental health policies; interviews with a range of stakeholders	• Bottom-up approach • Approval by different government bodies and development of detailed guidance documents	• Limited public demand for improved mental health policy, stigma attached to mental illness, mental health low on the agenda of policy-makers • Lack of data; also associated with low utilisation of health services by people with mental problems • WHO helped to raise profile of mental health, but it is not among the Millennium Development Goals and there is a lack of resources • Insufficient stakeholder consultation • Mental health users were largely neglected in the consultation process (also certain geographic regions and ethnic groups excluded) • Information to support policy-making (including needs assessments) either lacking (Ghana and Zambia) or inadequate and inappropriate (South Africa and Uganda) • Policy implementation generally poor (problems with responsibility, dissemination and communication, lack of resources)

	Facilitators / positive aspects	Barriers / perceived needs
Parkhurst 2010 – China, Nepal, Pakistan, Malawi, Uganda, Zambia Interviews with heads of communicable disease programmes and others to identify the most important and most frequently used sources of information and source of information behind their most recent policy change (with respect to HIV, Malaria, tuberculosis (TB))	Important and frequent sources of information • local ministry of health or international organisations (especially WHO (more important in African countries than in Asian countries), additional international donor agencies also mentioned by African but not Asian officials) • HIV and malaria officials also emphasised importance of internal surveillance or monitoring of these diseases • Journals and internet also frequently used Sources of information for recent policy changes • Malaria: WHO, ministry of health, other international organisations (in Africa) • HIV: national surveillance information, introduction of anti-retroviral therapy through international organisations, journals; international donors mentioned as influencing a shift to a 'community approach' • TB: WHO, international NGOs, Ministry of Health, journals, internet information	
Practihc Aaserud 2005 – Albania, Armenia, Bolivia, Cambodia, India, Indonesia, Iran, Nicaragua, the Philippines, Rwanda, South Africa, Yemen, Brazil, Egypt, Pakistan, Uganda Examination of the factors that might affect the translation of randomised controlled trial findings into policies and practice in developing countries (example of $MgSO_4$ for pre-eclampsia); interviews / survey of trialists and others	• Influence of WHO (contact with policy-makers; able to create pressure); also UNICEF • Training of health care professionals in providing appropriate care • Dissemination in national and regional medical journals; mass media • Channels to public authorities • Clinical practice guidelines; evidence-based international guidelines • Changes in payment for $MgSO_4$ and hospital costs • Need to identify credible national advocates or "knowledge brokers" • Importance of interactions between policy-makers, researchers and other stakeholders in facilitating uptake of research findings into policies	• Problems with access to drug ($MgSO_4$) in some countries • Low awareness of evidence-based medicine (both for policy-makers and clinicians) • Policy-makers distant from poor and under-resourced areas of countries • Lack of political will / engagement; pre-eclampsia not seen as priority health problem • Lack of availability of personnel and hospitals • Lack of resources
Practihc Woelk 2009 – Mozambique, South Africa, Zimbabwe Examination of the factors affecting the translation of randomised	• Local researchers were more open to the findings of research in which they had been involved • Local champions are important and are a potential route for facilitating knowledge transfer and should be supported	• Context is an important filter for the translation of knowledge at local levels; strong international evidence may not always be locally accepted • Skills and ability to act on research evidence was present in all of the study settings; but capacity for absorption was limited by human and other resource constraints

	Facilitators / positive aspects	Barriers / perceived needs
controlled trial findings into policies and practice in developing countries, focus on RCTs ($MgSO_4$ for eclampsia and bednets for malaria prevention); interviews with a range of research and policy stakeholders	• National, regional and international networks appear to be very important in both shaping ideas about what constitutes evidence and in acting as a conduit for transfer of research findings with both positive and negative impacts **Case study 1: $MgSO_4$ for eclampsia** • High quality evidence from RCTs that supported the effectiveness of $MgSO_4$ as first line treatment • Leading obstetricians in all three countries were involved in the trials • Prior experience in the use of specific drugs for eclampsia may explain, in part, differences in policy between the three countries • Obstetrician researchers championed $MgSO_4$ in all three countries, but in Zimbabwe the key champion emigrated prior to development of a policy supporting $MgSO_4$ as the first line drug • International networks that influenced $MgSO_4$ policy were largely evidence-based, such as the Cochrane Collaboration • Researchers played an important role in policy development in all three countries • This emerged as an important factor supporting the uptake of research findings for $MgSO_4$, due to the strong culture of evidence-based health care in obstetrics **Case study 2: Bed nets versus spraying for malaria** • No important difference in effectiveness in head-to-head comparisons in RCTs; researchers in South Africa involved in one comparative trial, researchers in Mozambique were involved in bed net research; prior experience heavily influenced support for spraying and inhibited policies favouring the use of bed nets; researchers regionally, particularly in South Africa, championed spraying, whereas researchers in Mozambique championed bed nets • A wide range of stakeholders and international organisations with differing interests, including bilateral donors, (e.g. DFID, JICA), and multilateral agencies, (e.g. WHO, UNICEF and the Roll Back Malaria Partnership), influenced malaria policy in Mozambique and Zimbabwe (partially due to donor dependence) • Regional networks of policy makers and researchers very important • Researchers played an important role in policy development in all three countries • The culture in relationship to evidence varied for malaria, with	• Knowledge translation was often dependant on a few key people or on a particular array of conditions/circumstances; the process is therefore fragile **Case study 1: $MgSO_4$ for eclampsia** • Regional networks of policy makers and researchers did not emerge as an important factor • Bureaucratic processes can in part explain the failure to include $MgSO_4$ in the national formulary in Mozambique even though it was recommended. • Although this did not emerge as an important factor, political and economic instability may have influenced policy in Zimbabwe. **Case study 2: Bed nets versus spraying for malaria** • Political processes at national, regional and international levels may have contributed to the continuation of policies that failed to promote the use of bed nets. • Political and economic changes influenced policy in several ways: through South Africa becoming influential in regional politics; through lobbying by interest groups; and with regard to ideological and political perceptions of spraying and bed nets.

	Facilitators / positive aspects	Barriers / perceived needs
	greater emphasis on local observational evidence; differences in malaria epidemiology contributed to this emphasis	
Rutherford 1997 – 32 countries File review of 53 IDRC-supported projects that focussed on some aspect of health and safety of an occupational group and their developmental impact; case study of subsample	• Projects had facilitated establishment of linkages between the principal investigator and institutional groups (such as the national government, unions, employers' associations, community groups) and categories of individuals (national researchers, third-world researchers, first-world researchers) • Projects had facilitated obtaining further grants • Projects had helped researchers to augment their research and scientific experience and assisted researchers in expanding their scientific careers; strengthening of ties between researchers and individuals and groups involved in occupational health and safety (contributing to stemming brain-drain) • Short term positive impacts on institutions: training of staff (83%), updating the institution's equipment (75%), enhancement of development of other research projects (71%); 50% of projects facilitated development of links with other institutions involved in occupational health and safety issues and research • Projects that had ensured sustained involvement of stakeholders had had greater likelihood of effecting changes • External factor were also significant in helping or hindering translating research into developmental impact • Projects seeking to increase worker participation in occupational health and safety monitoring had raised local consciousness about occupational risks • Most changes resulted when government and / or occupational or other health practitioners were among stakeholders; but employers / their associations and studied occupational group also important	• Lack of government support • Employer resistance to change • Economic, political or social situation of occupational group studied (e.g. not enough resources to buy protective equipment) • Need for better research and dissemination of results
Stewart 2005 – Southern African countries HIV Southern Africa (HIVSA) workshops	• Development of research skills (including searching for and assessment of literature)	• Lack of relevance of research – too narrow focus • Research jargon

	Facilitators / positive aspects	Barriers / perceived needs
Varkevisser 2001 – Southern African countries Joint Health Systems Research (HSR) Project for the Southern African Region	• Participatory approach • Timeliness • Cost-effectiveness • Quality control mechanisms	• High turnover of national health authorities • Policy relevance – broad policy questions were not the first focus • Not enough community participation • High cost of training • Donor dependency • Scarce resources for implementation
Middle-income		
Bedregal 2001 – Chile Interviews with stakeholders on perceptions, aspirations and expectations and thoughts in relation to evidence-based innovations	• Setting up models of participation where professionals could learn to disagree with respecting their views; one way of achieving this was through continuing education and setting up local discussion groups • Empowerment of personnel; enhancement of working with teams	• Lack of skills and resources to do evidence-based medicine; lack of continuity in education • Lack of dialogues in primary health care teams • Preferred mechanism for introducing change was informal discussions; stakeholders at all levels felt they could not participate properly in the formal mechanisms • Most stakeholders felt they had power to develop criteria for health care but not to undertake changes in practice because of lack of resources
COHRED 2000 Brazil Vaccine research, development and production; review and field survey	• Link between science and production (entrepreneurial technological development capability) • The state is critical in developing countries' entrance into research and production of high technology products • An endogenous research and development base can be an essential pre-condition to absorb the results of research conducted in more developed countries • Mobilisation of stakeholders	• Dispersion and fragmentation of research efforts for product and process development tended to lead to a low rate of research result utilisation
COHRED 2000 Indonesia Interviews with respect to reaching vulnerable groups and maintaining the delivery of essential health services to the poor		• Lack of commitment of stakeholders • Inadequate communication between researchers and stakeholders • Similar research projects conducted in different geographical areas without adequate research networking • Inadequate planning for dissemination of research findings to all stakeholders
COHRED 2000 Lithuania Reducing health inequalities; review of research to action	• Solid accessible database of research • Representatives of academic community participating both in research and policy	• Frequent changes in government • Other problems in health care reform considered higher priority

	Facilitators / positive aspects	Barriers / perceived needs
COHRED 2000 South Africa Combating vitamin A deficiencies; interviews and document review	• Policy-makers recognised they should identify their own research priorities	• Limited time and resources • Publication output was the main criterion for performance appraisal [rather than how well research met policy needs]; cheapest options were regarded as the best options • Department of Health infrastructure did not allow rapid research support • Slow processing of claims and reimbursements increased expenses for research institutions and immobilised the research process • Decision-makers appeared to be afraid of making mistakes • Public demand had greater impact on policy development than research • Political pressure meant decision-makers did not pause to consider research results • Policy-makers found research recommendations unrealistic • Policy-makers found research reports difficult to read • High staff (policy-makers) turnover impacted on planning and management
COHRED 2000 Uruguay Eradication of Chagas disease; review of policy process	• Timely and appropriate use of international cooperation • Research was supply-driven and university based; scientists became active in political parties and within the Ministry of Health and introduced research findings into actual programmes • The contribution of many different disciplines and approaches to the solution of the same problem • Continuity of research on a given subject, even in the absence of immediate solutions	
COHRED 2000 Pakistan Role of research in evolution of child health programmes; document review and interviews	• Definition of research question was defined in terms of its relevance for policy and practice from the beginning • The relevant decision-makers were aware of and involved in the research from the beginning • Overlap between researchers and programme staff and research questions were defined in terms of the programme's questions	• Transfer of programme from global institutions and programmes without local research • Environment not conducive to linking research with policy: low levels of economic and human development; health and social policy not high on political agenda; weak research capacity • Low supply of relevant high quality research; hard to find community-based primary health care research; data often questionable • Lack of trained researchers; weak research communities • Lack of communication between decision-makers and researchers; researchers felt it was not their responsibility to narrow the gap between research and policy

	Facilitators / positive aspects	Barriers / perceived needs
Colón-Ramos 2007 – Costa Rica Trans fatty acid research and nutrition policy; interviews		• Lack of awareness of in-country scientific studies; evidence perceived to be coming from outside • Lack of consensus or information about policy options • Perceived distrust and disparate attitudes between sectors (research, government and industry); limited collaboration between sectors • Discrepant expectations beyond the expertise of different sectors (investigators were expected to get involved in policy making, and government officials were expected to be informed in science) • Limited dissemination of research findings • Difficulties in communicating scientific or technical findings in lay terms to other actors
Cordero 2008 – Brazil, Colombia, India, the Philippines, South Africa, Thailand Strategies of selected health research funding agencies for promoting the translation of their funded research into policy and practice; interviews	• Favourable political climate for knowledge translation • Many funding agencies were actively involved in promoting knowledge translation for the projects they funded; funding agencies might consider their role as knowledge brokers	• Lack of tools for knowledge translation • Lack of funding for knowledge translation • Little involvement of stakeholders in the research process • Competition between stakeholders

	Facilitators / positive aspects	Barriers / perceived needs
Fiestas 2009 – 13 Latin American countries Mental and neurological health; interviews	Recommendations: • Capacity strengthening of human resources o Training for all health professionals in mental and neurological health issues, research methods and methods for implementation of research results o Encouragement of interaction between actors, including researchers, students, practitioners, decision-makers and other stakeholders o Establishment of academic awards and financial incentives for professionals engaging with research and translational work • Establishment of government-led strategies to establish a research culture o Generation and implementation of policies and legislation by government agencies aimed to improve research activities o Empowerment of pertinent existing institutions (e.g. National Institutes of Mental Health) o Creation of an office within health ministry's to coordinate research initiatives and translation of their results • Establishment in local and international institutions of a culture to facilitate research o Health-related institutions should organise and present themselves as continuously engaged either in research-generating, research-promoting or research-disseminating activities o Promotion of multidisciplinary activities and workshops o Strengthening of support given by international institutions on research on mental and neurological health issues • Establishment of a sustainable process of research production o Focus on health problems that are local priorities o Use of epidemiological studies to generate population- or community-level information on the distribution and determinants of the problem, and local dimensions that need to be considered o Funding: governments should take a lead role in providing financial support to mental and neurological health research o Dissemination: well-written reports, electronic and print versions; mass media; associated training	

	Facilitators / positive aspects	Barriers / perceived needs
FRONTIERS Guatemala (Bertrand 2001 / Brambila 2007) – Guatemala Operations research with Mayan populations	Facilitating factors for research implementation and utilisation of results • charismatic leadership • collaborative planning and intervention design (including needs assessment and perceived feasibility) • continued involvement and close monitoring and supervision of the intervention by the research group • simple, easy to use materials • a feasible design • a good match between the intervention and the implementing organisation (intervention should be consistent with the values, goals and culture of the organisation) • compelling results (observable improvements are communicated immediately and comprehensively to programme managers and policy-makers) • provider motivation • continuing technical assistance and institutional support beyond the end of the project • fortuitous timing (results becoming available at the correct time in the decision-making cycle)	Challenges for research implementation and utilisation of results • Too many or inappropriate objectives • Most organisations did not build sufficient technical capacity to enable them to conduct subsequent operations research projects without substantial external technical assistance • High staff turnover in the public sector
Liu 2006 – China Asian Development Bank Study on China's rural health security issues	• Local and policy-relevant research • Seminar for key decision-makers • Constructive partnership with policy-makers	• Need to pay attention to implementation as well as policy-making
Majdzadeh 2010 – Iran Integration of medical and health education into health services	• Interactive environment between researchers and decision-makers	• Lack of planning and systematic approach • Lack of needs assessments
Mahoney 2004 – Indonesia Policy analysis of hepatitis B vaccine introduction; published paper and interview with main researcher	• Support of programme by high-level political figures • Establishing consensus in the Ministry of Health (support secured through involving MoH) • Assuring long-term supply of vaccine (taking into account cultural issues related to plasma use in vaccine production) • Consensus building among medical and scientific personnel • Formulation of vaccine-delivery policy (with community involvement)	

	Facilitators / positive aspects	Barriers / perceived needs
Molina 2004 – Mexico 10-year integrated air quality management programme		• Lack of a powerful metropolitan institutional structure – the Metropolitan Environmental Commission (CAM) did not have a budget of its own nor did it have a defined operative organisational structure; constant change of personnel
Okonofua 2010 – Nigeria Implementation of free maternal and child health services	• High commitment shown by the President of Nigeria • Presence of a high level champion of maternal and child health – an appointed Health Advisor oversaw the gathering of evidence-based data and presented and pushed the findings to policymakers • Advent of democratic governance in Nigeria with its culture of accountability • Involvement of the media that gave wide publicity to the issue – the presentation of the survey results were televised nationally on two occasions • Involvement of stakeholders in both health and non-health sectors • Specificity of the issue – by identifying maternal mortality as a focus, federal funds could be specifically allocated to the problem rather than being swallowed up in a general health fund	• Concerns with respect to inadequate funding
Practihc Daniels 2008 – South Africa Exploration of how research information from RCTs and systematic reviews informed policy-making and guideline development with respect to $MgSO_4$ for the treatment of eclampsia and pre-eclampsia; interviews with policy-makers and academic clinicians	• Links between researchers and new government • Establishment of National Committee for the Confidential Enquiry into Maternal Death • Development of clinical management guidelines; involving people also active in the Cochrane Collaboration etc. • High quality evidence, i.e. trustworthy • Appropriate evidence available at the right time, in this case when a solution to the problem of the high maternal mortality rate was being sought • Political environment conducive to policy-making • A bureaucracy that is open to change rather than obstructive; a functioning policy network that includes researchers, policy-makers and bureaucrats • Positive attitude towards research utilisation	

	Facilitators / positive aspects	Barriers / perceived needs
Quality Improvement Demonstration Study (QIDS) 2008 – Philippines RCT of expanded insurance coverage for children versus performance-based payments to hospitals and physicians versus control	• Multi-institutional collaboration involving government entities • Formalisation and legalisation of the policy interventions into the existing health system • Equal shouldering of costs by collaborating entities or resources provided by neutral outside source • Voluntary participation • Carefully choose interventions so that they are relevant, implementable and can be scaled-up for large scale introduction	• Lack of financial resources • Limited sample size
Scott 2008 – South Africa Cape Town Equity Gauge	• Empowerment and involvement of health managers and other stakeholders • Involvement of communities	• Lack of financial resources and commitment • Inadequate communication between managers and staff • Failure to involve nurses and other frontline staff in participatory process

	Facilitators / positive aspects	**Barriers / perceived needs**
Trostle 1999 – Mexico Assessment of factors promoting or impeding exchanges between researchers and policy-makers; interviews of researchers for different settings involved in 4 vertical programmes	Content • quality (determined by identity and fame of researcher, reputation of journal / book of publication, training in research, judgement of decision-maker) • good relationship with decision-maker • specificity, concreteness and cost-effectiveness of research recommendations Actors • groups of researchers and decision-makers who have identified priority problems • international support • critical role of official research institutions in the health sector Process • informal communication and exchange • 'interest group equilibrium', i.e. balance among the demands of various interest groups involved in a decision; use of research results more probable if solutions included that do not conflict with programme operation and feasibility, or if decision-makers do not perceive researchers as actively interposing themselves in the decision-making process; use also more likely when a decision or policy does not pose a conflict to other governmental sectors or private industry • development and use of formal communication channels, e.g. newsletter Context • rotation between positions of researchers and decision-makers (typical in the Mexican system) • researchers and decision-makers being members of the same elite • urgency of medical problem Differences across programmes • formal communication channels more important in AIDS and cholera programmes • mass media thought to build social consensus in cholera and immunisation programmes • little conflict in cholera and immunisation programmes	Content • difference in vocabulary / language used • utility of each group's knowledge – 'mutual intellectual disdain'; desire of each party to 'own' the process • more attention paid to biomedical research results than social science research results Actors • lack of technical background of decision-makers and mass media • decision-makers tending to value experience more than information • particular agendas promoted by non-academic interest groups like private industry or specific social constituencies Process • communication problems • narrow professional interests Context • centralisation of power and information; hierarchical management of information • change in authorities (with new presidential terms) • restrictions on economic resources Differences across programmes • mass media thought to create discord in AIDS and family planning programmes • polarisation and conflict high in AIDS and family planning programmes

	Facilitators / positive aspects	Barriers / perceived needs
WHO Scaling-Up Health Service Delivery 2007 Brazil Scaling up of family planning services (Reprolatina)	• Municipal autonomy facilitated the introduction of innovations e.g. no need to obtain authorisation from the state or federal level • Working with strong municipal teams • Training addressing the rights, gender and reproductive health agenda as well as technical, management and systems needs • Combining training with the creation of an enabling environment • Building training capacity as a central element of scaling up	• Political and financial considerations discouraged collaborations among municipalities • Difficulties with distribution of contraceptives by Ministry of Health • Limited federal support • Family planning was not a high priority at either the federal, state or municipal level • Religious sensitivities and tensions surrounded family planning and an overall lack of political appeal hindered scaling up • Electoral cycles
WHO Scaling-Up Health Service Delivery 2007 China Improving quality of care in family planning	• Foster government ownership • Ensure local ownership • Cultivate powerful allies • Use research and technical assistance to define expansion needs • Adapt concepts to make them locally meaningful - project innovators applied many of the strategies that the literature suggests are important in effective scaling up: (1) recognised policy windows and cultivated ownership for the experiment among their leaders, (2) recognised and encouraged demand for the reforms from lower levels, (3) carried out the reforms using phased implementation, adaptation and learning	
Yousefi-Nooraie 2009 – Iran Promotion of development and usage of evidence from systematic reviews; survey of systematic review workshop attendants from different backgrounds	• Items judged most important in development and use of systematic reviews: 'willingness and competency of health policy makers to use systematic reviews', 'competency of researchers in conducting systematic reviews', 'access to international databases' and 'training of professional methodologists in the systematic review related fields'	

APPENDIX III – Quality assessment of intervention studies

Qualitative studies

Study	Theoretical approach	Study Design	Data collection	Trustworthiness	Analysis	Ethics	Overall assessment
FRONTIERS Guatemala (Bertrand 2001 / Brambila 2007) – Guatemala	**Is a qualitative approach appropriate?** Yes – use of key informant interviews, document review, and several site visits to health centers and NGOs **Is the study clear in what it seeks to do?** Yes	**How defensible / rigorous is the research design / methodology?** Yes – clear description and justification of methods used	**How well was the data collection carried out?** Not enough information	**Is the role of the researcher clearly described?** Yes- the evaluation team used an interview guide **Is the context clearly described?** Yes **Were the methods reliable?** Unsure	**Is the data analysis sufficiently rigorous?** Not enough information **Are the data 'rich'?** Good description of processes from document analysis However, no use of quotes from the interviews. **Is the analysis reliable?** Unsure for interviews as not enough information **Are the findings convincing?** Yes **Are the findings relevant to the aims of the study?** Yes for document analysis. More information and analysis of the interviews would have been appropriate. **Adequacy of Conclusions:** Discussion is clear	**How clear and coherent is the reporting of ethics?** Ethics approval from Cambodian National Ethics Committee	Approach – 2/2 Design – 1/1 Collection – 0/1 Trustworthiness – 2/3 Analysis – 3/5 Ethics – 1/1 Total – 9/13 Moderate Quality

Study	Theoretical approach	Study Design	Data collection	Trustworthiness	Analysis	Ethics	Overall assessment
Harpham 2006	**Is a qualitative approach appropriate?** Yes case study approach **Is the study clear in what it seeks to do?** Very little information on the justification for the interviews.	**How defensible / rigorous is the research design / methodology?** A framework to analyse if health care policy was used. No information on methodology for interviews.	**How well was the data collection carried out?** Not enough information.	**Is the role of the researcher clearly described?** No **Is the context clearly described?** No **Were the methods reliable?** Not enough information	**Is the data analysis sufficiently rigorous?** For case study description was appropriate For interviews no information on how data was analysed. **Are the data 'rich'?** Not enough information **Is the analysis reliable?** Not enough information **Are the findings convincing?** Not enough information **Are the findings relevant to the aims of the study?** Some useful information in a case study context very little from the interviews **Adequacy of Conclusions:** Not enough information	**How clear and coherent is the reporting of ethics?** No information given	Approach – 1/2 Design - 0/1 Collection – 0/1 Trustworthiness – 0/3 Analysis – 1.5/6 Ethics – 0/1 Total – 2.5/14 Low quality

Study	Theoretical approach	Study Design	Data collection	Trustworthiness	Analysis	Ethics	Overall assessment
Ir 2010	**Is a qualitative approach appropriate?** Yes – use of both document collection and analysis and interviews for triangulation purposes **Is the study clear in what it seeks to do?** Yes	**How defensible / rigorous is the research design / methodology?** Yes – clear description and justification of methods used	**How well was the data collection carried out?** Interviews appear not to have been recorded therefore may be gaps in note taking as the interviews were 30 minutes to one hour.	**Is the role of the researcher clearly described?** Yes- One researcher used a semi structured questionnaire **Is the context clearly described?** Not enough information **Were the methods reliable?** Note taking interviews may bias results, even though the interviews were immediately processed after the interview. Does mean there can be no check for accuracy by other researchers.	**Is the data analysis sufficiently rigorous?** Appropriate - Thematic analysis used **Are the data 'rich'?** Good description of processes from document analysis However, very little use of quotes from the interviews. **Is the analysis reliable?** Unsure for interviews as not enough information **Are the findings convincing?** Yes **Are the findings relevant to the aims of the study?** Yes for document analysis. More information and analysis of the interviews would have been appropriate. **Adequacy of Conclusions:** Three key conclusions given. Not enough information is given to justify the third conclusion	**How clear and coherent is the reporting of ethics?** Ethics approval from Cambodian National Ethics Committee	Approach – 2/2 Design - 1/1 Collection – 0/1 Trustworthiness – 1/3 Analysis – 4/6 Ethics – 1/1 Total – 9/14 Moderate quality
Majdzadeh 2010	**Is a qualitative**	**How defensible /**	**How well was**	**Is the role of the**	**Is the data analysis**	**How clear and**	Approach – 2/2

Study	Theoretical approach	Study Design	Data collection	Trustworthiness	Analysis	Ethics	Overall assessment
	approach appropriate? Yes **Is the study clear in what it seeks to do?** Yes	**rigorous is the research design / methodology?** Thematic framework. A knowledge translation model used for preparing interviews and guides.	**the data collection carried out?** Comprehensive data collection and details of the analysis clearly given	**researcher clearly described?** No information on interviewer **Is the context clearly described?** Yes **Were the methods reliable?** Yes	**sufficiently rigorous?** Two individuals independently coded the data and extracted core themes any identified discrepancies were discussed. **Are the data 'rich'?** Under the themes identified each theme is backed by a wealth of quotes from the interviews **Is the analysis reliable?** Yes **Are the findings convincing?** Yes **Are the findings relevant to the aims of the study?** Yes **Adequacy of Conclusions:** Discussion is clear in bringing out both the negative and positive aspects of the methods adopted. Given the limitations noted the conclusions are adequate.	**coherent is the reporting of ethics?** Details of ethical approval given.	Design - 1/1 Collection – 1/1 Trustworthiness – 2/3 Analysis – 6/6 Ethics – 1/1 Total – 13/14 High quality

Study	Theoretical approach	Study Design	Data collection	Trustworthiness	Analysis	Ethics	Overall assessment
Manandhar 2008	**Is a qualitative approach appropriate?** Justification for approach given **Is the study clear in what it seeks to do?** Two clear research questions	**How defensible / rigorous is the research design / methodology?** Four clear components to the design of the study and semi-structured interviews and ethnographic evaluation used. However, after clear description of the question and justification of the approach as well as the methodology the paper only describes the last component of intersectoral dialogue.	**How well was the data collection carried out?** Group meetings 2 to 3 hours "relatively unstructured" then more detailed discussion of relative points and meeting notes were taken and circulated. Then a wider discussion at subsequent meeting. For what it sets out to do appears to be thorough.	**Is the role of the researcher clearly described?** No **Is the context clearly described?** Yes **Were the methods reliable?** Unsure	**Is the data analysis sufficiently rigorous?** Not enough information **Are the data 'rich'?** Discussion themes given however only four themes reported and commented on. **Is the analysis reliable?** Not enough information **Are the findings convincing?** The authors do admit that this part of the research had mixed success but it is not clear in the findings they have reported why this is the case. **Are the findings relevant to the aims of the study?** Not to all the aims initially stated **Adequacy of Conclusions:** Need more information on other parts of the research to make a judgment	**How clear and coherent is the reporting of ethics?** Ethics approval from both universities in Zambia and Ireland	Approach – 2/2 Design - 0.5/1 Collection – 1/1 Trustworthiness – 1/3 Analysis – 1.5/6 Ethics – 1/1 Total – 7/14 Low quality

Study	Theoretical approach	Study Design	Data collection	Trustworthiness	Analysis	Ethics	Overall assessment
WHO Scaling-Up Health Service Delivery 2007- Brazil	**Is a qualitative approach appropriate?** Yes = case study approach with interviews **Is the study clear in what it seeks to do?** Yes - to investigate how to enhance equitable access and improve the quality of public sector family planning services	**How defensible / rigorous is the research design / methodology?** Not very- descriptive analysis only No information on methodology for interviews.	**How well was the data collection carried out?** Document data collection appeared to be thorough but interview data collection was not described	**Is the role of the researcher clearly described?** No **Is the context clearly described?** No **Were the methods reliable?** Yes – examined published/unpublished reports and laws/guidelines as well as interviews	**Is the data analysis sufficiently rigorous?** The document analysis was thorough but the interview process was not described well **Are the data 'rich'?** Not enough information **Is the analysis reliable?** Not enough information **Are the findings convincing?** Not enough information **Are the findings relevant to the aims of the study?** There was useful information from the document analysis but not from the interviews **Adequacy of Conclusions:** Not enough information	**How clear and coherent is the reporting of ethics?** No information given	Approach – 2/2 Design - 0/1 Collection – 0.5/1 Trustworthiness – 1/3 Analysis – 1/6 Ethics – 0/1 Total – 3.5/14 Low quality

Quality of quantitative studies reporting correlations and associations

Study	Population	**Method of selection of exposure (or comparison) group**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Shimkhada 2008 (QIDS2008-2009)	**Is the source population or source area well described?** Yes **Is the eligible population or area representative of the source population or area?** Yes Philippine Department of Health **Do the selected participants or areas represent the eligible population or area?** Yes	**Selection of exposure (and comparison) group Not described** **How was selection bias minimised?** Visays islands used. A main advantage of the island sites is they are remote from each other, limiting cross-over between intervention sites. **Was the selection of explanatory variables based on a sound theoretical basis?** Not enough information. **Was the contamination acceptably low?** Useful description of attempts to control for experimental biases. **How well were likely confounding factors identified and controlled?** Grouped districts with similar population characteristics into matched blocks of three before randomisation. Randomisation was done within these blocks 'A' site, 'B' site and 'C' as the control site, 'Because of the possibility that the study may alter behaviour response of participants over time, careful, consideration was given to control for potential participant effects in the study design.' This is described.	**Were outcome measures and procedures reliable?** Baseline data collection carried out of study facilities and participants. Smaller data collection carried out at different time points. **Were all outcome measurements complete?** High response rates appears to be around 90% overall. However, in limitations report that in several parts of the study they were unable to conduct second rounds of data collection due to limited resources. **Were all the important outcomes assessed?** Summary of measures clear and appear comprehensive. **Was there a similar follow-up time in exposure and comparison groups?** Could not find	**Was the study sufficiently powered to detect an intervention effect (if one exists)?** No information Authors have documented in limitations that they would have liked to include more communities to improve sample size. **Were multiple explanatory variables considered in the analyses?** No statistical analysis reported **Were the analytical methods appropriate?** No information given **Was the precision of intervention effects given or calculable?** No information given **Were they meaningful?** No information given	**Are the study results internally valid (i.e. unbiased)?** Discussion paper rather than results given **Are the findings generalisable to the source population (i.e. externally valid)?** While there are no results given it the paper does give some useful pointers on how to conduct this type of research in the future.	Population – 3/3 Method – 4/6 Outcomes – 4/5 Analyses – 0/5 Summary – 1/2 Overall – 12/21 Moderate Quality

Study	Population	**Method of selection of exposure (or comparison) group**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
		Was the setting relevant to low and middle-income countries? Yes	information on the control groups **Was follow-up time meaningful?** Yes up to 2 years.			

Quality of other study types

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Ashford 2006	**Are the study aims described?** Yes	**Is the source population or source area well described?** Description of application in Kenya **Is the eligible population or area representative of the source population or area?** Yes **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Model to guide policy reform well described. Theoretical framework of transformation of knowledge described.	**Were all the important outcomes assessed?** Primary outcome to develop 70 evidence-based health plans. No other information given. **Development** **Were outcome measures and procedures reliable?** Unsure, not enough information to assess **Was follow-up time meaningful?** Not reported	**Were the analytical methods appropriate?** None described	**Are the study results internally valid (i.e. unbiased)?** Descriptive paper therefore no clear results to assess **Are the findings generalisable to the source population (i.e. externally valid)?** Unsure	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 1/3 Summary – 0/2 Total – 5/10 Low quality (for a descriptive study

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Campbell 2003	**Are the study aims described?** Yes Six item framework to aid reproductive health policy	**Is the source population or source area well described?** Setting and framework well described **Is the eligible population or area representative of the source population or area?** Yes well described Nepali population **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Description of framework and how it is applied is described.	**Were all the important outcomes assessed?** Unsure outcomes mentioned but more description than measurement **Were outcome measures and procedures reliable?** Unsure not enough information **Was follow-up time meaningful?** Unsure – no information	**Were the analytical methods appropriate?** Not applicable – descriptive only	**Are the study results internally valid (i.e. unbiased)?** Reports that the tools described are useful in the hands of motivated people but reports in discussion that most of what happened is due to opportunistic change process. Two statements appear not to agree with each other. Therefore unable to say if the report is unbiased. **Are the findings generalisable to the source population (i.e. externally valid)?** Unsure for the above reason	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 1/3 Summary – 0/2 Total – 6/10 Moderate quality (for a descriptive study

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Haaga 1996	**Are the study aims described?** Yes description of several case studies	**Is the source population or source area well described?** Description given of initial project with case studies over 10 years described. **Is the eligible population or area representative of the source population or area?** Yes Bangladesh population **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Description of several research cases but not a full description of research methods.	**Were all the important outcomes assessed?** Not clear **Were outcome measures and procedures reliable?** Not enough information **Was follow-up time meaningful?** Processes described over a 10 year period. This does show different pathways of implementation between case studies.	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** **Case study reports appear to be reported with a balanced view of what worked and did not work.** **Are the findings generalisable to the source population (i.e. externally valid)?** Historically useful summation of work in Bangladesh which may be useful for future work in this area.	Focus – 1/1 Population – 3/3 Methods – 0/1 Outcomes – 1/3 Summary – 2/2 Total – 7/10 Moderate quality (for a descriptive study

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Liu 2006	**Are the study aims described?** Yes to describe the process of a new rural health financing policy in China	**Is the source population or source area well described?** Political context in China well described **Is the eligible population or area representative of the source population or area?** Yes **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Case study which gives description of ADB study but no methods described	**Were all the important outcomes assessed?** No information **Were outcome measures and procedures reliable?** No information **Was follow-up time meaningful?** No information	**Were the analytical methods appropriate?** No analysis conducted, descriptive study.	**Are the study results internally valid (i.e. unbiased)?** **No as authors report they delayed publication of the results to report them first to the government so that they could prepare a response. Unsure then if the publication was not without bias due to their responses.** **Are the findings generalisable to the source population (i.e. externally valid)?** Authors report that this study is of particular relevance to China alone.	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 0/3 Summary – 1/2 Total – 6/10 Moderate quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Molina 2004	**Are the study aims described?** Description of changes to improve air quality over a 10 year period in Mexico city.	**Is the source population or source area well described?** Clear description of the air quality program and the Mexico city population and air quality **Is the eligible population or area representative of the source population or area?** Yes **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Case study historical context described	**Were all the important outcomes assessed?** Report of air quality over several time periods given. **Were outcome measures and procedures reliable?** Reports of air quality appear reliable. **Was follow-up time meaningful?** Historical, 10 year period described.	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Not enough information **Are the findings generalisable to the source population (i.e. externally valid)?** Recommendations given to create a sustainable transportation / mobility / environmental system which have been incorporated into the air quality management plan.	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 3/3 Summary – 1/2 Total – 9/10 High quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Newman 2006	**Are the study aims described?** Yes – focus was a detailed description of the factors that contributed to the rapid adoption of policies to prevent malaria during pregnancy in West Africa	**Is the source population or source area well described?** No - Mali, Burkina Faso and Benin were assessed but the affected populations and the extent of the problem were not described in detail **Is the eligible population or area representative of the source population or area?** Unknown **Do the selected participants or areas represent the eligible population or area?** Unknown	**How well is the study methodology described?** Well described – policy process and workshops were described in detail	**Were all the important outcomes assessed?** Yes – lessons learned and barriers were discussed in detail **Were outcome measures and procedures reliable?** No – were based on authors' perceptions only **Was follow-up time meaningful?** Yes – over 6 years	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown **Are the findings generalisable to the source population (i.e. externally valid)?** Unknown	Focus – 1/1 Population – 0/3 Methods – 1/1 Outcomes – 2/3 Summary – 0/2 Total – 4/10 Low quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Okonofua 2010	**Are the study aims described?** Yes – detailed description of policy to promote free maternal and child healthcare access	**Is the source population or source area well described?** Yes - clear description of maternal mortality rates and access to maternal and child healthcare services within 37 states **Is the eligible population or area representative of the source population or area?** Yes **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Well described - this before-and-after case study was described in detail	**Were all the important outcomes assessed?** Yes - change in status of individual states regarding their provision of free maternal and child health care services **Were outcome measures and procedures reliable?** Yes - reports of provision of maternal and child health care services appeared reliable **Was follow-up time meaningful?** Unknown - historical, 2 year period described.	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Yes – sources of statistics suggests the conclusions are internally valid **Are the findings generalisable to the source population (i.e. externally valid)?** Conclusions likely valid for Nigerian population.	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 2/3 Summary – 2/2 Total – 9/10 High quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Orobaton 2007	**Are the study aims described?** Not in detail – aim was to describe how the UPHOLD project and use of the LQAS survey methodology created links between stakeholders	**Is the source population or source area well described?** Yes – a detailed description of the fragmentation of the Ugandan health sector **Is the eligible population or area representative of the source population or area?** Unknown – not enough detail provided **Do the selected participants or areas represent the eligible population or area?** Unknown – not enough detail provided	**How well is the study methodology described?** Not very - this case study was described only in general with few details	**Were all the important outcomes assessed?** No – outcomes were limited to authors' observations **Were outcome measures and procedures reliable?** No – authors' observations only **Was follow-up time meaningful?** Unknown	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Not likely **Are the findings generalisable to the source population (i.e. externally valid)?** Not likely	Focus – 0/1 Population – 1/3 Methods – 0/1 Outcomes – 0/3 Summary – 0/2 Total – 1/10 Low quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Pappaioanou 2003	**Are the study aims described?** Aims were not clearly described – the focus was the process and outcomes of the Data for Decision-Making (DDM) Project in Bolivia, Cameroon, Mexico, and the Philippines	**Is the source population or source area well described?** No – populations were not described **Is the eligible population or area representative of the source population or area?** Unknown – not enough detail provided **Do the selected participants or areas represent the eligible population or area?** Unknown – not enough detail provided	**How well is the study methodology described?** Well described – the DDM process and outcomes were described in detail	**Were all the important outcomes assessed?** Yes – number of successful trainees and examples of the impact of DDM project **Were outcome measures and procedures reliable?** Yes – statistics of successes from training project were reported **Was follow-up time meaningful?** Yes – 5 years	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown – not enough information on the population **Are the findings generalisable to the source population (i.e. externally valid)?** Unknown – not enough information on the population	Focus – 0/1 Population – 0/3 Methods – 1/1 Outcomes – 3/3 Summary – 0/2 Total – 4/10 Low quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Scott 2008	**Are the study aims described?** Yes – detailed quantitative and qualitative descriptions of the inequities in health status and health provision in the sub-districts of Cape Town	**Is the source population or source area well described?** Yes - clear description of inequities in health status and health provision in the sub-districts of Cape Town **Is the eligible population or area representative of the source population or area?** Yes **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Not very – description of effects of intervention only	**Were all the important outcomes assessed?** Yes – in particular, the success of the pilot and extended pilot of the Water and Sanitation Project were described in detail **Were outcome measures and procedures reliable?** Yes – results from Water and Sanitation Project appear reliable **Was follow-up time meaningful?** Yes	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown **Are the findings generalisable to the source population (i.e. externally valid)?** Conclusions and lessons learned are likely valid for South Africa	Focus – 1/1 Population – 3/3 Methods – 0/1 Outcomes – 3/3 Summary – 1/2 Total – 8/10 Moderate quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Stewart 2005	**Are the study aims described?** Yes – detailed description of mixed and participatory training in accessing and appraising research	**Is the source population or source area well described?** Yes – clear description of who attended the workshops **Is the eligible population or area representative of the source population or area?** Unknown – how trainees were selected was not discussed **Do the selected participants or areas represent the eligible population or area?** Unknown	**How well is the study methodology described?** Not very – authors' reflections on success of workshops supplemented by trainee feedback	**Were all the important outcomes assessed?** Yes – success and lessons learned from the workshops were reported in detail **Were outcome measures and procedures reliable?** Yes – in particular, results from feedback are probably reliable **Was follow-up time meaningful?** Yes - 3x week-long workshops in 2001	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown – how trainees were selected was not reported **Are the findings generalisable to the source population (i.e. externally valid)?** Unknown – the 7 southern African countries that participated differed considerably in wealth and resources.	Focus – 1/1 Population – 1/3 Methods – 0/1 Outcomes – 3/3 Summary – 0/2 Total – 5/10 Low quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
TEHIP 2008 – Tanzania (Fixing Health Systems)	**Are the study aims described?** Yes – detailed description of the Tanzania Essential Health Interventions Project (TEHIP)	**Is the source population or source area well described?** Yes – very clear description Tanzanian population with supporting statistics **Is the eligible population or area representative of the source population or area?** Yes **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Well described – very detailed description of TEHIP process	**Were all the important outcomes assessed?** Yes – success and lessons learned were reported in detail **Were outcome measures and procedures reliable?** Yes – reported outcomes are likely reliable **Was follow-up time meaningful?** Yes - decades	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown – descriptive methodology only **Are the findings generalisable to the source population (i.e. externally valid)?** Yes – findings are likely generalisable to other similar countries.	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 3/3 Summary – 1/2 Total – 9/10 High quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
van den Broucke 2010 – South Africa	**Are the study aims described?** Yes –description of project to strengthen the capacity for health promotion in two Provinces in South Africa	**Is the source population or source area well described?** No – only a general description of the populations in Mpumalanga and Free State **Is the eligible population or area representative of the source population or area?** Unknown **Do the selected participants or areas represent the eligible population or area?** Unknown	**How well is the study methodology described?** Well described – provided detailed description of project including focus groups and interviews	**Were all the important outcomes assessed?** Yes – success and lessons learned were reported in detail **Were outcome measures and procedures reliable?** Yes – measures and procedures were likely reliable **Was follow-up time meaningful?** Yes - 5 years	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown – descriptive methodology only **Are the findings generalisable to the source population (i.e. externally valid)?** Unknown – not enough description of populations studied	Focus – 1/1 Population – 0/3 Methods – 1/1 Outcomes – 3/3 Summary – 0/2 Total – 5/10 Low quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
Varkevisser 2001 – 10 Southern Africa countries	**Are the study aims described?** Yes –description of the Joint Health Systems Approach Project	**Is the source population or source area well described?** No – no description of targeted population **Is the eligible population or area representative of the source population or area?** Unknown **Do the selected participants or areas represent the eligible population or area?** Unknown	**How well is the study methodology described?** Well described – provided detailed description of project including workshops	**Were all the important outcomes assessed?** Yes – success and lessons learned were reported in detail **Were outcome measures and procedures reliable?** Yes – measures and procedures were likely reliable **Was follow-up time meaningful?** Yes - 10 years	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown – descriptive methodology only **Are the findings generalisable to the source population (i.e. externally valid)?** Unknown – not enough description of populations studied	Focus – 1/1 Population – 0/3 Methods – 1/1 Outcomes – 3/3 Summary – 0/2 Total – 5/10 Low quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
WHO Scaling-Up Health Service Delivery 2007- China	**Are the study aims described?** Yes – to re-align China's one-child policy to focus on client needs without increasing the birthrate.	**Is the source population or source area well described?** Yes – in great detail **Is the eligible population or area representative of the source population or area?** Yes – 5 rural counties and 1 city **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Well described from a description perspective - authors examined the success of the pilot project through the lens of the Strategic Approach to Strengthening Reproductive Health Policies and Programmes	**Were all the important outcomes assessed?** Yes – strengths and weaknesses were analysed using a single evaluation process **Were outcome measures and procedures reliable?** Yes – process of evaluation appears to be reliable **Was follow-up time meaningful?** Yes – description of efforts covers 9 years	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown **Are the findings generalisable to the source population (i.e. externally valid)?** Yes – the findings are likely generalisable to other rural areas in China	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 3/3 Summary – 1/2 Total – 9/10 High quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
WHO Scaling-Up Health Service Delivery 2007- Ghana	**Are the study aims described?** Yes – a description of the national expansion of community health services that were successfully tested in the Navrongo district of Ghana	**Is the source population or source area well described?** Yes – Nkwaanta district population **Is the eligible population or area representative of the source population or area?** Yes **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Well described for a descriptive study – details of intervention were provided including focus groups and implementation	**Were all the important outcomes assessed?** Yes – strengths and weaknesses were analysed **Were outcome measures and procedures reliable?** No – no evaluation process described, Descriptive only **Was follow-up time meaningful?** Yes – description of efforts covers 3 years	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown **Are the findings generalisable to the source population (i.e. externally valid)?** Yes – the findings are likely generalisable to other districts in Ghana	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 2/3 Summary – 1/2 Total – 8/10 Moderate quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
WHO Scaling-Up Health Service Delivery 2007-Vietnam	**Are the study aims described?** Yes - the focus was to introduce injectable contraceptive DMPA as part of a package of interventions to improve quality of care in the provision of contraceptives	**Is the source population or source area well described?** No – broad and general descriptions only **Is the eligible population or area representative of the source population or area?** Unknown - not enough information provided **Do the selected participants or areas represent the eligible population or area?** Unknown	**How well is the study methodology described?** Well described – strategic assessment of pilot programme with outcomes and lessons learned	**Were all the important outcomes assessed?** Yes – outcomes and lessons learned were described **Were outcome measures and procedures reliable?** Unknown – not enough information provided **Was follow-up time meaningful?** Yes – 7 years	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown – not enough information provided **Are the findings generalisable to the source population (i.e. externally valid)?** Yes – results from pilot project likely generalisable to other regions in Vietnam	Focus – 1/1 Population – 0/3 Methods – 1/1 Outcomes – 2/3 Summary – 1/2 Total – 5/10 Low quality (for a descriptive study)

Study	Focus	Population	**Methods**	**Outcomes**	**Analyses**	**Summary**	Overall assessment
WHO Scaling-Up Health Service Delivery 2007-Zambia	**Are the study aims described?** Yes - the focus was the expansion of the range of contraceptive methods available at health facilities, the development of innovative training approaches for health-care workers, and the testing of strategies to reach out to communities	**Is the source population or source area well described?** Yes - 8 of the Copperbelt's rural and peri-urban districts **Is the eligible population or area representative of the source population or area?** Yes **Do the selected participants or areas represent the eligible population or area?** Yes	**How well is the study methodology described?** Well described – strategic assessment of pilot programme with outcomes and lessons learned	**Were all the important outcomes assessed?** Yes – outcomes and lessons learned were described **Were outcome measures and procedures reliable?** Unknown – not enough information provided **Was follow-up time meaningful?** Yes – 6 years	**Were the analytical methods appropriate?** Not applicable	**Are the study results internally valid (i.e. unbiased)?** Unknown – not enough information provided **Are the findings generalisable to the source population (i.e. externally valid)?** Yes – results from pilot project likely generalisable to other regions in Zambia	Focus – 1/1 Population – 3/3 Methods – 1/1 Outcomes – 2/3 Summary – 1/2 Total – 8/10 Moderate quality (for a descriptive study)