

Draft for discussion

MATERNAL AND CHILD HEALTH

Evidence from Systematic Reviews to Inform Decision-Making Towards Achieving the Millennium Development Goals For Reducing Maternal and Child Mortality

**A Background Document prepared for An International Dialogue on
Evidence-informed Action to Achieve Health Goals in Developing Countries
(IDEAHealth)**

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Preface

International Dialogue on Evidence-informed Action to Achieve Health Goals in Developing Countries (IDEAHealth)

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Without evidence-informed action, health-related Millennium Development Goals as well as those of individual nations are unlikely to be achieved. Health policies are influenced by a variety of factors – values and beliefs, stakeholder power, institutional constraints, and donor funding flows, among others – and research evidence *needs* to be one of the critical factors taken into account. In contexts where resources are most scarce, it is arguably even more important that research evidence informs policy-making in order to ensure the wise use of limited resources. Unfortunately, evidence-informed action is rare. Research evidence is lacking for a number of policy questions and impact evaluations still need to be a more integral part of policy implementation. Where research evidence exists for policy questions, it is not always in a form that it is easy for policy-makers and stakeholders (including civil society groups) to acquire, assess or use. Research evidence may be scattered across numerous reports and articles, or difficult to assess in terms of its quality. It may also have been conducted in contexts which may not be similar to other country contexts and local conditions. Or it may have addressed only specific questions (such as the effects of different policy options) rather than other, perhaps more urgent ones, such as how to implement preferred options.

The purpose of IDEAHealth is to improve the appropriate use of research evidence to inform policy-making. The Dialogue is co-hosted by WHO, the Thai Ministry of Public Health, the Alliance for Health Policy and Systems Research, and Khon Kaen University. Participants will explore the use of policy briefs and engage in frank, off-the-record, deliberations (these will be called ‘country dialogues’) as two innovative approaches to supporting evidence-informed action. As the name ‘Dialogue’ suggests, there are no pre-cooked answers, either to the primary question about how to support evidence-informed action (as a policy-maker, civil society group representative, researcher or global partner) or to the secondary questions concerning what constitutes evidence-informed action in the

three policy domains that country participants have selected as priorities for deliberation (financing, human resources for health, and maternal and child health).

RESEARCH EVIDENCE

Policy-making about actions that affect health, including health systems interventions, can be informed by a wide range of research evidence, including randomized controlled trials, observational studies, qualitative research, animal studies, and laboratory studies. Discussions of evidence-informed action can generate debates regarding what constitutes research evidence or what constitutes evidence more generally (Lomas et al. 2005). A common understanding of evidence is that it “concerns facts (actual or asserted) intended for use in support of a conclusion.” A fact, in turn, is understood to be something known by experience or observation. An important implication of this logic is that evidence is seen as being used to support a conclusion. But, significantly, it is not the same as a conclusion. Evidence alone does not make decisions.

This understanding of what evidence is has six implications.

- 1) **Expert opinion is more than just evidence.** It combines facts together with the interpretation of those facts, and with conclusions. Evidence informs expert opinions. Policy-makers and stakeholders (including civil society groups) therefore should use expert opinion appropriately by identifying the facts (experiences or observations) that underlie opinions and appraising carefully the extent to which facts support the conclusions (Schünemann et al. 2006).
- 2) **Global research evidence** (i.e., the best research evidence from around the world) **is the best starting point for judgements about effects and likely modifying factors.** This argument is based on the understanding that all research evidence is context-sensitive to some extent and, therefore, is at least partially indirect. Policies based on a subset of observations are more prone to random errors (Counsell et al. 1994), and judgements about whether to base a conclusion on a subset of observations, are better informed if the overall observations are known (Oxman and Guyatt 2002) (i.e., all of the relevant global research evidence). Systematic reviews provide a helpful source of global evidence about effects. They differ from regular literature reviews in that they involve systematic and transparent efforts to identify all relevant studies, select these studies for inclusion, assess the quality of the relevant studies, and synthesize the findings. This policy brief draws on systematic reviews of evidence of effects.

- 3) **Not all research evidence is equally convincing.** How persuasive research evidence is for effects should be judged according to criteria such as: What sort of observations were made? How well were they done? How consistent were they? How directly relevant were they? How many were there? And how strong was the association? Judgements about how much confidence to place in different types of evidence (i.e., the quality of the research evidence) are made both implicitly or explicitly. It is better to make these judgements systematically and explicitly in order to limit errors, resolve disagreements, and communicate information. This policy brief draws on quality-assessed systematic reviews of effects (and these reviews, in turn, draw on quality-assessed studies). This policy brief also provides checklists to assist policy-makers and their support staff, as well as civil society group representatives, in assessing the quality of overviews of systematic reviews (such as the overview presented in this policy brief); in evaluating the quality of systematic reviews (like the systematic review that will be discussed in some detail during the country dialogue in which you will be participating); in assessing the quality of research evidence and strength of recommendations; and in assessing equity and scaling up.
- 4) **All research evidence is context sensitive, given that observations are made in a specific context.** A judgement always needs to be made about their applicability beyond that context. It is best to make judgements about local applicability systematically and explicitly, for the same reasons that it is best to make systematic and explicit judgements about the quality of research evidence. This policy brief provides assessments of the local applicability of selected systematic reviews of effects and a checklist for assessing the local applicability of systematic reviews.
- 5) **Local evidence (from the specific setting in which policies will be set and actions taken) is needed for most other judgements related to the actions required,** including: the presence of modifying factors in specific settings, needs (prevalence, baseline risk or status), values, costs and the availability of resources. The ‘country dialogues’ will provide opportunities to discuss needs for country-specific evidence, how to acquire and assess this evidence, and how to integrate and utilize it with global research evidence about effects.
- 6) **Finally, because policy decisions depend on different types of evidence from different sources as well as different kinds of judgements, expertise and people, they are inevitably complex.** In addition to judgements about the quality and local applicability of the research evidence, judgements are needed concerning needs and priorities, about the balance between the desirable and

undesirable consequences of choosing one option over another, and about a range of other inputs to the policy-making process. While these issues will be touched on in the country dialogues, they are more appropriate as a focus for within-country dialogues.

POLICY BRIEF

This policy brief is an innovation-in-progress. It uses a graded-entry format (i.e. a list of key messages, an executive summary, and a full report) to present policy relevant research evidence about the *effects* of different policy options that could be used to address country-level health challenges. It was produced to illustrate and bring to life the challenges and opportunities in using research evidence to inform policy-making. The policy brief does not aim to provide a comprehensive overview of all of the research evidence relevant to policy-making in the area. In focusing on global research evidence about effects (both benefits and harms) and hence on studies that use research designs that are best suited to examining effects (i.e., randomized controlled trials, controlled before/after studies, and interrupted time series), it excludes other types of research evidence. This policy brief, for example, excludes global research evidence related to how and why interventions work, as well as local research evidence about the views and experiences of stakeholders, both of which can be addressed using qualitative studies. Moreover, the policy brief was produced under significant time constraints: limited input from policy-makers, civil society representatives and researchers was available when shaping its focus and format.

One outcome of the Dialogue will be ideas on how to improve this policy brief and the others that will follow. When reading the policy brief, you may want to consider the following questions: How useful is global research evidence for policy-making at the country level, and how could it be made more useful? What type of research evidence is typically used at the country level to inform policy-making, and how does it compare to the research evidence presented in this policy brief? What kinds of policy briefs should global institutions like WHO be developing and how can briefs such as this one be made more useful? Where are the key information gaps? What kinds of systematic reviews should be conducted, and what kinds of evaluations should policy-makers be considering when they implement new policies? How can policy briefs like this one be combined effectively with local evidence and input?

COUNTRY DIALOGUES

The country dialogues are also an innovation for such a large international meeting. While policy-makers are ultimately responsible for setting policies, actual policy development typically occurs through a complex set of interactions involving government officials, stakeholders (including civil society groups), and (sometimes) researchers. The country dialogues will reflect this complexity by bringing together small numbers of policy-makers, civil society group representatives and researchers for frank, off-the-record deliberations about the policy challenges they face in their respective countries; how research evidence about effects can inform the ways in which these policy challenges are addressed; and how other types of evidence can inform the way in which these policy challenges are addressed.

A second outcome of the Dialogue will be ideas about ways to improve deliberations about evidence-informed action, including how global institutions like the World Health Organization can support these deliberations through meetings like IDEAHealth and through other mechanisms. When participating in the country dialogues, you may want to consider the following additional questions: How useful are such dialogues for policy-making at the country level, and how could they be made more useful? What types of deliberations are used typically at the country level to inform policy-making? And how do these compare to the country dialogues taking place at IDEAHealth? What type or form of country dialogues should global institutions like WHO be supporting and how can dialogues such as those in which you participated be made more useful? Who is missing? What kinds of background materials should be prepared, and what kinds of facilitation should be provided?

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Abbreviations and definitions

ARV	Antiretroviral
CBI	Community based health insurance
CCT	Conditional cash transfers
CDSR	Cochrane Database of Systematic Reviews
CE	Continuing education
CPG	Clinical practice guideline
DARE	Database of Abstracts of Reviews of Effects
EPI	Expanded programme of immunization
EPOC	The Effective Practice and Organisation of Care Cochrane review group
GRADE	Grades of Recommendation, Assessment, Development and Evaluation. A system for grading the quality of evidence and the strength of recommendations
IMCI	Integrated management of childhood illness
IDEAHealth	International Dialogue on Evidence-informed Action to Achieve Health
LHW	Lay health worker
LMIC	Low and middle income country
MCH	Maternal and child health
MTCT	Mother-to-child transmission
MDG	Millennium Development Goal
PubMed	A service of the U.S. National Library of Medicine with over 16 million citations from MEDLINE and other life science journals
QI	Quality improvement
RCT	Randomized controlled trial
RR	Risk ratio
SHI	Social health insurance
SR	Systematic review
STD	Sexually transmitted disease
WHO	World Health Organization

Key Messages

The core interventions and strategies considered in this brief are programmes and services that have focused on the following issues: the reduction of maternal and child mortality; the use of lay health workers (LHW) to deliver MCH services; the integrated delivery of MCH services compared to separate vertical programmes; financial mechanisms for improving access to MCH services; consumer involvement; and, finally, quality improvement (QI) strategies.

WHAT IS THE NATURE OF THE AVAILABLE EVIDENCE?

Programmes and services

- Relatively few systematic reviews address the direct impacts of interventions on maternal mortality, in part because this event is itself generally rare. There are however, many systematic reviews of interventions apparently effective for the major causes of maternal mortality
- Stronger, direct evidence is available for a number of interventions that can reduce child mortality. But relevant, up-to-date systematic reviews are still not available for many potentially important interventions
- Evidence for interventions to reduce mother-to-child transmission (MTCT) of HIV is evolving rapidly, as is evidence for other interventions designed to reduce maternal and child mortality
- Many interventions are effective, generally simple and inexpensive. However, strategies to ensure access in rural and underserved areas are important for reducing inequalities. This has important implications for scaling up because of the costs of extending and sustaining services required to ensure the availability of essential medicines, equipment, trained health workers and access to hospitals

Delivery arrangements

- There is moderate to high quality evidence of the effects of using LHWs to deliver a wide variety of interventions. Evidence is lacking for other interventions including: LHWs compared to health professionals for delivering similar interventions, alternative training strategies, and strategies for sustaining LHW interventions

- Few good quality studies exist that assess strategies to promote service integration in LMICs

Financial mechanisms

- There is low quality evidence of the effects of user fees on utilization and a lack of evidence of health or socio-economic effects
- There is little evidence of the effects of community-based health insurance (CBI), social health insurance (SHI) or the contracting out of services to the private sector
- There is good quality evidence of the effects of conditional cash transfers (CCT) in Latin America
- There is generally a need for more rigorous impact evaluations for these and other financial mechanisms that attempt to improve access

Governance

- There is little evidence from comparative studies regarding how to achieve consumer or public involvement in collective decisions about healthcare and few systematic reviews of alternative governance arrangements

Bringing about change

- Many overlapping systematic reviews of a variety of QI strategies are available, but the vast majority of evidence comes from studies in high-income countries
- There are few systematic reviews and limited evidence for the effects of financial incentives on professional practice, organizational interventions or strategies for implementing health systems changes

WHAT WORKS AND WHAT LOOKS PROMISING?

Programmes and services

- There are many effective treatments and preventive interventions for the major causes of maternal and child mortality yet many are not being delivered to the women and children who need them

Delivery arrangements

- LHWs can effectively promote breastfeeding, reduce mortality and morbidity from common health conditions in children, and improve tuberculosis treatment outcomes. LHWs can also effectively promote immunization uptake in children and provide support to mothers of sick children in high-income settings. These findings may be transferable to LMICs
- Reproductive health is a popular area for studies on integration, but the evidence is inconclusive. Integration may not, in reality, improve service delivery. If strategies to achieve integration are used, their impact should be evaluated. IMCI appears promising

Financial mechanisms

- User fees reduce utilization. The social and health impacts of user fees are uncertain, but may reduce the use of essential as well as non-essential services, especially among disadvantaged populations. Reducing or removing user fees can increase utilization

Governance

- There is almost no evidence from comparative studies to guide decisions about how best to involve consumers or communities in decisions concerning healthcare systems, or how to ensure transparency. Important questions remain about how best to recruit participants or promote participation, create forums for communication, and establish ways of providing training and support

Bringing about change

- Interactive workshops, reminders, multifaceted interventions and tailored interventions can improve professional practice. Educational outreach visits, too, consistently improve prescribing, but have variable effects on other behaviours. Many interventions, such as audit and feedback, also have variable effects on professional practice. The effects of financial, regulatory and many organizational interventions is uncertain, although these strategies are likely to play a role in bringing about change
- From a health systems perspective, the following elements are likely to be important: stakeholder involvement; suitable methods for identifying priorities for improvements; evidence-informed clinical practice guidelines; practical approaches to measuring and monitoring performance; thoughtful approaches to identifying the main determinants of practice and designing interventions to address identified barriers; and routine evaluation of QI efforts

Executive summary

BACKGROUND

Making well-informed decisions about how best to achieve the MDGs for maternal and child mortality depends on public policy makers accessing the best available evidence about what is known to work and what could be potential useful, and findings ways to integrate these solutions into complex and often under-resourced health systems. Evidence is thus needed about: 1. What services and programmes to offer or cover; 2. How to deliver those services; 3. Financial arrangements; 4. Governance arrangements, and 5. How to bring about change. In this brief we summarize relevant evidence from systematic reviews in each of these five key domains. The aim of this report is not to address all questions relevant to each of domain. Instead, we illustrate how systematic reviews can be used to inform decisions for key questions within each domain.

METHODS

Overviews of systematic reviews of interventions to reduce maternal and child mortality

Two teams of reviewers (one for maternal and one for child mortality) identified potentially relevant interventions by reviewing published overviews of the effectiveness and cost-effectiveness of interventions to reduce maternal or child mortality; the WHO Reproductive Health Library; and by consulting experts. They identified systematic reviews by searching the Cochrane Database of Systematic Reviews (CDSR), the Database of Abstracts of Reviews of Effects (DARE), PubMed and the reference lists of published overviews up to October 2006. They assessed the quality of reviews using specified criteria, prepared GRADE evidence profiles for relevant interventions, and addressed considerations of applicability, equity and scaling up using a brief checklist for each of these considerations.

Overview of interventions to prevent mother-to-child transmission of HIV

Medline, Embase, CDSR, DARE and 10 other databases were searched up to January 2006 for systematic reviews, randomized controlled trials (RCTs) and cohort studies, placing emphasis on systematic reviews of RCTs and large RCTs. Smaller RCTs and systematic reviews of non-controlled studies were considered if large RCTs were unavailable. GRADE evidence profiles for each recommendation were prepared.

Systematic review of using lay health workers to deliver MCH

The review team updated a Cochrane review published in 2005. Medline, Embase and six other databases for RCTs were searched up to August 2006. Two of the authors assessed independently the relevance of all titles, abstracts and the full text of retrieved articles. The risk of bias for each included study and extracted data was also evaluated. Following this, studies were grouped into nine categories and, where feasible, results of the included studies were combined to obtain an overall estimate of effect using meta-analysis.

Systematic review of strategies for integrating services

The authors searched the register of the Cochrane Effective Practice and Organisation of Care (EPOC), Medline, Embase and seven other databases up to September 2005 for RCTs, interrupted time series analyses and controlled before-after studies of integration strategies in LMICs. Two authors assessed independently the relevance of studies and the risk of bias for included studies and extracted data.

Systematic reviews of four financial mechanisms for improving access

PubMed, Embase the EPOC register and 22 other databases up to January 2006 were searched for RCTs, interrupted time series analyses and controlled before-after studies of the effects of four financial mechanisms on access to healthcare. Grey literature using websites and online resources of relevant international organizations and networks were also searched. Two authors assessed independently the relevance of the studies selected, as well as the risk of bias for included studies and extracted data.

Systematic review of methods of consumer involvement

The Cochrane Consumers and Communication Review Group's register; Medline; Embase; and nine other databases were searched up to January 2006 for RCTs, interrupted time series analyses and controlled before-after studies that assessed methods of involving consumers in developing healthcare policy, clinical practice guidelines, patient information material or healthcare research. Two authors assessed independently the relevance of the studies selected and the risk of bias for included studies and extracted data.

Overview of systematic reviews of QI interventions

The EPOC register of systematic reviews was searched up to October 2006. Reviews included examined the effects of QI interventions or governance arrangements on professional practice or healthcare outcomes, and could be applied to MCH in LMICs. Two

authors assessed independently the relevance of reviews, assessed the quality of relevant reviews, and extracted data related to the focus, inclusion criteria, main results and conclusions of the included reviews.

RESULTS

1. Programmes and services offered or covered

Interventions to reduce maternal mortality

Maternal mortality is generally rare and the reliable measurement of reductions in rigorous trials of interventions is difficult. The only intervention for which a statistically significant reduction in maternal mortality was reported was that of magnesium sulphate for the management of eclampsia. Trials of prophylactic antibiotics to prevent infection following caesarean section found a statistically significant reduction in the combined outcome of serious infectious morbidity or death. Other interventions found to be effective for major causes of maternal morbidity included: antibiotics for the preterm rupture of membranes; anti-malarial drugs, external cephalic version for breech presentation; a reduced number of antenatal visits with specific activities for low risk pregnancy; active management in the third stage of labour; normal delivery by skilled attendants; surgical procedures to evacuate incomplete abortion; umbilical vein injection for management of retained placenta; and treatment of postpartum haemorrhaging.

Interventions to reduce child mortality

Interventions found to reduce child mortality included: antenatal corticosteroids in preterm delivery; antimalarial intermittent preventive treatment in pregnancy; case management of pneumonia; insecticide-treated bed nets; tetanus toxoid; vitamin A for treating measles; and zinc supplementary therapy for treating diarrhoea. Promising interventions included: chemoprophylaxis or intermittent treatment against malaria; interventions to improve water quality and sanitation; Haemophilus influenza b immunization and measles immunization. Other interventions have been found to be effective for major causes of child mortality, but evidence of their impact on child mortality is lacking. This is a rapidly evolving field and recent emerging evidence has not yet been systematically reviewed.

Interventions to prevent mother-to-child transmission of HIV

ARV therapy reduces MTCT of HIV, but the most effective regimen in terms of the choice of agent(s), timing of introduction and postpartum use, has not been established. One RCT in Kenya found formula feeding which incorporated access to clean water and health education, when compared with breastfeeding, reduced the incidence of HIV in infants at 24 months without increasing mortality from other causes. Other trials are currently underway. There is limited evidence that elective caesarean section can reduce the incidence of HIV in infants compared with vaginal delivery. Studies of the effects of immunotherapy, vaginal microbes and vitamin supplements have not found significant effects on MTCT of HIV.

2. Delivery arrangements

Options to ensure that effective interventions are delivered to those who need them, include: community-based approaches; training (see the QI and governance arrangements reviewed below); expanded roles for nurses, midwives, pharmacists and other health professionals (see the IDEAHealth human resources for health policy brief); the use of lay health workers; promotion of self-care; changes in the setting or site of service delivery; and the integration services. Systematic reviews of two of these strategies are included in this policy brief.

Lay health workers

LHWs can effectively promote breastfeeding, reduce mortality and morbidity from common health conditions in children, and improve tuberculosis treatment outcomes. LHWs can also effectively promote immunization uptake in children and provide support to mothers of sick children in high-income settings – findings that may be transferable to LMICs. Evidence is still needed for other interventions including: LHWs compared to health professionals for delivering similar interventions, alternative training strategies, and strategies for sustaining LHW interventions.

Integration of services

There are few good quality studies of strategies to promote service integration in LMICs. Reproductive health is a popular area for studies of integration, but the evidence thus far is inconclusive. Integration may not, in fact, improve service delivery. If strategies to achieve integration are used, their impact should be evaluated, including evolving strategies for implementing and sustaining IMCI.

3. Financial arrangements

Features characteristic of healthcare financing in LMICs include that of a low tax base that limits government financing; the presence of donor financing; a number of different care providers in the public and private sectors; and a large proportion of out-of-pocket spending on finance health care. Systematic reviews of five financial mechanisms to improve access are included in this policy brief. These are: (1) the introduction, removal or change in the level of user fees; risk protection mechanisms, including (2) community-based insurance (3) social insurance; (4) contracting out and other forms of privatization or use of private sector providers to improve access to care; and (5) demand-side interventions such as vouchers or conditional cash transfers (CCT).

There is low quality evidence of the effects of user fees on utilization and a lack of evidence related to health or other socioeconomic effects. The available evidence supports the assumption that user fees reduce utilization. Though their social and health impacts are uncertain, they may reduce the use of essential as well as non-essential services, especially for disadvantaged populations. Reducing or removing user fees can increase utilization.

There is little evidence of the effects of community-based health insurance (CBI), social health insurance (SHI) or contracting out of services to the private sector. CBI schemes may increase inequities. If initiated, their impact on the population at large should be

evaluated. Contracting, although widely used, has been poorly evaluated and needs further assessment and evaluation. The potential benefits of contracting may be limited by a lack of competition, the capacity to manage a contract and monitor service delivery, and the difficulties governments face in redeploying public funds to private providers. SHI is a form of compulsory insurance that aims to provide universal coverage. SHI is intended to provide coverage to every household. Every citizen is required to make contributions, although governments may do so on behalf of the poorest and the unemployed; employers usually also contribute on behalf of their employees. Capacity issues are equally important for CBI and SHI: both depend on adequate health systems to ensure that services are provided to remote and rural populations.

There is good quality evidence of the effects of conditional cash transfers (CCT) in Latin America. CCT programmes have effectively increased the uptake of preventive services, encouraged particular preventive behaviours, and had positive effects on health status. However their applicability, sustainability and desirability in more deprived settings is uncertain.

4. Governance arrangements

There are few systematic reviews of the effects of different governance options for health systems such as centralizing versus decentralizing responsibility; or locating responsibility for health delivery in government versus for-profit versus non-profit organizations; or closed versus open and participatory governance structures.

Systematic review of methods of consumer involvement

There is almost no evidence from comparative studies of the effects of different methods to involve consumers or stakeholders in healthcare decisions about healthcare systems. There is very low quality evidence that face-to-face group meetings and interviews engage consumers better than surveys when setting priorities for community health goals. Such approaches may result in different priorities being set. There is also a lack of research evaluating methods to recruit consumer or stakeholder representatives, alternative degrees of involvement, forums for communication, ways of providing training and support, and degrees of financial support for involvement.

5. Bringing about change

There are important gaps in the quality of care reported in all countries where this has been examined. In LMICs ensuring the delivery of effective MCH services to those who need them most is a major challenge.

QI interventions

Passive dissemination strategies are unlikely to achieve change. Most active strategies that have been examined, including interactive educational meetings, outreach visits and the use of reminders, have the potential to achieve moderate but important changes in professional practices. Tailored interventions, in theory at least, offer particular promise and there are logical arguments for adjusting interventions to address specific problems. However, there is uncertainty concerning how best to diagnose possible underlying problems and how to select interventions likely to be most effective in addressing specific

problems. Regulatory strategies, as well as educational strategies are likely to play an important role, although there is limited evidence of their effects and, like other interventions, may have unwanted effects. Financial incentives are also likely to play an important role. But these have not been well evaluated, may be difficult to apply, can be costly and may even have perverse effects. Organisational strategies are likely to play a critical role and warrant further evaluation..

DISCUSSION

There is evidence of high or moderate quality for the effectiveness of preventive and therapeutic interventions for the major causes of maternal and child mortality. However, these interventions are often not delivered to the mothers and children who need them most. Interventions delivered by lay health workers have been found to reduce mortality as well as morbidity from common health conditions in children. Reducing user fees is likely to increase utilization. Several QI strategies are effective, including interactive training, outreach visits and reminders. Decisions about how best to deliver, finance and govern MCH services need to be made, despite the lack of evidence for other strategies considered in this brief. Given the uncertainty about their effects, it is important to monitor and evaluate their impact.

This document illustrates that it is possible to prepare a policy brief quickly relying largely on existing systematic reviews. However, a weakness of this report is that it has only addressed a limited number of strategies for which systematic reviews were available or could be updated (for lay health workers) or completed (for financing).

Background

To make well-informed decisions regarding how best to achieve the MDGs for maternal and child mortality, public policy makers need access to robust evidence about interventions and strategies that work and about those that may be potentially useful. They need, too, to understand how to fit these solutions into complex and under-resourced health systems. Evidence is needed to clarify (i) what services and programmes to offer or cover, (ii) how to deliver those services, (iii) financial arrangements, (iv) governance arrangements and (v) how to implement change. In this brief we have summarized relevant evidence from systematic reviews in each of these five domains. The aim is not to address all questions relevant to these domains, but rather to illustrate how systematic reviews can be used to inform decisions for key questions within each domain.

In the remainder of the background section of this brief, we provide a broad overview of each of these domains. While acknowledging the importance of non-health sector interventions (for example, education, sanitation, water supply) to maternal and child health, this policy brief focuses largely on the selection, delivery, financing, governance and implementation of health interventions, including public health interventions.

The scope of this policy brief is broad. To obtain the best use of this document, we recommend reading the background section and scanning through the rest. After this, you should focus on those sections most relevant to you. It is not necessary to read this policy brief from beginning to end.

PROGRAMMES AND SERVICES OFFERED OR COVERED

In this brief we have focused primarily on interventions that have the potential to achieve the Millennium Development Goals (MDGs) for reducing maternal and child mortality. Mortality rates in LMICs have declined significantly in the past two or three decades. Millions of children, however, still die each year from easily preventable causes [1]; similarly, hundreds of thousands of women die from maternal causes, and millions of others suffer maternal morbidity that affect the survival of the foetus and newborn [2]. To achieve the MDGs, the first question that policy makers – and those advising them – need to answer is: what are the best solutions for the major causes of mortality? Several previous papers have addressed this question [3, 4]. In this brief therefore, we

build on these earlier overviews by searching for, critically appraising, and then summarising the results of systematic reviews of the effects of maternal and child health (MCH) interventions that can potentially reduce maternal and child mortality.

Systematic reviews have several advantages. Firstly, they reduce the risk of bias in selecting and interpreting the results of studies. Secondly, they reduce the risk of being misled by the play of chance in identifying studies for inclusion, or the risk of focusing on a limited subset of relevant evidence. Thirdly, systematic reviews provide a critical appraisal of the available research and place individual studies or subgroups of studies in the context of all of the relevant evidence. Finally, they allow others to appraise critically the judgements made in selecting studies and the collection, analysis and interpretation of the results.

Decisions about how to apply the results of systematic reviews are always located in specific contexts: as such they need to take into account local conditions, needs, values, costs and the local availability of resources. However, solutions to health problems can (and are) increasingly being assessed by systematic reviews that can inform those decisions. Such reviews are becoming more widely available for a wide range of problems in The Cochrane Library, the Database of Abstracts of Reviews of Effects (DARE), through PubMed and elsewhere.

DELIVERY ARRANGEMENTS

Once particular programmes and services are identified as suitable, policy makers are faced with further critical questions. What delivery arrangements, for example, should be used to ensure that effective services are delivered efficiently and equitably? Who should deliver services? Should they be lay health workers, midlevel health professionals, general practitioners, or specialists? And where should such delivery occur and how should it be implemented? Less rigorous research and fewer systematic reviews on these topics are to be found; few address specifically the challenges faced by decision makers in LMICs who are frequently faced with substantial resource shortages and massive demands. In such settings the need for more evidence is even more essential than in wealthier countries, as available resources need to be used effectively, efficiently and equitably.

In this brief we have updated a previously published systematic review that addressed one possible delivery strategy for delivering effective services more efficiently and equitably, namely the use of lay health workers (LHWs) [5]. The number of randomized controlled trials (RCTs) of LHWs has increased from 42 in the previous version of this review to 101 in this current version. This illustrates both the importance of questions as to when and how to use LHWs, should be used and also the value of systematic reviews for reliably summarizing and ensuring that this wealth of evidence is more accessible to decision makers.

Policy makers need to decide, too, whether to integrate the delivery of MCH services with other primary care health services or organize separate vertical programmes [6]. Unfortunately, although this choice has been debated for decades [7], almost no high quality

research has been undertaken to evaluate the impact of these two distinct ways of delivering services on coverage, costs or health outcomes. Nonetheless, a systematic review in these circumstances remains essential for ascertaining what is known and not known, and planning well-designed impact evaluations accordingly to reduce important uncertainties.

Other systematic reviews have addressed questions concerning the expansion of the roles of mid-level health professionals and substitution of physicians for other health cadres. The recruitment and retention of health professionals in rural and other underserved communities has also been considered. These reviews are summarized in the human resources for health (HRH) policy brief prepared for the IDEAHealth meeting, but are not included in this brief.

FINANCIAL ARRANGEMENTS

Policy makers also need to consider how the delivery of services should be financed? Which mechanisms to use to raise revenue (taxes, social insurance, donor financing, user fees); how to fund the organizations that deliver care; and how to remunerate health workers in ways that will maximise efficiency and equity, are all key questions that need to be considered.

In this brief we have summarized five systematic reviews completed for the IDEAHealth policy brief on health financing. These mechanisms were: user fees, community-based and social health insurance, conditional cash transfers, and user fees.

GOVERNANCE ARRANGEMENTS

Policy makers also need to consider the influence of governance upon service delivery arrangements. They need to be aware, for example, of the rules and processes for decision-making; mechanisms for protecting against corruption (to ensure that resources are used as intended) and the monitoring the delivery of services; the division of power between the government and the private sector, the extent to which market mechanisms are used, and the role of public-private partnerships; the influence of centralized versus regionalized governance structures; closed versus participatory processes; and mechanisms to ensure that users or consumers of health services and citizens are given a voice [8].

In this brief, we have summarized a systematic review of mechanisms for consumer involvement in healthcare policy decisions. This provided even less evidence than the review of integration, but did provide a good starting point for quickly learning this. It may also be useful for framing considerations about how best to involve consumers, and planning appropriate evaluations.

BRINGING ABOUT CHANGE

Finally, policy makers need to assess the best ways of bringing about desired changes in the health system. Many well designed systematic reviews and evaluations of strategies for changing professional practice are now available. They focus primarily on what can broadly be defined as educational strategies. There are, however, fewer reviews and a minimal number of rigorous evaluations of the effects of organizational, financial and regulator interventions. Strategies for realising health system changes are difficult to evaluate. However, systematic reviews of both qualitative and quantitative research can help to inform decisions about how to bring about health systems changes by, for example, improving the use of research evidence in health policy decisions [9, 10].

We have prepared an overview of systematic reviews of strategies for quality improvement (QI) for this brief; particularly strategies for implementing clinical practice guidelines (CPGs) and changing professional practice.

Methods

The methods used for each overview of systematic reviews and for each systematic review are summarized here. These methods are described in more detail in the overviews and reviews included as Appendices to the brief.

OVERVIEWS OF SYSTEMATIC REVIEWS OF INTERVENTIONS TO REDUCE MATERNAL AND CHILD MORTALITY

Selection criteria

Two teams of reviewers (one for maternal and one for child mortality) identified potentially relevant interventions by evaluating published overviews of the effectiveness and cost-effectiveness of interventions to reduce maternal or child mortality [3, 4, 11, 12, 13, 14, 15, 16] and the WHO Reproductive Health Library. Experts were also consulted.

Search strategy

Systematic reviews were identified by searching the Cochrane Database of Systematic Reviews (CDSR), and the Database of Abstracts of Reviews of Effects (DARE), PubMed (using the clinical query hedge for systematic reviews) and the reference lists of published overviews, when an up-to-date Cochrane review could not be found. The searches were conducted up to October 2006.

Assessment

The quality of reviews was assessed using a checklist.

Synthesis

GRADE evidence profiles for relevant interventions [17] were prepared, and considerations of applicability, equity and scaling up were addressed using a brief checklist for each of these considerations.

OVERVIEW OF INTERVENTIONS TO PREVENT MOTHER-TO-CHILD TRANSMISSION OF HIV

Selection criteria and search strategy

Medline, Embase, CDSR, DARE and 10 other databases were searched up to January 2006 for systematic reviews, randomized controlled trials (RCTs) and cohort studies. Emphasis was placed on systematic reviews of RCTs and large RCTs. Smaller RCTs and systematic reviews of non-controlled studies were considered if large RCTs were not available.

Assessment and synthesis

GRADE evidence profiles were prepared for each recommendation.

SYSTEMATIC REVIEW OF USING LAY HEALTH WORKERS TO DELIVER MCH

Selection criteria

The review team included RCTs of any LHW (paid or voluntary) including community health workers, village health workers, birth attendants, etc. who delivered interventions intended to promote health, manage illness or other support. Interventions needed to be relevant to MCH or high burden diseases in LMICs in order to be included in the update prepared for this policy brief. The primary outcomes considered were healthcare behaviours and outcomes. Costs, adverse effects, satisfaction with care and other outcomes were also included.

Search strategy

A Cochrane review of the effects of lay health worker interventions, published in 2005, was updated. The Medline, Embase and six other databases were searched up to August 2006.

Assessment

Two of the authors assessed independently the relevance of all titles, abstracts and the full text of retrieved articles. They also assessed the risk of bias for each included study and relevant extracted data.

Synthesis

Studies were grouped into nine categories and, where feasible, results of the included studies were combined to obtain an overall estimate of effect using meta-analysis. The quality of the evidence (the extent to which one can be confident that an estimate of effect is correct) was graded using the approach recommended by the GRADE Working Group [17].

SYSTEMATIC REVIEW OF STRATEGIES FOR INTEGRATING SERVICES

Selection criteria

The authors included RCTs, interrupted time series analyses and controlled before-after studies of integration strategies in LMICs.

Search strategy

The register of the Cochrane Effective Practice and Organisation of Care (EPOC), Medline, Embase and seven other databases were searched up to September 2005.

Assessment

Two authors assessed independently the relevance of studies, assessed the risk of bias for included studies, and extracted data.

Synthesis

Studies that compared broadly similar types of interventions were grouped together, including LHW interventions to:

- Promote breastfeeding compared with usual care
- Promote immunization uptake in children compared with usual care
- Reduce mortality in children under five compared with usual care
- Reduce morbidity from common infectious diseases in children under 5 compared with usual care
- Improve TB treatment outcomes compared with institution-based directly observed therapy
- Provide support to mothers of sick children compared with usual care
- To prevent/reduce child abuse compared with usual care
- To promote parent-child interaction/health promotion compared with usual care
- To support women with a higher risk of low birth weight babies or other health conditions in pregnancy compared with usual care

Where feasible, the results of studies for each type of intervention were combined to obtain an overall estimate of effect.

SYSTEMATIC REVIEWS OF FOUR FINANCIAL MECHANISMS FOR IMPROVING ACCESS

Selection criteria

RCTs, interrupted time series analyses and controlled before-after studies of the effects of four financial mechanisms on access to healthcare were included.

Search strategy

PubMed, Embase the EPOC register and 22 other databases were searched up to January 2006. Grey literature using websites and the online resources of relevant international organizations and networks was also searched.

Assessment

Two authors assessed independently the relevance of the studies, assessed the risk of bias for included studies, and extracted data.

Synthesis

A structured, qualitative approach was used to analyze the results. For each intervention, summary tables of studies were prepared summarizing the types of outcomes (e.g. utili-

zation and equity), results and key contextual factors that might modify effects on the outcomes recorded.

SYSTEMATIC REVIEW OF METHODS OF CONSUMER INVOLVEMENT

Selection criteria

RCTs, interrupted time series analyses and controlled before-after studies that assessed methods of involving consumers in developing healthcare policy, clinical practice guidelines, and patient information material or healthcare research were all included.

Search strategy

Cochrane Consumers and Communication Review Group's register, Medline, Embase and nine other databases were searched up to January 2006.

Assessment

Two authors assessed independently the relevance of studies, evaluated the risk of bias, and extracted data.

Synthesis

A summary was provided of the known effects of alternative ways of involving consumers; this also included options for which no evaluations were found. Quality of the evidence was graded using the approach recommended by the GRADE Working Group [17].

OVERVIEW OF SYSTEMATIC REVIEWS OF QI INTERVENTIONS

Selection criteria

Reviews were included that examined the effects of QI interventions or governance arrangements on professional practice or healthcare outcomes, and which could be applied to MCH in LMICs.

Search strategy

The EPOC register of systematic reviews was searched up to October 2006.

Assessment and synthesis

Two authors assessed independently the relevance of reviews, evaluated the quality of the relevant reviews, and extracted data about the focus, inclusion criteria, main results and conclusions of included reviews. Data were analysed qualitatively to identify broad conclusions across the interventions and then summarized in tables. For each intervention the analysis included the evaluation of applicability to LMICs and MCH and considerations of equity and scaling up.

Results

1. PROGRAMMES AND SERVICES OFFERED OR COVERED

Interventions to reduce maternal mortality

Maternal mortality and serious maternal morbidity are generally rare events. They are often difficult outcomes to assess in randomized controlled trials for mortality prevention because large sample sizes are needed to achieve sufficient statistical power to show an effect. Most studies and reviews that have included maternal mortality as an outcome did not have sufficient sample sizes to reliably assess impacts on these outcomes. For many studies mortality was included as a secondary outcome and the primary outcome measures were, instead, risk factors or morbidity (e.g. hypertension, haemorrhage or infections), which are important causes of maternal mortality [18].

The majority of the reviews included in this overview were Cochrane reviews available in the WHO Reproductive Health Library (Update 9, 2006) or from the Cochrane Library (Update 4, 2006). These reviews use standard methods, including the selection of randomized trials and critical appraisal of the risk of bias and meta-analysis.

The evidence from systematic reviews for interventions that might have an impact on maternal mortality is summarized in Appendix 10. Systematic reviews were not found for the following interventions that might have an impact on maternal mortality:

- PRECONCEPTION
 1. Contraception
- ANTENATAL
 2. Counselling and educational programmes to prevent problems during pregnancy
 3. Low dose aspirin to prevent pre-eclampsia
 4. Nutrition during pregnancy, such as protein energy supplements
 5. Screening for pre-eclampsia
- INTRAPARTUM
 6. Bimanual compression of the uterus
 7. Ensuring clean delivery
 8. Partograph for labour surveillance
 9. Uterine massage

- POSTPARTUM
 10. Management of specific causes for maternal sepsis
 11. Screening for postnatal maternal complications

Eight of the reviews included in this overview included maternal mortality as an outcome of interest, but only seven reported data for mortality. Only one reported a statistically significant reduction in maternal mortality [19], namely the review of magnesium sulphate versus diazepam in the management of eclampsia found a relative reduction in maternal mortality of 41% (RR = 0.59, 95%CI 0.37-0.94), based on high quality evidence. Reviews of magnesium sulphate usage in comparison to other regimens also found reductions in mortality, but these were not statistically significant. In addition to reducing maternal mortality, magnesium sulphate was found to reduce the recurrence of convulsions and prevent eclampsia.

For infectious causes of mortality, one review found a statistically significant 58% relative reduction in the combined outcome of serious infectious morbidity or death with the use of prophylactic antibiotics versus no antibiotics in women who having a caesarean section (RR 0.42, 95%CI 0.28-0.65) [20].

Other reviews did not report effects on maternal mortality. However, effects for important morbidity (e.g. seizures) and surrogate outcomes (e.g. haemorrhage, hypertension, abnormal labour) that are causes of maternal mortality were reported. Prophylactic antibiotics significantly reduced endometritis (or uterine lining infection) in caesarean section and puerperal sepsis/postpartum endometritis in delivery [21]. The use of antibiotics for cases of premature rupture of the membrane also significantly reduced chorioamnionitis (i.e. the infection of the pregnancy sac lining) [22]. The use of anti-malarial drugs significantly reduced febrile episodes, antenatal parasite prevalence, and severe antenatal anaemia [23].

Active management of the third stage of labour was found to reduce severe postpartum haemorrhage, the amount of blood loss from post-partum haemorrhage, the need for therapeutic oxytocics as well as the need for blood transfusions [24]. The use of misoprostol (a uterine contracting drug) versus oxytocin in primary postpartum haemorrhage reduced the rate of hysterectomy (which is used as a last resort for uncontrolled bleeding), persistent haemorrhage, and the need for other medical interventions [25]. Injections of oxytocin in the umbilical vein to facilitate the delivery of a retained placenta reduced the need for manual removal of the placenta [26].

For prolonged labour and the use of operative obstetric interventions (such as forceps and vacuum delivery), no studies reported maternal mortality as an outcome [27]. The use of oral iron supplements, with or without folic acid, was found to reduce maternal anaemia – a common problem among pregnant women that may affect foetal and maternal health [28].

Summary

This overview provides a concise, systematic summary of rigorous evaluations of interventions based on systematic reviews. Importantly, this summary is limited to systematic reviews, many of which only included RCTs, and this should be kept in mind when

attempting to apply such results. Interventions for which we did not find systematic reviews, more recent evidence, or relevant evidence from observational studies were not included. Certain effective interventions were not included as they were considered to be delivery or quality improvement strategies (e.g. the training of traditional birth attendants) [29]. Beneficial interventions unlikely to have a direct impact on mortality were not included either, even though these may nonetheless be important. (See lists of beneficial and potentially beneficial interventions in the WHO RHL).

Local needs (dependent, for example, on whether a disease like malaria is present), and modifying factors (e.g. resistance patterns), values, costs and the availability of resources must also be considered at the country level when making decisions and setting priorities for the delivery of effective interventions to reduce maternal mortality. Similarly, knowledge of the extent to which effective interventions are being used is also needed to prioritize and plan quality improvement strategies, as is discussed in further detail below. Although these interventions are generally simple and inexpensive, strategies to ensure access in rural and underserved areas are particularly important to reduce inequalities. This in turn, has important implications for scaling up because of the costs of extending and sustaining services required to ensure the availability of essential medicines, equipment, trained health workers and access to hospitals when needed.

Interventions to reduce child mortality

42 interventions that may have had an impact on child mortality, together with 36 systematic reviews, were identified (for further information, please see References: Systematic reviews of interventions to reduce child mortality). One review on the training of traditional birth attendants was not included as it focused primarily on quality improvement [29]. The main findings of the overview are summarized in Table 2. Due to time constraints, we focused on reviews of interventions included by the Bellagio Child Survival Study Group [3]; we were unable to assess the quality of evidence or prepare summaries of the findings for all of the reviews identified.

We were not able to identify systematic reviews for the following interventions:

- Clean delivery
- Maternal antihelminthic treatment
- Newborn resuscitation
- Timely initiation of breastfeeding
- Postnatal visits within three days of delivery
- Hepatitis B vaccination and immunoprophylaxis¹
- Antibiotics for dysentery
- Care seeking for pneumonia
- Antimalarial treatment for fever

Several of the systematic reviews did not report child mortality as an outcome of interest:

- Prolonged exclusive breastfeeding (>6 months)
- Breastfeeding plus complementary food at six to nine months of age

¹ This may be a less relevant intervention for reducing child mortality, as the effects on morbidity and mortality were typically seen after childhood.

- Complementary feeding
- Diphtheria Polio Tetanus (DPT) immunization
- Hypo-osmolar oral rehydration therapy

The following interventions were found to reduce child mortality, though at least two of these were based on small numbers of included studies.

- Antenatal corticosteroids in preterm delivery
- Antimalarial intermittent preventive treatment in pregnancy
- Case management of pneumonia
- Insecticide-treated bed nets
- Tetanus toxoid
- Vitamin A for treating measles
- Zinc supplementary therapy for diarrhoea

The main findings for the effects interventions found to reduce child mortality are summarized below:

Outcome	# of participants (# of trials)	Control group risk (Range)	Relative effect (95% CI)	Illustrative absolute effect	Quality	Comments
Antenatal corticosteroids versus placebo used to accelerate foetal lung maturation for women at risk of preterm birth						
Foetal and neonatal deaths	3627 (13)	18,8% (4,5% to 61%)	RR 0.77 (0.67 to 0.89)	43 fewer/1,000	⊕⊕⊕○ Moderate	
Intermittent treatment of chemoprophylaxis with antimalarial drugs versus no drugs, for women in their first or second pregnancy						
Perinatal death	1986 (3)	9%	RR 0.73 (0.53 to 0.99)	23 fewer /1,000	⊕⊕○○ Low	
Insecticide treated bed nets and curtains versus no nets or untreated nets						
All cause child mortality	149221 (5)	3,6%	RR 0.83 (0.76 to 0.89)	6 fewer/1,000	⊕⊕⊕○ Moderate	
Malaria-specific child mortality	61363 (2)	-	Range in relative risk 0.78 to 0.86	-	⊕⊕⊕○ Moderate	
Tetanus toxoid administration in women of childbearing age for neonatal tetanus						
Death all causes up to 5 years of age	688 (1)	13.3%	RR 0.31 (0.17 to 0.55)	91 fewer/1,000	⊕⊕⊕○ Moderate	
Neonatal death from all causes	8641 (1)	6.0%	RR 0.68 (0.56 to 0.82)	19 fewer/1,000	⊕⊕⊕○ Moderate	
Death from neonatal tetanus	688 (1)	7.8%	RR 0.02 (0.00 to 0.30)	76 fewer/1,000	⊕⊕⊕○ Moderate	
Vitamin A versus placebo for the treatment of measles						

Outcome	# of participants (# of trials)	Control group risk (Range)	Relative effect (95% CI)	Illustrative absolute effect	Quality	Comments
All cause mortality (more than 200,000 IU – double dose schedule)	429 (3)	10,5%	RR 0.40 (0.19 to 0.87)	63 fewer/1,000	⊕⊕⊕○ Moderate	
All cause mortality (200,000 IU or under)	1094 (3)	6,5%	RR 0.77 (0.34 to 1.78)	15 fewer/1,000	⊕⊕⊕○ Moderate	
Oral zinc supplementation (+ORT) versus placebo or vitamins (+ORT) for preschool children with persistent diarrhoea >14 days						
Treatment failure or death	640 (4)	20,1%	RR 0.60 (0.38 to 0.93)	70 fewer/1,000	⊕⊕⊕⊕ High	

The following interventions were found to have promising effects on child mortality:

- Chemoprophylaxis or intermittent treatment against malaria
- Interventions to improve water quality and sanitation
- Haemophilus influenza b immunization
- Measles immunization

Summary

Previous overviews of effective interventions for reducing child mortality have not consistently used systematic reviews to inform judgements about the effects of interventions that might have an impact. For this review, a list of candidate interventions was compiled and systematic reviews for all the interventions were sought. A systematic and transparent process was used when searching for reviews, critically appraise them, assessing the quality of the evidence they contained, and extracting and summarizing the findings. In addition, we have considered issues of applicability, equity and scaling up with regard to each intervention.

However, due to time limitations, the scope of this overview was limited to an assessment of interventions as identified by the Bellagio Group in the first instance. More recent research was not examined to supplement the information in the reviews, and neither were evaluations of interventions sought if a systematic review could not be found. As a consequence, this document does not provide a complete, up-to-date overview of relevant interventions (see Appendix 12). This may explain why this overview found fewer interventions with well-documented effects on child mortality than others [3, 13-16]. Nonetheless, it is important to note the lack of relevant, up-to-date, systematic reviews for many potentially important interventions. When expanding the scope of this overview, it will be important to include outcomes other than mortality in order to provide a solid basis for informing decisions concerning which interventions to prioritize. This will ensure the best use of limited resources to reduce child mortality and improve the health status of children in LMICs.

Interventions to prevent mother-to-child transmission of HIV

The risk of mother-to-child transmission (MTCT) of HIV without antiviral treatment and with prolonged breastfeeding is on average about 25–35% in sub-Saharan Africa. This is higher than in the established market economies, where the risk is estimated to be 15–20% in Europe and 15–30% in the USA. In emerging market economies, such as Thailand, transmission rates are similar to those in Europe and the USA. It has been estimated that at the end of 2005, 2.3 million children worldwide were living with HIV/AIDS. Of these, over 80% were in sub-Saharan Africa. An estimated 700 000 children were newly infected with HIV in 2004 alone, more than 75% of these children were in sub-Saharan Africa. Approximately 25% of infants infected with HIV progress rapidly to AIDS or death in the first year. In children under five years of age in sub-Saharan Africa, HIV was estimated to account for 2% of deaths in 1990. This rose to almost 8% in 1999. Effective measures to reduce mother-to-child transmissions of HIV are therefore a major public health priority.

Antiretroviral therapy

Antiretroviral therapy has been shown to reduce MTCT of HIV, but the most effective regimen, in terms of the choice of agent(s), timing of introduction and post-partum use, has not been established.

Zidovudine

One systematic review that included RCTs undertaken in Africa and Thailand found that zidovudine monotherapy given to mothers before, during, or after labour reduced the incidence of HIV in infants compared with placebo, and that longer courses of zidovudine given to the mother and infant reduced the incidence of HIV compared with shorter courses of zidovudine.

Nevirapine versus zidovudine

A large RCT undertaken in Uganda found that nevirapine administered to antiretroviral-naïve mothers and their newborn babies reduced the risk of HIV transmission compared with zidovudine.

Combination antiretroviral regimens versus single dose drugs

Combination antiretroviral treatments have been shown to reduce MTCT of HIV both in the presence and absence of breastfeeding in RCTs undertaken in Africa, but the most effective regimen has not yet been determined. It is also unclear whether or not both mothers and babies should be treated.

Breast feeding

One RCT of HIV-positive women in Kenya who had access to clean water and health education found that, compared with breast feeding, formula feeding reduced the incidence of HIV in infants at 24 months without increasing mortality from other causes.

Elective caesarean section

One RCT and five observational studies undertaken in Europe found limited evidence that elective caesarean section reduced the incidence of HIV in infants compared with vaginal delivery.

Other interventions

Immunotherapy

One multicentre RCT undertaken in Puerto Rico and the USA found no significant difference in HIV transmission to infants from mothers taking zidovudine together with either HIV hyperimmune globulin, or immunoglobulin without HIV antibody.

Vaginal microbicides

One systematic review of trials undertaken in Africa found no significant reduction in HIV transmission with vaginal microbicides compared with no vaginal cleansing.

Vitamin supplements

One systematic review and one RCT undertaken in Africa found no significant difference in the risk of HIV infection in infants between vitamin A supplements or multivitamins given to HIV positive pregnant women compared with placebo or no treatment.

Summary

The risk of mother to child transmission of HIV is highest in resource poor countries. Many factors contribute to this including: breastfeeding, poor maternal nutritional status and limited availability of obstetric interventions.

There is strong evidence to support the administration of ARV therapy to HIV-positive pregnant women. Nevirapine is more effective than zidovudine, but there is theoretical concern that single dose nevirapine used as monotherapy could select for nevirapine-resistant mutations of the HIV virus. This could reduce the effectiveness of future ARV treatment that contained a non-nucleoside reverse transcriptase inhibitor. Combination ARV drugs are becoming more widely available in resource-poor countries through treatment access programmes. Combination therapy should be used when available and indicated to treat symptomatic mothers and may be more effective postpartum for the prevention of MTCT when HIV-positive women have not received intrapartum treatment.

Although avoiding breastfeeding was found to reduce MTCT in one trial, it did not have a measurable effect on mortality. Other trials have not yet been reported. In countries with high infant mortality, avoiding breast feeding may further increase infant morbidity and mortality through its effect on nutrition, immunity, maternal fertility, and birth spacing. Limited access to clean water and education when using formula feeds may explain the similar mortality in breastfed and formula fed infants. Thus, while avoidance of breastfeeding has been shown to reduce MTCT, it may not always be appropriate in resource-poor settings.

There is low quality evidence for elective caesarean sections as a means to prevent MTCT; women having caesarean sections may have more postpartum morbidity than women having vaginal deliveries.

There is insufficient evidence to support the use of immunotherapy, viral microbicides or vitamins to prevent MTCT.

2. DELIVERY ARRANGEMENTS

Lay health workers

Lay health workers (LHWs) perform diverse functions related to health care delivery. Though they have no formal professional or paraprofessional tertiary qualifications, many are often provided with informal training. LHWs can be both paid and voluntary, and the term includes, for example, community health workers, village health workers, cancer supporters and birth attendants.

There is growing interest in the use LHWs for the delivery of a wide range of maternal and child health MCH services in LMICs. However, robust evidence of the effects of LHW interventions is limited.

This systematic review summarizes evidence from randomized controlled trials (RCTs) on the effects of LHW interventions in improving MCH and in addressing key high burden diseases in LMICs.

LHW interventions to reduce mortality and morbidity in children under five compared with usual care

Settings: Ethiopia, Tanzania, Nepal, Ghana, Thailand, Viet Nam

Outcome	# of participants (# of trials)	Control group risk (Range)	Relative effect (95% CI)	Illustrative absolute effective	Quality	Comments
Mortality	35828 (3)	4.4% (3.7 to 4.6%)	RR 0.74 (0.55 to 0.99)	11 fewer/1,000	⊕⊕⊕⊕ High	
Morbidity	7544 (3)	39.2% (24.7 to 53.8%)	RR 0.81 (0.71 to 0.92)	8 fewer/1,000	⊕⊕⊕○ Moderate	

The main purpose of these interventions was to promote health and in some cases to manage or treat illnesses, including acute respiratory infections (ARI), malaria, diarrhoea, malnutrition and other illnesses in the neonatal period.

Three studies that measured mortality among children less than five years of age provided high quality evidence of a 26% relative reduction in mortality with the LHW intervention (RR 0.74, 95% CI 0.55-0.99, $p = 0.04$). The overall control group risk was 4% in these studies (range 4-5%).

Four studies measured morbidity from fever, ARI or diarrhoea among children under five years. Three studies were included in a meta-analysis that provided evidence of moderate quality of a 29% relative reduction in morbidity with the LHW interventions compared with usual care (RR 0.81, 95% CI 0.71-0.92, $p = 0.001$). The overall control group risk was 39% (range 25-54%).

LHW interventions to promote immunization uptake in children under five compared with usual care

Settings: Included trials from the USA (3) and Ireland (1)

Outcome	# of participants (# of trials)	Control group risk (Range)	Relative effect (95% CI)	Illustrative absolute effective	Quality	Comments
Vaccination complete according to schedule	3,568 (4)	49,5% (18.9 to 74%)	RR 1.22 (1.10 to 1.37)	109 more/1,000	⊕⊕⊕○ Moderate	

LHWs achieved a 23% relative increase in immunization uptake (RR 1.23, $p = 0.009$) compared with usual care, but the results varied significantly across six studies. To address this, one study focusing on adults and one implemented in a setting that was different from the other studies were removed from the analysis. The subsequent findings showed strong evidence of a 22% relative increase in immunization uptake with LHW based promotion strategies (RR 1.22, 95%CI 1.10-1.37, $p = 0.0004$). Overall uptake in the control group was 50% (range 19–74%).

LHW interventions to promote breastfeeding compared with usual care

Settings: Included trials undertaken in the USA, UK, Canada, Scotland, Mexico, Bangladesh, Philippines, and India

Outcome	# of participants (# of trials)	Control group risk (Range)	Relative effect (95% CI)	Illustrative absolute effective	Quality	Comments
Initiated breastfeeding - LMIC	1881 (3)	19.8% (14% to 67.6%)	RR 1.98 (0.80 to 4.89)	194 more/1,000	⊕⊕⊕○ Moderate	
Any breastfeeding up to 6 months - LMIC	2295 (4)	65,7% (28.9 to 84.6%)	RR 1.17 (0.98 to 1.40)	138 more/1,000	⊕⊕○○ Low	
Exclusive breastfeeding 6 weeks to 6 months - LMIC	3021 (5)	21,9% (0 to 41.6%)	RR 3.67 (1.66 to 8.11)	584 more/1,000	⊕⊕⊕○ Moderate	

LHWs more than tripled exclusive breastfeeding up to the age of six months in LMICs (RR 3.67, $p = 0.001$, evidence of moderate quality) and had a smaller effect on promoting any breastfeeding (RR 1.22, $p = 0.02$) and exclusive breastfeeding up to the age of six months (RR 1.5, $p = 0.04$).

The effect of LHWs on initiating breastfeeding varied across three studies from 0.80 to 4.89 ($p = 0.00001$; $I^2 = 95.8\%$). This heterogeneity cannot easily be explained, but may be related to differences in inputs provided to women who delivered in hospital rather than home settings.

LHW interventions to improve TB treatment outcomes compared with institution-based directly observed therapy

Settings: Included trials conducted in South Africa (2) and Tanzania

Outcome	# of participants (# of trials)	Control group risk (Range)	Relative effect (95% CI)	Illustrative absolute effective	Quality	Comments
Cure rates for smear-positive pulmonary tuberculosis patients	798 (3)	44% (28 to 41%)	RR 1.21 (1.00 to 1.47)	92 more/1,000	⊕⊕⊕○ Moderate	

LHWs also appear to be effective in improving TB treatment outcomes compared with institution-based directly observed therapy (RR 1.21, $p = 0.05$, evidence of moderate quality).

Summary

In summary, the use of LHWs showed promising benefits, compared to usual care, in promoting immunization and breastfeeding uptake; in reducing mortality and morbidity from common childhood illnesses; and in improving TB treatment outcomes. There is little evidence available regarding the effectiveness of LHWs in substituting for health professionals, the effectiveness of alternative training strategies for LHWs, or the sustainability of the effects of LHW interventions. It is difficult to assess whether the failure to achieve intended outcomes in some trials was due to the intervention itself or other effects such as poor delivery of the intervention.

Although 30 of the 48 studies were from high-income countries, mostly the US, the interventions were directed at low income groups in 37 of the studies. All of the trials of LHWs providing support to mothers of sick children and LHWs to prevent child abuse were conducted in the USA. It is uncertain whether their applicability to LMICs is limited, given the high cultural and socioeconomic diversity in the United States.

LHWs could potentially reduce the costs of healthcare if substituted for professionals. However, as noted above, little evidence is available from direct comparisons of LHWs and professionals delivering the same services. There is also the possibility of harmful effects when professionals are substituted by LHWs for the delivery of services.

There is also inadequate information related to the costs of training and supporting LHWs. LHWs are most likely to be effective when they have effective when the health care interventions that they deliver are effective. Careful selection of the interventions that LHWs deliver, appropriate training and adequate support are all important considerations for scaling up the use of LHWs to deliver MCH.

Integration of services

In many LMICs, government health services are frequently organized through a set of vertical programmes, each responsible for organizing a set of inputs to ensure delivery for the specific health problem being addressed, (including, for example, HIV/AIDS, ma-

laria, or deaths during childbirth). Specialized, separate, vertical programmes allow central technical supervision to 'reach out' through self-contained vertical programmes. The advantage of this approach to delivering care is assumed to be that it can better assure the delivery of services within the particular programme. Vertical programmes, however, can also lead to service duplication, inefficiency and service fragmentation.

The WHO and organizations promote integration as a solution to such problems. Integration of primary health care is defined in this review as "a variety of managerial or operational changes to health systems to bring together inputs, delivery, management and organization of particular service functions." Integration aims, therefore, to improve service efficiency and quality, thereby maximizing the use of resources and opportunities. For example, a fully integrated primary health care unit should be expected to be able to be multi-functional: it should be able to cure people (using staff, procedures and drugs); deliver vaccines (with effective cold chains, immunization schedules and information systems to ensure coverage); and provide reproductive health services (requiring expertise in family planning methods, skills in advising people, treatment of sexually transmitted diseases and provision of effective follow up). Strategies to promote integration would ensure these services were managed together; that they would maximize efficiency, and that they would be delivered together, to increase service quality and opportunities the public have for accessing the service. Thus the main intended outcomes of integration are:

- Improved efficiency
- Increased quality of health services
- Better health status overall
- The potential to offer a wider range of services
- The reduction of differences in access and utilization levels of health services between geographical and socio-economic groups
- Increased convenience and satisfaction for users
- More sustainable health services

Integration, though may have unintended and unwanted outcomes such as:

- Overloaded or deskilled health workers
- Reduced ability and capacity to deliver specific technical services
- Services not achieving what is intended
- Decreased service quality
- Worse health outcomes
- Increased costs of service provision

In areas with weak public health systems, targeted, vertical programmes may have advantages if they can ensure the delivery of life-saving technologies. Integrated programmes associated with increased complexity may actually be less effective in delivering specific services.

Examples of integration include:

- Sexually transmitted disease treatment services integrated with family planning provision
- HIV education integrated with family planning
- Immunization programmes within primary care services

- TB programmes linked to HIV counselling and testing
- Integration of TB and leprosy control
- Antenatal care and maternal child health (MCH) clinics

Integration between specialist services is a concern for high-income countries with highly sophisticated levels of care, where the goal of integration is similar, but where the context is so different to poorer countries that findings are unlikely to be relevant. This review therefore excluded studies in high-income countries.

This review focuses on integration at the point of delivery. Some programmes, for example, such as those centred on nutrition may include an array of inputs, and while these may be thought of as ‘integrated nutrition programmes’ they may, in reality, simply be implemented as a single vertical programme with several activities. These are not considered strategies to promote integration. Others, like the WHO/UNICEF strategy Integrated Management of Childhood Illness (IMCI) began initially as an attempt to integrate case management care from a series of vertical programmes (in diarrhoeal disease control, acute respiratory tract infection, malaria and nutrition) but grew to encompass prevention through immunization, improved referral, and health education.

The packaging of enhanced primary child care services versus routine child care (IMCI)

Two studies included in this review evaluated IMCI compared with routine services. One was a cluster-randomized trial of 20 first level outpatient clinics and their catchment areas in Bangladesh. The study reported a number of improvements in health care delivery: an index of correct assessment increased from 18 to 73 in IMCI facilities over the period, and for correct treatment and counselling moved from 8 to 54, with control areas remaining low and similar to the baseline measures. Attendance also improved from 0.6 per child to 1.9 per child per year in the intervention area, as did the proportion of children taken to a health facility when sick (19% in the intervention and 9% in the control areas in the last survey carried out). The number of children with severe illness who used the facilities increased in the intervention areas, but not in the controls areas.

The second study was a controlled before-after investigation of two selected districts in Tanzania. It, too, reported improvements in health care delivery: more children attending health facilities were checked for cough, fever and diarrhoea and correctly classified. More supervisory visits to facilities occurred in the intervention group. The costs of child health care (which included some of the training costs of IMCI) were similar between the two groups. Child mortality was similar in the two areas at the start of the study, but fell in the IMCI group (a 13% reduction, with 95% CI of -7 to +30%).

Service add-on

A cluster randomized trial evaluated adding a concurrent family planning clinic for mothers attending expanded programme of immunization (EPI) clinics. The number of referrals to the contraceptive clinic increased with a consequent increase in the number of new acceptors. But a survey of desired birth interval showed no change associated with the intervention.

Integrated services versus single special services

A controlled before-after study in four selected districts in Nepal compared the family planning services provided through integrated primary preventive services (in two of the districts) with vertical programmes in the two other districts. Contraceptive use, knowledge of family, and the impact on infant mortality were measured. Knowledge of family planning was higher in the vertical programme group, but intention to use and the mean number of preferred children showed little difference. There was low overall use of contraceptives and a secular modest increase between 1975 and 1978; no differences were reported between the two modes of delivery. Infant mortality fell in both groups over the period of study, and was approximately the same in the two groups at follow up. The fall was higher in the vertical group, but this may be related to the higher baseline mortality within this group.

Summary

In summary, there are a number of strategies for integrating services, including the simple add-on of services, the integration of existing services, and implementation of packages of services. There is limited evidence of the effects of alternative strategies or comparisons between integrated and vertical approaches to delivering services. It is difficult to draw conclusions concerning the cost dimensions of integration from the studies included in this review. A broader review than this, that did not have such explicit selection criteria for the studies evaluated, reached similar conclusions and found “very few studies providing empirical evidence in this important area, and the overall quality of the studies was less than desirable.” [30]

IMCI appears to be a promising strategy for improving the delivery of interventions with the potential to reduce child mortality. IMCI comprises a ‘set of guidelines for integrated case management of the five most important causes of childhood deaths and common associated conditions in outpatient settings’. The strategy involves extensive training of health workers, and it has broadened its scope to include preventive activities (including vaccinations and nutrition monitoring). Further, IMCI has been rolled out in a variety of different ways in different countries and it has evolved over time. “Much more policy-relevant research is needed and should be conducted at country level, especially studies that focus on the effectiveness of policies and strategies implemented by Ministries of Health and their partners.” [31] This should include evaluation of interventions targeted at improving the quality of services in the private sector. Successful implementation of IMCI and improving the quality of services depends on bringing about change, which is addressed in the last section of this policy brief.

3. FINANCIAL ARRANGEMENTS

This policy brief focuses on five health financing options that have been proposed as means to improve access to health services for poor people or to reduce the financial burden represented by health care:

- **User fees** are charges levied for any aspect of health services at the point of delivery. It has been argued that the additional revenue they generate, directly, or indirectly through better allocation of resources, could be used to improve the quality and availability of government health services, and thus benefit the poor. Counter argu-

ments that advocate the removal of user fees as a mechanism to improve financial accessibility for the poor, have gained increasing currency during the last decade.

- **Community based health insurance (CBI)** is a form of voluntary, not-for-profit insurance mechanism that often involves some form of community management. The schemes are based on a collective entity that may be defined on a geographical, professional, or religious basis. CBI has been introduced as a means to increase revenue for health care, while reducing payments at point of use and allowing redistribution from the healthy to the sick.
- **Social health insurance (SHI)** is a form of compulsory insurance that aims to provide universal coverage. The compulsory nature of the scheme should reduce adverse selection and enable extensive redistributive mechanisms between healthy and sick people, as well as poor and better off groups.
- **Contracting out** consists of hiring a non-state provider (often an NGO) to provide health services for a specific geographic area and period of time, on behalf of the government. It has been supported as a more efficient way to provide health services, and an effective solution to increase available services in underserved areas.
- **Conditional cash transfers (CCT)** provide monetary transfers to households on the condition that they comply with some pre-defined requirements. CCT programmes have been justified on the grounds that demand side subsidies are necessary to address particular constraints of social services provision and effective social transfers for poor people.

User fees

17 studies were included in the systematic review. Many of these were seriously flawed. Reduction or removal of fees appears to increase utilization for poorer groups, although the level of evidence is weak. There was evidence that introducing or increasing user fees has a detrimental effect. However, some studies that improved the quality of care simultaneously found improved access and utilization for poorer groups. The studies that have demonstrated positive effects on utilization through combining user fees and quality improvements have been small-scale studies, whose replicability at the national level has proven difficult, particularly because the revenues raised by user fees are typically limited. There is also strong evidence that poorer groups are more sensitive to prices and that exemption policies are seldom well managed and effective enough to protect the poor from the detrimental effects of user fees.

Community-based insurance

Only one study on CBI met the inclusion criteria for the systematic review. Based on such limited evidence, it is not clear whether CBI could have a positive effect on access to care for poorer groups. Despite this, descriptive case studies have indicated that disadvantaged populations are less able to enrol in such schemes. These studies suggest that the technical skills required to design, implement and sustain CBIs limit their replicability. Finally, reviews of existing CBIs in low and middle-income countries have emphasized their limited size and a rather disappointing capacity to mobilize revenue.

Social health insurance

The review did not identify any studies meeting the inclusion criteria for this type of financing mechanism. There are few examples of social health insurance schemes operating at a large scale in developing countries and even less evidence on their impact.

However some experiences suggest that without careful design and social safety nets, developing social insurance may have negative impacts on equity. There are also attendant issues linked to the complexity of extending such SHI schemes to a national level as well as the feasibility of developing adequate technical capacity in developing country contexts.

Contracting out services

Three studies were included in the systematic review. All of them provided weak evidence that contracting out increases service delivery in previously under-served areas. Despite methodological weaknesses, a study in Cambodia showed that contracting out services increased access for poorer groups. Other descriptive literature on contracting out highlighted issues regarding the capacity of non-state providers to deliver services on a large scale if contracting out were to be scaled up. Concerns have also been raised about the implications of contracting out services for the integrity of the health system.

Conditional cash transfers

Good evidence from six different experiments of conditional cash transfers was synthesized in the review. Offering conditional cash transfers to targeted poor populations is an effective mechanism to increase uptake of preventive health services, and sometimes improve health status. However, the use of conditional cash transfers seems only relevant in settings where there is a functional primary health care system. There is also need for substantial management capacity in order to run CCT schemes.

Summary

This policy brief is limited in a number of ways. Specifically it focuses on a limited number of financing mechanisms, reviews primarily studies that employed specific study designs, and is restricted to evidence from low and middle-income countries. The brief is transparent in its approach and methodology, but it is not comprehensive in its scope. These reviews provide important information about what is and is not known about the effects of the included financial mechanisms. Policy makers though, when considering these options, may need additional information and complementary evidence about other alternative options such as the tax financing of a basic package of services and mixed approaches. For instance, case studies can enhance our understanding of implementation issues, and qualitative studies can provide information about people's attitudes to and experience of different financing mechanisms.

There remain substantial evidence gaps in the field of health financing. More high quality impact evaluations are needed, particularly for insurance mechanisms and contracting out. In addition other study designs that provide complementary evidence about implementation issues and people's attitudes are needed.

Specific issues that need to be considered when assessing the applicability of evidence on health financing mechanisms to different contexts include:

- The effectiveness with which the government exercises its stewardship role (for example the capacity of government to manage complex new financing schemes, identify the poor, and manage relations with donors). Local capacity, and in particular government capacity was identified as a critical factor determining the success of all

the five financing mechanisms reviewed, and underlined the complex nature of many of these schemes

- The level of development of the health system, and the overall accessibility and quality of services were identified as important for social health insurance and CCT schemes in particular, but also relevant to user fees and CBI. For contracting out, it is important to have a pool of possible bidders for contracts, but contracting may also work well in contexts where the public health system has badly deteriorated, provided governments retains a stewardship role
- The economic development of a country and especially levels of per capita income and participation in the formal labour market, appeared to be significantly important factors influencing the feasibility of social health insurance schemes
- The degree to which mechanisms for proposed new financing fit with existing values and societal attitudes was also seen as particularly important for user fees. It is also likely to be important for insurance schemes, although the nature of this relationship is not well understood

4. GOVERNANCE ARRANGEMENTS

The term 'governance' can be defined in several, sometimes overlapping, ways. Its use differs within the social sciences, especially between economics and political science.

Definitions of governance include:

- Rules, processes and behaviour that affect the way in which powers are exercised, particularly with regard to openness, participation, accountability, effectiveness and coherence
- The processes and systems by which an organization, society (or health system) operates
- The use of institutions, structures of authority or collaboration to allocate resources and coordinate or control activity in society, the economy and (in the case of this policy brief) the health system

The World Bank defines governance as the exercise of political authority and the use of institutional resources to manage society's problems and affairs. In general terms, governance occurs in three ways:

1. Through top-down methods that primarily involve governments and state bureaucracy,
2. The use of market mechanisms where market principles of competition are employed to allocate resources while operating under government regulation and
3. Through networks involving public-private partnerships or the collaboration of community organizations.

Within each of these approaches, many unique options should be evaluated. Questions that policy makers must address when considering issues of governance include:

- To what extent should responsibility for the management and delivery of health services be centralised or decentralized?

- To what extent should responsibility lie with the government, with private not-for-profit organizations and with private for-profit organizations?
- How should clinical governance be implemented and monitored to ensure accountability, quality of care and equitable access?
- And to what extent should governance structures be closed versus participatory?

In this policy brief we addressed one aspect of the last question listed above: what are the effects of involving the public or community members in developing healthcare policy? Although this is referred to as ‘consumer involvement’, this term is broad and includes patients, unpaid carers, users of health services and members of the public who are potential recipients of health promotion or public health programmes.

Consumer involvement

The potential benefits of consumer/citizen involvement include policies that include consumers’ ideas or addresses their concerns; policies that are more readily implemented; better health care; and better health. However, consumer participation can be viewed as a goal in itself given that it encourages participative democracy, public accountability and transparency. For example, the WHO’s Declaration of Alma Ata states that “people have the right and duty to participate individually and collectively in the planning and implementation of their health care.” [32]

Consumers may offer different and complementary perspectives to those of professionals. And they may also be free of the conflicts of interest and loyalties of professionals.

It is often assumed that input from consumers in planning of health care can lead to more accessible and acceptable health services, and improve health and quality of life [33]. But there is a lack of research that reliably investigates whether consumer involvement is, in fact, able to realize such claims and, if so, by which methods?

Consumer involvement in health care has also faced considerable resistance. Although most professionals are dedicated, they face challenging demands, are hierarchically socialized and are organized to view themselves as authorities. Involving consumers requires resources and involves challenges of:

- Deciding the degree of consumer involvement (none, consultation or collaboration)
- Identifying and involving consumers who will bring an appropriate spectrum of ideas, concerns and perspectives
- Establishing effective communication (e.g. meetings, interviews, written consultations);
- Deciding the extent of consumer involvement in decision making (e.g. either with no involvement or as committee members with implicit or explicit involvement (for example with voting rights)
- Providing training and support for consumer involvement; and
- Providing financial and practical support

Consumers may not find it meaningful to function as consumer representatives if opportunities for input and influence are minimized.

Comparative studies are needed to determine which methods are most effective for achieving consumer involvement and what the effects are of alternative degrees and methods of consumer involvement. There is a lack of such research that reliably investigates methods for overcoming barriers to consumer involvement. This systematic review found only one study in which three different methods of consulting consumers were compared. The study contrasted two forms of deliberative involvement (telephone discussion and face to face meetings) with a mailed survey in eliciting priorities for community health goals. Participants were members of community organizations in Canada. Due to a low response rate in the mailed survey group this group was not included in further comparisons. No indication was given as to whether or how the consumer priorities elicited did indeed inform community health goals. This study provided very low quality evidence of telephone discussions compared with face-to-face meetings affecting consumer priorities for community health goals, and had limited relevance to LMICs. In the context in which this study was undertaken, both methods of deliberative involvement appeared to achieve more participation than the mailed survey and both resulted in changes in the views of participants. No evidence was available as to whether consumers influenced decisions about policy.

Summary

There is a lack of evidence from comparative studies to inform decisions about desirable and adverse effects related to different ways of involving consumers/citizens in decisions about the management and delivery of health systems, as well as how to achieve more effective consumer involvement. While there is some evidence of the effectiveness of community mobilization and involvement in LMICs [34], this review found no studies from LMICs of alternative degrees or methods of consumer involvement in developing healthcare policy. Policy makers considering implementation strategies to ensure consumer involvement need to consider how to incorporate comparative evaluations of:

- Methods for recruiting consumers or promoting participation
- Degrees of involvement (the relationship between consumers and professionals)
- Forums for communication
- Degrees of consumer involvement in decision-making
- Ways of providing training and support
- Degrees of financial support

5. BRINGING ABOUT CHANGE

While some governments possess the authority to implement changes in health systems by decree, most rely on some combination of information and education targeted at health system users or health professionals. Financial or other incentives or disincentives targeted at individuals or organizations, and regulations with varying degrees of monitoring and enforcement are also used. Improvements in the quality of care are particularly important for achieving the MDGs for maternal and child mortality. In this section, we focus on an overview of systematic reviews of quality improvement (QI) strategies relevant to MCH in LMCI.

QI strategies

This overview included 17 reviews that focused on QI strategies, two reviews that included financial and reimbursements strategies, (such as provider incentives), and four that focused on strategies for the organization of care. The results of these studies are summarized in Appendix 13.

Effective interventions for reducing maternal and child mortality, such as those included in earlier sections of this policy brief are infrequently used in LMICs. Effective interventions to reduce neonatal mortality like the administration of antenatal steroids may be used in no more than 5% of preterm births [3]. It has been estimated that the implementation of already known interventions could reduce neonatal or child mortality by between 40 to 70% in LMICs [3, 4].

Decision makers in LMICs need access to evidence-based information related to the effects of alternative strategies in order to ensure that health care providers involved in maternal and child care administer beneficial preventive or therapeutic interventions, and that they do not waste resources on ineffective interventions. A variety of QI interventions (broadly defined as strategies to ensure delivery of effective services efficiently and equitably) can effectively be used to diffuse evidence-based practices among clinicians in high-income countries [35, 36 37]. However, little QI-related research has been undertaken in LMICs [38]. It is important therefore, to consider the applicability of the available evidence, most of which is conducted in high-income countries, rather than in LMICs. Approximately 50% of the births in LMICs occur at home, in rural areas, and frequently without skilled attendance. Ignoring facts such as these could result in the selection of inappropriate strategies, with the attendant risks of failing to deliver services to the mothers and children who need them most, and that of increasing health inequalities. Considerations of applicability, equity, scaling up, and key messages for policy makers are summarized in Appendix 14.

The superscript numbers in this section refer to the systematic reviews listed under “Systematic reviews of QI strategies” in the reference section.

Continuing education and quality improvement strategies

Distribution of educational materials

Passive distribution of printed educational or audiovisual materials were reported in six reviews that included 1-64 studies.^{1,4-8} Five reviews agreed that the strategy was ineffective to change professional practice, unless it was combined with other, more active strategies like interactive meetings or educational outreach visits. One review reported a median effect +8.1% (range +3.6 to +17.0) in the absolute improvement in performance regarding the implementation of guidelines.⁸

Audit and feedback

This strategy was reviewed in 10 reviews that included 2-64 studies. A recent Cochrane review focused exclusively on audit and feedback reported a small to moderate effect of audit and feedback alone.⁹ The adjusted risk difference ranged from -16% to 32% (median = 4%).

Reminders

This strategy was evaluated in seven reviews that included 3-92 studies.^{1,4,6-8,11,12} All reviews showed some degree of positive change (small to moderate changes) in improving professional practice. Only three reviews reported a quantitative size effect: one found absolute changes in post-intervention data varying between 5% and 24%; relative changes varied between 13% and 264%,⁴ one found an increase of preventive care performance 13.1% (95% CI 10.5%; 15.6%),¹⁰ and one found within 14 comparisons a median effect size +14.1% (range -1.0% to + 34.0%).⁸

Educational meetings

Planned educational activities (meetings, conferences, lectures, workshops, seminars, symposia, and courses) occurring off-site from practice settings have been considered in eight reviews including 3-129 studies.^{1,4-6,14,7,8} One – a Cochrane review – focused exclusively on educational meetings.¹⁵ Small to moderately large positive effects on professional practice were observed with active approaches (interactive workshops, small group sessions, tutorial sessions) within six reviews. Absolute improvements in the use of targeted behaviours ranged from approximately 1 to 30%. More passive approaches, like didactic sessions, conferences or lectures, did not show effects.

Local consensus processes (the inclusion of participating providers in discussion to ensure agreement that the chosen clinical problem is important and the approach to managing it appropriate) was reviewed in one review with 10 studies included.¹ The review concluded that the importance of local consensus processes is not clear in improving professional practice.

One review assessed problem based learning¹⁴. This took the form of tutor-facilitated, problem-based learning sessions in which

- A small, self directed group started with a brainstorming session
- A problem was posed to challenges existing group knowledge and experience
- Learnt goals were formulated by consensus and new information was learnt by self directed study
- The process ended with group discussion and evaluation

There was inconsistent evidence regarding the effectiveness of problem-based learning compared to other approaches.

Educational outreach visits.

Educational outreach programmes using trained personnel to meet with providers in their practice settings in order to provide information, were also described. In such programmes, the information given may include feedback on the provider's performance. Five reviews that included 1-11 studies were included.^{1,4-6,16} These all reported that educational outreach visits improved prescribing. It is unclear though if the strategy is effective for changing non-prescribing practices, such as clinical preventive services. An updated version of the Cochrane review of educational outreach visits (not yet published) found small positive effects for prescribing, variable effects for other behaviours, and provided little evidence of the cost-effectiveness of outreach interventions, which was reported as uncertain.¹⁶

Local opinion leaders

Local opinion leaders were reported in two reviews that included 10-28 studies.^{1, 17} Small absolute positive changes in professional practice were found (between 5 and 10%). One review reported a 7% median absolute improvement with the use of opinion leaders compared to no intervention (Adjusted absolute improvement in performance varied from -6% to +15%).

Patient mediated and mass media interventions

One review including 10 studies evaluated patient mediated interventions, in which the performance of health care providers was modified by information sought from or given directly to patients.¹ This intervention was found to be ineffective when implemented alone. However, one review that evaluating patient mediated interventions showed moderate to large effects with a median absolute effect of +20.8% (range +10.0 to +25.4%).⁸ Another (incorporating 20 studies) found that mass media interventions were effective in changing professional practice.¹⁸ Absolute improvements ranged from 0.1% to 13%.

Multifaceted interventions

Combinations of strategies included two or more of the following interventions: educational materials, educational meetings, outreach visits, local opinion leaders, patient mediated interventions, audit and feedback, office systems, and economic incentives. Multiple combinations were considered in 10 reviews that included 1-117 studies.^{1, 4-6, 8, 9, 12, 16, 17, 19} An absolute improvement in compliance with desired practice was found to range from 0.78 to 18.3 (median = 1.10).⁹ Multifaceted interventions to disseminate guidelines showed a modest to moderate improvement between 5% and 20%.⁸ The 10 reviews found positive changes in professional practice. It is unclear if multifaceted interventions were more effective compared to single interventions.^{8, 9, 17, 19} Two reviews using more explicit methods found that multifaceted interventions were no more effective than single interventions.^{8, 9}

Tailored interventions to overcome identified barriers to change

Two reviews, that included 18 studies, evaluated whether interventions tailored to address specified barriers to change in health providers can improve professional practice and health care outcomes.^{1, 20} Focus group discussions, surveys or interviews can be used to identify or diagnose the underlying reasons for gaps in quality. Theory-based or pragmatic approaches, too, can be used both to guide the exploration of the underlying problems and the design of interventions to address these. The results of the review, however, were not conclusive. The results from the pooling of six studies suggested that tailored interventions are effective (combined OR of 2.18 (1.09, 4.34), in favour of tailored interventions).²⁰ However, the effect of tailoring is uncertain because no direct comparisons of tailored versus untailored interventions were available.

Organizational interventions

One systematic review evaluating the integration of primary services (summarized in the section on delivery strategies above) included five studies. It found no consistent pattern of benefit.²¹ All five studies were conducted in developing countries and are relevant to MCH. IMCI appears to have promising effects, but it has been implemented differently in

different countries and limited evaluations were used of the training programmes or implementation strategies.

Another review evaluated organizational interventions and included two studies conducted in developed countries.⁸ One study assessed continuity of care in diabetes in primary care and showed a small effect (a +2.1% relative improvement). One review that included three studies found that booking appointments at longer time intervals was associated with an 88% increase in the number of patients tested.⁴ The review also found that screening by a nurse during a routine visit was more effective than a generic physician reminder (30% more patients treated). Another review including six studies showed that assistance from facilitators of nurses in the design and implementation of office routines and tools could increase screening uptake.⁶ A further review, that included eight trials, failed to find evidence that improving nursing record systems improved professional practice.²²

Financial interventions

Provider incentives

Use of fundholding in practices was evaluated in nine studies summarized in two reviews.^{5, 23} The intervention was found to be partly effective in improving professional practice in one of the reviews that included observational studies. In the other review, which included RCTs, only one study of six reported that financial incentives improved professional practices. There was insufficient evidence, therefore, to determine the effects of this strategy.

Potentially relevant strategies not covered in the included reviews

Training programmes in MCH essential care

The effective training of birth attendants and other healthcare providers for skills to manage critical moments and emergency situations in MCH care is relevant to improve professional practice and to reduce maternal and neonatal mortality and morbidity. Evidence-based basic essential obstetric care, management of acute obstetric complications, essential newborn care, and neonatal resuscitation, constitute the most relevant knowledge and skills that need to be targeted by training programmes, as most of the causes of maternal and perinatal deaths are related to those circumstances.

Training programmes can be conducted as interactive workshops for relatively small groups, using dummies, simulation models and drills. These strategies allow for:

- The introduction and discussion of clinical practice guidelines recommending best practices
- Learning and practising how to deliver preventive practices, the identification and treatment of complications, and
- The certification of health providers based on competency evaluation on the simulation models, before skills are applied to real patients.

These training workshops can also include plans and strategies to implement the promoted forms of care at the health care setting, including needed materials. Training workshops can also be designed to be replicable and scaled-up, using a train-the-trainers model.

These strategies are currently utilized in LMICs by WHO to offer training in essential newborn care [39]; by JHPIEGO and WHO to offer training in basic essential obstetric care [40]; and by several country paediatric scientific societies in neonatal resuscitation skill programmes [41]. However, rigorous published assessments of the effects of these programmes and formats on professional practice and health care outcomes are not available. The only systematic review we found included only training programmes in developed countries and reported no evaluations of the effects on professional practice or health outcomes. The neonatal resuscitation-training programme has been found to be effective to reduce neonatal mortality in some observational studies using historical controls [42, 43] and is currently under evaluation in an international collaborative trial ongoing in several LMICs [44].

Similarly, rigorous evaluations of training programmes for the implementation of IMCI are needed.

Regulatory interventions

Regulatory interventions are poorly evaluated, but may sometimes be both inexpensive and effective. For example, Fretheim and colleagues, when conducting research in Norway, found that a simple rule requiring the use of thiazides as first line treatment for newly diagnosed hypertension was more effective and less costly than a tailored intervention delivered using outreach visits [45]. However, the effectiveness of regulatory interventions is likely to vary considerably, depending on the context in which they are used, the behaviours which they target, and the use of penalties or rewards.

Summary

There are important gaps in the quality of care in all countries where this has been examined. In LMICs ensuring the delivery of effective MCH services to those who need them most is a major challenge. Passive dissemination strategies are unlikely to achieve change. Most active strategies that have been examined, including interactive educational meetings, outreach visits and the use of reminders, have the potential to achieve moderate changes in professional practice that are important. Tailored interventions, at least in theory, offer particular promise and there are logical arguments for tailoring interventions to address specific problems. However, there is uncertainty about how best to diagnose what the underlying problems are and how to select interventions that would be most effective to address specific problems. Regulatory strategies, as well as educational strategies are likely to play an important role, although there is limited evidence of their effects and, like other interventions, they can have unwanted effects. Financial incentives are also likely to play an important role, but have not been well evaluated, may be difficult to apply, or be costly and even have perverse effects. Organisational strategies are likely to play a critical role and warrant further evaluation.

Professional behaviours, like any other behaviour, are complex. There are no simple solutions to bringing about change, which often takes time and requires resources. Because the effects of most strategies is uncertain and most often cannot be expected to be large, rigorous evaluations are important.

In view of these findings, the following elements are likely to be important from a health systems perspective: stakeholder involvement; suitable methods for identifying priori-

ties for improvements; evidence-informed clinical practice guidelines; practical approaches to measuring and monitoring performance; thoughtful approaches to identifying the main determinants of practice and designing interventions to address identified barriers; and routine evaluation of QI efforts.

Discussion

An arsenal of effective interventions can be utilized to address the most important causes of maternal and child mortality in LMICs. The main challenge faced by policy makers is therefore finding appropriate health systems solutions in order to ensure that these services are delivered to the women and children who need them. The evidence provided in this policy brief can help to inform decisions about which interventions are most likely to have an impact. The evidence from the brief on lay health workers suggests that LHWs can play an important role and can contribute to a reduction in child mortality, although further evaluations are needed on how best to train and sustain LHWs; there is uncertainty, too, regarding the extent to which LHWs can be substituted for professionals.

There is little evidence either regarding integrated versus vertical organization of MCH services despite more than 40 years of debate on this topic. IMCI appears promising, but implementation strategies for IMCI require further evaluation.

While there are strong arguments for stakeholder involvement in developing health policies, there is little evidence about how best to involve consumers or communities in developing well-informed health policies and actions that are effective, efficient and equitable.

The strengths of this policy brief include its breadth, its focus on systematic reviews and the fact that it was prepared quickly. Its weaknesses lie in the fact that it has not addressed all the questions of importance within the broad scope that it covers. Despite its length, it has only explored those questions for which systematic reviews could be found, and has been unable to incorporate additional relevant evidence that was not included in systematic reviews, or material for which up-to-date reviews could not be found. It also has focused on questions about the effects of different interventions or policies and has not incorporated other types of relevant evidence, such as process evaluations to address questions regarding why particular interventions may or may not work, or what factors can impact on its effects.

WELL-INFORMED DECISIONS AND ACTIONS REQUIRE RELIABLE EVIDENCE

This policy brief has an unusually wide scope and has attempted to summarize the findings of a large number of systematic reviews relative to the full range of decisions that policy makers must make about MCH services in LMICs. On the one hand, the amount of information that is summarized is overwhelming. On other hand, there are striking gaps, including important questions that have not been addressed, questions for which no systematic reviews could be found, and questions for which systematic reviews found insufficient evidence to answer the questions they addressed.

Key general messages from this broad overview are:

- **Beware of dogma!** There are advocates for many of the policy options considered in this brief, as well as other policy options. Before committing scarce public resources to implementing new policies, it is important to examine the extent to which they are supported by the results of reliable impact evaluations. All too often this evidence is lacking. This was the case for most of the financial mechanisms considered in this brief and all methods for involving consumers/citizens in policy making
- **Evaluate!** Decisions must still be taken, but policy makers are accountable to those they serve for the decisions that they make on their behalf: they have an obligation to ensure that they use public resources well. When there is important uncertainty about how to do this, as is the case for many policy decisions, consideration should be given to evaluating the impacts of those decisions to ensure that intended outcomes are achieved and that there are no unwanted outcomes. These evaluations should be designed to ensure that the results are reliable and useful, both in the countries where they are undertaken and to others

While it is important for policy makers to scan broad areas such as MCH to identify what the most pressing problems and policy issues are, preparing a brief such as this one is demanding. Even with resources, it cannot be done both quickly and well. This and many other areas of importance to health in LMICs are evolving rapidly.

Often it is important to focus on specific policy decisions rather than scan a broad area. Generally, there are limited resources and time to access the relevant evidence needed to inform policy decisions. International organizations such as the Cochrane Collaboration, the Campbell Collaboration, the Alliance for Health Policy and Systems Research and the World Health Organization, all of whom have an important role in helping to ensuring that relevant evidence for important questions is systematically and concisely summarized and kept up-to-date.

- More work is needed to ensure that systematic reviews are available to inform important decisions that policy makers in LMICs must make, and to fill in the gaps in this policy brief
- These reviews need to be summarized in formats useful to policy makers and made available in ways that they can be easily accessed when they are needed. More work is needed to learn how best to do this
- Policy makers and researchers in different countries need to ensure that they have the capacity and suitable organizational arrangements to access this evidence and

interpret it in their own context. Together with local evidence, this will form the basis of well-informed actions to achieve the MDGs and other health goals

As Iain Chalmers has said: “Professional good intentions and plausible theories are insufficient for selecting policies and practices for protecting, promoting and restoring health. Humility and uncertainty are preconditions for unbiased assessments of the effects of the prescriptions and proscriptions of policy makers and practitioners for other people. We will serve the public more responsibly and ethically when research designed to reduce the likelihood that we will be misled by bias and the play of chance has become an expected element of professional and policy making practice, not an optional add-on.”

Both policy makers and researchers must continue struggling to ensure that judgments about health policies are well informed by research evidence. The alternative is to acquiesce to poorly informed health policies [46].

Appendix 1. Contributors

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Appendix 2. Overview of systematic reviews of interventions to reduce maternal mortality

This appendix is available at <http://www.who.int/rpc/meetings/ideahealth/en/>.

Appendix 3. Overview of systematic reviews of interventions to reduce child mortality

This appendix is available at <http://www.who.int/rpc/meetings/ideahealth/en/>.

Appendix 4. Overview of interventions to prevent mother-to-child transmission of HIV

This appendix is available at <http://www.who.int/rpc/meetings/ideahealth/en/>.

Appendix 5. Systematic review of trials of lay health workers

Attached.

Appendix 6. Systematic review of strategies for integrating primary health services

This appendix is available at <http://www.who.int/rpc/meetings/ideahealth/en/>.

Appendix 7. Health financing policy brief

This appendix is available at <http://www.who.int/rpc/meetings/ideahealth/en/>.

Appendix 8. Systematic review of consumer involvement in developing healthcare policy

This appendix is available at <http://www.who.int/rpc/meetings/ideahealth/en/>.

Appendix 9. Overview of systematic reviews of QI strategies

This appendix is available at <http://www.who.int/rpc/meetings/ideahealth/en/>.

Appendix 10. Interventions that can have an impact on maternal mortality

Intervention	Included in					Does the intervention reduce maternal mortality?	Does the intervention reduce an important cause of maternal mortality?	Cause(s) of mortality	Comments
	RHL-beneficial list*	RHL - likely to be beneficial list*	Lancet maternal survival series*	CHOICE*	IMPAC*				
Antenatal									
Antibiotic regimens for management of intra-amniotic infection	No	Yes	Yes	Yes	Yes	Mortality not reported, but important cause of mortality assessed	?	Septic shock, endometritis	[20] Might also have an impact on neonatal mortality.
Antibiotics for preterm rupture of membranes	Yes	No	Yes	Yes	Yes	Reported mortality but the effect was not estimable	Yes	Chorioamnionitis	[11]
Antimalarial drugs during pregnancy	Yes	Yes	Yes	No	Yes	Mortality not reported, but important cause of mortality assessed	Yes	Severe anaemia	[8] Only 1 trial assessed maternal mortality and included relatively few events. Might also have an impact on neonatal mortality.
External cephalic version for breech presentation at term	Yes	No	Yes	Yes	Yes	Included mortality as an outcome of interest but no results reported on mortality	Yes	All causes, especially due to effects of prolonged labour	[9]

Intervention	Included in					Does the intervention reduce maternal mortality?	Does the intervention reduce an important cause of maternal mortality?	Cause(s) of mortality	Comments
	RHL-beneficial list*	RHL - likely to be beneficial list*	Lancet maternal survival series*	CHOICE*	IMPAC*				
Iron supplementation with or without folic acid supplementation	Yes	No	Yes	No	Yes	Measured mortality but the effect was not estimable	Yes	All causes, especially related to effects of anaemia from blood loss	[14]
Magnesium sulphate for pre-eclampsia	Yes	No	Yes	Yes	Yes	Yes	Yes	Convulsions, haemorrhage	[2]
Reduced number of antenatal care visits with specific activities for low-risk pregnancy	Yes	No	No	No	No	Included mortality as an outcome of interest but no results reported on mortality	Yes	All intrapartum related causes	[18] Lower cost intervention and may improve outcomes compared to a higher number of visits without specific activities. May prepare the patient to prevent other causes of morbidity and mortality and to deliver under safer settings with a skilled birth attendant.
Intrapartum									
Active versus expectant management in the third stage of labour	Yes	No	Yes	Yes	Yes	Included mortality as an outcome of interest but no results reported on mortality	Yes	All intrapartum related causes of bleeding	[15]
Antibiotic prophylaxis for caesarean section	Yes	No	Yes	No	No	Included mortality as an outcome of interest but no results reported on mortality	Yes	Sepsis	[16] Might have an impact on preterm birth.

Intervention	Included in					Does the intervention reduce maternal mortality?	Does the intervention reduce an important cause of maternal mortality?	Cause(s) of mortality	Comments
	RHL-beneficial list*	RHL - likely to be beneficial list*	Lancet maternal survival series*	CHOICE*	IMPAC*				
Antibiotic prophylaxis to prevent infectious morbidity 1	Yes	No	No	No	No	Measured mortality but the effect was not estimable	Yes	Puerperal sepsis and postpartum endometritis	[17]
Magnesium sulphate versus diazepam for eclampsia	Yes	No	Yes	Yes	Yes	Yes	Yes	Convulsions, haemorrhage	[4]
Magnesium sulphate versus lytic cocktail for eclampsia	Yes	No	Yes	Yes	Yes	Not a statistically significant effect	Yes	Convulsions, haemorrhage	[3]
Magnesium sulphate versus phenytoin for eclampsia	Yes	No	Yes	Yes	Yes	Large (RR=0.50) but not statistically significant effect	Yes	Convulsions, haemorrhage	[5]
Normal delivery by skilled attendant	No	No	Yes	Yes	Yes	Measured mortality but the effect was not estimable	Yes	All causes	[19]
Surgical procedures to evacuate incomplete abortion	Yes	Yes	Yes	Yes	Yes	Mortality not reported, but important cause of mortality assessed	Yes	Reduction of bleeding, infections and related complications	[6]
Umbilical vein injection for management of retained placenta	Yes	No	Yes	No	Yes	Mortality not reported, but important cause of mortality assessed	Yes	Manual removal of placenta, haemorrhage	[1] Statistically significant only for saline plus oxytocin versus saline.

Intervention	Included in					Does the intervention reduce maternal mortality?	Does the intervention reduce an important cause of maternal mortality?	Cause(s) of mortality	Comments
	RHL-beneficial list*	RHL - likely to be beneficial list*	Lancet maternal survival series*	CHOICE*	IMPAC*				
Vacuum extraction versus forceps for assisted vaginal delivery	No	Yes	No	Yes	Yes	Mortality not reported, but important cause of mortality assessed	Yes	Caesarean section, serious maternal morbidity due to injuries	[10] The review compares alternative treatments. Might have an impact on perinatal death.
Postpartum									
Treatment for primary postpartum haemorrhage	Yes	Yes	Yes	Yes	Yes	Measured mortality but the effect was not estimable	Yes	Haemorrhage	[13] The review compares alternative treatments. There is no strong evidence regarding which treatment is best. Misoprostol is better than oxytocin in reducing persistent haemorrhage.

*RHL= WHO Reproductive Health Library, Lancet maternal survival series=reference [4], CHOICE='WHO choosing interventions that are cost effective project' [11], IMPAC=Integrated Management of Pregnancy and Childbirth [12].

Appendix 11. Interventions that can have an impact on child mortality

Intervention	Bellagio Child Survival Study Group*	Bryce et al.*	Lancet Neonatal Survival Steering Team*	Countdown to 2015*	CHOICE*	Does the intervention reduce child mortality? (Quality of the evidence)	Does the intervention reduce an important cause of child mortality? (Quality of the evidence)	Comments
Pregnancy and childbirth								
Antenatal corticosteroids in preterm delivery	Yes	Yes	Yes	No	Yes	Yes ⊕⊕⊕○ Moderate	Yes ⊕⊕⊕○/⊕⊕⊕⊕ Moderate-High	[9] Reduction in foetal and neonatal mortality, respiratory distress syndrome, chronic lung disease and length of hospitalisation.
Antibiotics for premature rupture of membranes	Yes	Yes	Yes	No	No	Insufficient evidence ⊕⊕⊕○ Moderate	Yes ⊕⊕⊕⊕ High	[10] No evidence of reduction in perinatal death. Statistically significant reduction in neonatal infection, including pneumonia. See overview of interventions to reduce maternal mortality.
Antimalarial intermittent preventive treatment in pregnancy	Yes	Yes	Yes	No	No	Yes ⊕⊕○○ Low	Yes ⊕⊕○○ Low	[11] Reduction in perinatal deaths and low birth weight babies for women in first or second pregnancy. See overview of interventions to reduce maternal mortality.
Birth spacing	No	No	Yes	No	No	-	-	[24] Unclear association between birth spacing and the risk of foetal or early neonatal death.
Clean delivery	Yes	Yes	Yes	No	No	SR not found	SR not found	
Delayed umbilical cord clamping	No	No	No	No	No	-	-	[33] Studies too small to determine impact.
Maternal antihelminthic treatment	No	No	Yes	No	No	SR not found	SR not found	
Newborn resuscitation	Yes	Yes	Yes	No	No	SR not found	SR not found	

Intervention	Bellagio Child Survival Study Group*	Bryce et al.*	Lancet Neonatal Survival Steering Team*	Countdown to 2015*	CHOICE*	Does the intervention reduce child mortality? (Quality of the evidence)	Does the intervention reduce an important cause of child mortality? (Quality of the evidence)	Comments
Newborn temperature management	Yes	Yes	Yes	No	No	SR not found	SR not found	[29] See Kangaroo mother care+.
Postnatal visit within three days of delivery	No	No	No	Yes	No	SR not found	SR not found	
Prevention of mother-to-child transmission (MTCT) of HIV	No	No	Yes	Yes	No	-	Yes ⊕⊕⊕⊕ High	[25] Reduction in MTCT with zidovudine compared to placebo; a long compared to a short course; nevirapine compared to zidovudine; combination compared to monotherapy; and avoidance of breastfeeding. Low quality evidence of reduction in MTCT with caesarean section compared to vaginal delivery. See overview of interventions to reduce MTCT of HIV.
Kangaroo mother Care+	?	?	?	?	?	Insufficient evidence ⊕○○○ Very low	Insufficient evidence ⊕○○○ Very low	[29] Possible reduction in infant mortality, nosocomial infection, severe illness and lower respiratory tract disease.
Nutrition								
Breastfeeding and HIV	No	No	No	No	No	-	-	See overview of interventions to prevent MTCT of HIV.
Breastfeeding plus complementary food at 6-9 months of age	Yes	No	Yes	Yes	No	-	Insufficient evidence ⊕○○○ Very low	[1] No data on mortality. Not possible to estimate effect on growth due to sparse data.
Complementary feeding	Yes	Yes	Yes	No	Yes	-	-	[3] No firm conclusions about the effects of community-based supplementary feeding. Mortality was not assessed in this review.

Intervention	Bellagio Child Survival Study Group*	Bryce et al.*	Lancet Neonatal Survival Steering Team*	Countdown to 2015*	CHOICE*	Does the intervention reduce child mortality? (Quality of the evidence)	Does the intervention reduce an important cause of child mortality? (Quality of the evidence)	Comments
Exclusive breastfeeding for six months	Yes	Yes	Yes	Yes	No	-	Yes ⊕⊕○○/⊕⊕⊕○ Low-Moderate	[1] No data on mortality. Improvement in growth; reduction in days with fever or diarrhoea.
Extended breast feeding till 20-23 months	No	No	No	Yes	No	-	-	[30] Pooled data from five countries suggests statistically non-significant trend towards reduction in overall mortality.
Population based iodine supplementation	No	No	Yes	No	No	-	-	[22] Only one small study reported on mortality.
Routine iron and folate during pregnancy	No	No	Yes	No	No	-	-	[23] Only two small studies, not possible to estimate effect on mortality.
Timely initiation of breastfeeding	Yes	Yes	Yes	Yes	No	SR not found	SR not found	
Vitamin A supplementation	Yes	Yes	Yes	Yes	Yes			[7, 17, 18] See vitamin A for treatment of measles and non-measles pneumonia. Review of vitamin A for low birth weight babies not yet appraised.
Prevention – diarrhoea								
Interventions to improve water quality and sanitation	Yes	Yes	Yes	Yes	No	Promising ⊕○○○ Very low	Yes ⊕⊕⊕⊕ High	[6] Reduction in all cause and disease specific (diarrhoea) mortality and diarrhoea.
Prevention – malaria								
Chemoprophylaxis or intermittent treatment against malaria	Yes	Yes	Yes	No	No	Promising ⊕⊕⊕⊕ High	Yes ⊕⊕⊕⊕ High	[2] Statistically non-significant trend towards reduction in all cause mortality; statistically significant reductions in clinical malaria, severe anaemia and hospital admission

Intervention	Bellagio Child Survival Study Group*	Bryce et al.*	Lancet Neonatal Survival Steering Team*	Countdown to 2015*	CHOICE*	Does the intervention reduce child mortality? (Quality of the evidence)	Does the intervention reduce an important cause of child mortality? (Quality of the evidence)	Comments
Insecticide-treated bed nets	Yes	Yes	Yes	Yes	No	Yes ⊕⊕⊕○ Moderate	Yes ⊕⊕⊕○ Moderate	[4] Reduction in all cause mortality and severe disease.
Immunizations								
Diphtheria Polio Tetanus (DTP) immunization	No	No	No	Yes	No	-	-	[5] Impact on overall mortality not assessed. Main focus was on adverse effects of DTP vaccine.
Haemophilus influenza b immunization	Yes	Yes	Yes	Yes	No	Promising ⊕⊕⊕○ Moderate	Yes ⊕⊕⊕⊕ High	[19] Statistically non-significant trend towards a reduction in disease specific mortality; no evidence of a reduction in all cause mortality; reduction in invasive Haemophilus influenza b disease.
Hepatitis B vaccination and immunoprophylaxis	No	No	Yes	No	No	SR not found	SR not found	
Malaria vaccine	No	No	No	No	No	-	Promising	[34–36] Not yet licensed.
Measles immunization	Yes	Yes	No	Yes	No	Promising ⊕○○○ Very low	-	[5] Reduction in all cause mortality, and mortality following measles.
Tetanus toxoid	Yes	Yes	Yes	Yes	No	Yes ⊕⊕⊕○ Moderate	Yes ⊕⊕⊕○ Moderate	[20] Reduction in all cause mortality up to five years of age, neonatal deaths, tetanus deaths and neonatal tetanus cases. Absolute benefits depend on risk of neonatal tetanus.
Infectious disease management								
Antibiotic treatment for pneumonia – oral versus parenteral	Yes	Yes	No	Yes	No	-	-	[12] Moderate quality evidence of no significant difference in mortality between oral amoxicillin and intravenous penicillin for severe pneumonia.

Intervention	Bellagio Child Survival Study Group*	Bryce et al.*	Lancet Neonatal Survival Steering Team*	Countdown to 2015*	CHOICE*	Does the intervention reduce child mortality? (Quality of the evidence)	Does the intervention reduce an important cause of child mortality? (Quality of the evidence)	Comments
Comparisons of different antibiotics for community acquired pneumonia	Yes	Yes	Yes	Yes	No	-	Insufficient evidence ⊕○○○/⊕⊕⊕○ Very low-Moderate	[13] Few studies (three trials). Insufficient evidence to determine whether there are important differences in effects.
Antibiotics for dysentery	Yes	Yes	Yes	No	No	SR not found	SR not found	
Antibiotics for sepsis	Yes	Yes	Yes	No	No	-	-	[14] Low quality evidence of no difference in mortality between mono-therapy and combination therapy.
Antimalarial treatment for fever	No	No	No	Yes	No	SR not found	SR not found	
Case management of pneumonia	No	No	No	Yes	No	Yes	-	[28] Reduces all cause and pneumonia specific mortality for children under four years of age
Care-seeking for pneumonia	No	No	No	Yes	No	SR not found	SR not found	
Hypo-osmolar oral rehydration therapy	Yes	Yes	No	Yes	No	-	-	[15] See oral versus IV rehydration therapy. [16] Impact on mortality not assessed. Data from two studies included no deaths in either treatment or intervention group.
Oral versus intravenous (IV) rehydration therapy for diarrhoea	Yes	Yes	No	Yes	Yes	-	Yes ⊕○○○/⊕⊕⊕○ Very low-Moderate	[16] A small increase in treatment failures (1 of 25 requiring IV rehydration); no evidence of increased mortality or duration of diarrhoea. Reduction in hospital stays.
Vitamin A for treating measles	Yes	?	Yes	No	No	Yes ⊕⊕⊕○ Moderate	-	[18] Reduction in all cause and pneumonia specific mortality in children under 2, receiving 2 large consecutive doses of Vitamin A.

Intervention	Bellagio Child Survival Study Group*	Bryce et al.*	Lancet Neonatal Survival Steering Team*	Countdown to 2015*	CHOICE*	Does the intervention reduce child mortality? (Quality of the evidence)	Does the intervention reduce an important cause of child mortality? (Quality of the evidence)	Comments
Vitamin A for non-measles pneumonia	Yes	Yes	No	No	No	Not promising ⊕⊕⊕○ Moderate	Not promising ⊕⊕○○ Low	[17] No evidence of a reduction in mortality or length of stay in hospital.
Zinc supplementary therapy for diarrhoea	Yes	Yes	Yes	Yes	Yes	Yes ⊕⊕⊕⊕ High	Yes ⊕⊕⊕⊕ High	[8] Reduction in treatment failure or death as a combined outcome, continuation of diarrhoea and mean duration of diarrhoea.

*Bellagio Child Survival Study Group=reference [3], Bryce et al.=reference [13], Lancet Neonatal Survival Steering Team=reference [14], Countdown to 2015=reference [15], CHOICE='WHO Choosing Interventions that are cost-effective', reference [16].

SR=systematic review.

+Kangaroo mother care is defined as skin-to-skin contact between a mother and her newborn, frequent and exclusive or nearly exclusive breastfeeding, and early discharge from hospital. It has been proposed as an alternative to conventional neonatal care for low birth weight infants.

Appendix 12. Additional evidence relevant to interventions to reduce child mortality

We gratefully acknowledge Prof Zulfiqar Bhutta for the following comments regarding interventions to reduce child mortality. Although some of these comments refer to an earlier version of the list of interventions that can reduce child mortality, these comments highlight the challenges of organising information in a way that is sensible for policy makers; keeping up with a rapidly developing field in ways that are both systematic, to reduce the chances of being misled by chance or bias, and at the same time up-to-date; and the need for international collaboration to do this as effectively and efficiently as possible.

It is difficult to separate out maternal and child health related systematic reviews from those of lay workers and primary health services, especially as so much emphasis in recent series has been placed on community and outreach strategies. Secondly, as you may know, I have long expressed my concern that the current format of Cochrane reviews firstly does not entirely reflect evidence for child health and survival interventions that are of relevance to developing countries for the following reasons

1. Few reviews disaggregate developing and developed country data as well as true community data from that derived from facility settings. This makes it very difficult to granularize findings, as the context in many studies is so different. While this is being gradually sorted out in recent reviews and updates, it remains an issue
2. The number of systematic reviews of relevance to major killers of newborns and children are woefully limited, especially from effectiveness studies. For greater discussion of this please see Bhutta et al. (Pediatrics 2005).
3. Increasingly, with recognition of the importance of health systems in delivery strategies, it is no longer enough to merely state the intervention as a “commodity” as the delivery strategy is the critical element. Thus while early and exclusive breastfeeding may be the intervention, the key issue is the mechanism to make this happen (BCC strategies, peer counselling, support groups etc).

Notwithstanding the above, this is a very useful effort and collation of work. In general I found the interventions reviewed for child mortality true to the sources used (the Lancet series and the Countdown and CHOICE permutations). However, this is a very dynamic field and much is in progress that your group should be aware of

1. As part of the forthcoming Lancet series on maternal and child undernutrition (early 2007) a comprehensive review of interventions that impact nutrition and disease burden reduction has just been concluded (funded by the World Bank). This review has updated many interventions, disaggregated them by age groups and location and will be available in the first quarter of 2007. My group has led the process and some of my comments may stem from the knowledge of this process.
2. There is also an effort underway to look at integrated community-based interventions that impact maternal and newborn outcomes. This data will be available in early 2007 as well.
3. Some additional reviews related to diarrhoea management in children (Miller et al.) and respiratory care in children have just been concluded and may be available very soon.

My specific comments regarding interventions that should be added to the list and identification of other systematic reviews for relevant interventions include

- 1. Evidence of the impact of community support groups on newborn and maternal outcomes**
 - i. Manandhar DS, Osrin D, Shrestha BP, Mesko N, Morrison J, Tumbahangphe KM, Tamang S, Thapa S, Shrestha D, Thapa B, Shrestha JR, Wade A, Borghi J, Standing H, Manandhar M, Costello AM; Members of the MIRA Makwanpur trial team. Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial. *Lancet*. 2004;364:970-9.
 - ii. Costello A, Azad K, Barnett S. An alternative strategy to reduce maternal mortality. *Lancet*. 2006;368:1477-9
 - iii. Rosato M, Mwansambo CW, Kazembe PN, Phiri T, Soko QS, Lewycka S, Kunyenge BE, Vergnano S, Osrin D, Newell ML, Costello AM. Women's groups' perceptions of maternal health issues in rural Malawi. *Lancet*. 2006;368:1180-8
- 2. Delayed cord clamping (updated review available including)**
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- 3. Early introduction of breastfeeding (day 1)**
 - i. Edmond KM, Zandoh C, Quigley MA, Amenga-Etego S, Owusu-Agyei S, Kirkwood BR. Delayed breastfeeding initiation increases risk of neonatal mortality. *Pediatrics*. 2006;117:e380-6
- 4. Kangaroo mother care in community settings**
 - i. Sloan et al. (Bangladesh) data forthcoming
 - ii. Darmstadt et al. (Shivgarh) data forthcoming
- 5. Hand washing strategies**
 - i. Luby SP, Agboatwalla M, Feikin DR, Painter J, Billhimer W, Altaf A, Hoekstra RM. Effect of hand washing on child health: a randomised controlled trial. *Lancet*. 2005;366:225-33.
 - ii. Fewtrell L, Kaufmann RB, Kay D, Enanoria W, Haller L, and Colford Jr JM. Water, sanitation, and hygiene interventions to reduce diarrhea in less developed countries: a systematic review and meta-analysis. *Lancet Infect Dis* 2005; 5: 42-52
- 6. Treatment of severe acute malnutrition in community settings**

- i. Prudhon C, Prinzo ZW, Briend A, Daelmans BM, Mason JB. Proceedings of the WHO, UNICEF, and SCN Informal Consultation on Community-Based Management of Severe Malnutrition in Children. *Food Nutr Bull.* 2006;27:S99-104.

7. Probiotics for diarrhea (another promising intervention)

- i. Sazawal S, Hiremath G, Dhingra U, Malik P, Deb S, Black RE. Efficacy of probiotics in prevention of acute diarrhoea: a meta-analysis of masked, randomised, placebo-controlled trials. *Lancet Infect Dis.* 2006;6:374-82

I was surprised to see the comments pertaining to *Hemophilus influenzae* type B vaccination. The evidence for its effectiveness is strong (certainly in Africa)

Cowgill KD, Ndiritu M, Nyiro J, Slack MP, Chipchasi S, Ismail A, Kamau T, Mwangi I, English M, Newton CR, Feikin DR, Scott JA. Effectiveness of *Haemophilus influenzae* type b Conjugate vaccine introduction into routine childhood immunization in Kenya. *JAMA.* 2006;296:671-8.

In fact many would argue now for potential inclusion of Rotavirus and pneumococcal vaccines (if costs were not an issue, but they need to be flagged as potential life saving interventions now)

Whitney CG, Pilishvili T, Farley MM, Schaffner W, Craig AS, Lynfield R, Nyquist AC, Gershman KA, Vazquez M, Bennett NM, Reingold A, Thomas A, Glode MP, Zell ER, Jorgensen JH, Beall B, Schuchat A. Effectiveness of seven-valent pneumococcal conjugate vaccine against invasive pneumococcal disease: a matched case-control study. *Lancet.* 2006;368:1495-502

O'Brien KL, Levine OS. Effectiveness of pneumococcal conjugate vaccine. *Lancet.* 2006;368:1469-70.

I could not find the review of community management of pneumonia by Sazawal et al in your list as the issue of community management of non severe and severe pneumonia has received a lot of attention recently

Sazawal S, Black RE; Pneumonia Case Management Trials Group. Effect of pneumonia case management on mortality in neonates, infants, and pre-school children: a meta-analysis of community-based trials. *Lancet Infect Dis.* 2003;3:547-56.

The evidence for the superior effectiveness of combination anti-malarial therapy has been shown in several recent studies and perhaps we can now specify what we mean by evidence for antimalarials in children in anti-malarial resistant settings

Smithuis F, Kyaw MK, Phe O, Aye KZ, Htet L, Barends M, Lindegardh N, Singtoroj T, Ashley E, Lwin S, Stepniewska K, White NJ. Efficacy and effectiveness of dihydroartemisinin-piperaquine versus artesunate-mefloquine in falciparum malaria: an open-label randomized comparison. *Lancet.* 2006;367:2075-85

Appendix 13. Summary of findings for QI strategies

Continuing education and quality assurance

Intervention	Description	Targeted health-care providers	Number of reviews (range of studies included in the reviews)	Review Quality	Observed Results			Comments
					Professional practice	Health-care outcomes	Compared to other single strategies?	
Distribution of educational materials	Passive distribution of printed or audiovisual educational materials	Any health-care provider (2 reviews), primary care health providers (4 reviews)	6 reviews (1 – 28 studies)	4.5 – 6	Mostly ineffective (4 reviews) or modest effect (1 review). Median effect +8.1% absolute improvement in performance (range +3.6 to +17.0)	No statistically significant differences (1 review)	Not compared (5 reviews). Less effective (1 review)	Usually ineffective unless combined with other strategies
Audit and feedback	Any summary of clinical performance of health-care over a specified period of time. The summary may also include recommendations for clinical action. The information may be given in a written, electronic or verbal format.	Any type of health-care professionals responsible for patient care	10 reviews (2 – 51 studies)	Median 5 (range 4.5 – 6)	Small to moderate positive effects reported in the 9 reviews. Not effective in 1 review. The magnitude of the effect varied from –17% to +49% change.	No statistically significant differences (1 review)	Less effective than reminders (2 reviews) and opinion leaders (1 review). More effective than incentives (1 review). As effective as patient education, self-study education and practice-based education (1 review).	–
Reminders	Any intervention (manual or computerized) that prompts the provider to perform a clinical action.	All type of providers	7 reviews (3 – 52 studies)	4.5 – 6	All reviews showed some degree of positive change (small to moderate changes). The effect size range from –1.0% to +34.0%	No statistically significant differences in most studies (1 review)	Equally effective as giving the patient a handout and a questionnaire about her or his current preventive care status (1 review)	–

Intervention	Description	Targeted health-care providers	Number of reviews (range of studies included in the reviews)	Review Quality	Observed Results			Comments
					Professional practice	Health-care outcomes	Compared to other single strategies?	
Educational meetings	Planned educational activities: meetings, conferences, lectures, workshops, seminars, symposia, and courses that occurred off-site from the practice setting.	All types of health-care providers	7 reviews (3 – 45 studies)	4.5– 6	Small to moderately large effects (absolute change 1% – 30%) observed in the 5 reviews with active approaches (interactive workshops, small group sessions, tutorial sessions). More passive approaches (didactic sessions like conferences or lectures) did not show effects.	Unclear. Only one study in one review showed beneficial effects in asthma symptoms in children.	Less effective than multifaceted strategies that included education meetings as one component (3 reviews). Two reviews did not report such comparisons.	–
Local consensus processes	Inclusion of participating providers in discussion to ensure agreement that the chosen clinical problem is important and the approach to managing it appropriate.	All type of health csare providers	1 review (10 studies)	5.5	No evidence of effectiveness	–	Not reported	–

Intervention	Description	Targeted health-care providers	Number of reviews (range of studies included in the reviews)	Review Quality	Observed Results			Comments
					Professional practice	Health-care outcomes	Compared to other single strategies?	
Problem-based learning in continuing medical education	Tutor facilitated, problem-based learning session in which a small, self-directed group starts with a brainstorming session. A problem is posed that challenges their knowledge and experience. Learning goals are formulated by consensus and new information is learnt by self-directed study. It ends with a group discussion and evaluation.	General practitioners	1 review (6 studies)	4.5	Not effective	Unclear	More effective than lectures	–
Education outreach visits	Use of a trained person who meets with providers in their practice settings to provide information. The information given may include feedback on the provider's performance.	All types of health-care providers	5 reviews (1 – 8 studies)	4.5 – 6	Effective for prescribing (50% of relative improvement in one study). Unclear if effective for preventive services.	Unclear	Outreach visits are more effective than audit and feedback (1 review).	–
Local opinion leaders	Those health providers perceived by their colleagues as "educationally influential"	Health-care professionals in charge of patient care	2 reviews (8 – 12 studies)	5.5	Likely to produce small positive changes (ARD varied from –0.06 (favours control group) to +0.12 (favours intervention)).	–	Shown to be more effective than feedback or didactic educational meetings.	–

Intervention	Description	Targeted health-care providers	Number of reviews (range of studies included in the reviews)	Review Quality	Observed Results			Comments
					Professional practice	Health-care outcomes	Compared to other single strategies?	
Patient-mediated interventions	Any interventions aimed at changing the performance of health-care providers for which information was sought from or given directly to patients by others.	All types of health-care providers	2 reviews (7 – 10 studies)	5.5 – 6	Not effective when implemented alone (1 review). Moderate to large effects. Median absolute effects of +20.8% (range +10.0 to +25.4%) (1 review).	–	Not reported	–
Mass media	Channels of mass communication (including radio, television, newspapers, magazines, leaflets, posters and pamphlets) on the utilization of health services	Health-care providers, patients and general public	1 review (20 studies)	5.5	Effective strategy. Change in effect size ranging from 0.1% to -13.1% in the desired direction.	–	Not reported	–
Multifaceted interventions	Any intervention that includes two or more of the following interventions: educational materials, conferences, outreach visits, local opinions leaders, patient-mediated, audit and feedback, office systems, and economic incentives	All types of health-care providers	10 reviews (1 – 117 studies)	4.5 – 6	Effective: 10 reviews found positive changes. The range of the absolute changes found was from 1% to 64%.	Unclear: 3 reviews reported evidence in favour and against.	Unclear: 3 reviews showed combined strategies were more effective than single; 2 reviews found heterogeneous results.	–

Intervention	Description	Targeted health-care providers	Number of reviews (range of studies included in the reviews)	Review Quality	Observed Results			Comments
					<i>Professional practice</i>	<i>Health-care outcomes</i>	<i>Compared to other single strategies?</i>	
Tailored interventions to overcome identified barriers to change	Interventions tailored to address specified barriers to change in health providers: focus group discussions, surveys, interviews	Health providers	2 reviews (3 – 15 studies)	5.5	Tailored interventions may improve health providers' performance and health-care outcomes, but the results are inconclusive. Combined OR in one review: 2.18 (1.09, 4.34) in favor of tailored interventions)	–	–	Effectiveness remains uncertain and more rigorous trials (including process evaluations) are needed.

Organization of care

Intervention	Description	Targeted health-care providers	Number of reviews (range of studies included in the reviews)	Review Quality	Observed Results			Comments
					<i>Professional practice</i>	<i>Health-care outcomes</i>	<i>Compared to other single strategies?</i>	
Formal integration of services	Integration of primary health-care services	Health workers delivering care at primary level	2 reviews (2 and 5 studies)	6	No consistency in the results, or partially effective (+2.1% relative improvement)	–	There was no consistent pattern of benefit.	–
Improving office systems	Organization of office systems to increase the use of health service procedures	Health workers	2 reviews (3 and 6 studies)	5 – 6	Effective to increase use of health services.	–	Screening and referral by nurses, more effective than only screening by nurses. Screening during a routine visit more effective than physician reminder.	–
Structural interventions: changes in medical record systems	Nursing record systems	Nurses, students or health-care assistants working under the direction of a qualified nurse	1 review (8 studies)	5.25	Inconclusive. Further research needed	–	–	All RCT

Financial interventions

Intervention	Description	Targeted health-care providers	Number of reviews (range of studies included in the reviews)	Review Quality	Observed Results			Comments
					<i>Professional practice</i>	<i>Health-care outcomes</i>	<i>Compared to other single strategies?</i>	
Providers' incentives	Fundholding in practices	Health providers	2 reviews (3 – 6 studies)	4.5	Unclear	–	–	Well-designed trials of management were rarely found.

Appendix 14. Applicability, equity and scaling-up considerations for QI strategies

Continuing Education Strategies

Intervention	Applicability considerations		Equity considerations	Scaling up	Key messages for policy- makers
	To LMIC	To MCH			
Distribution of educational materials	Applicable to health-care providers working in all settings	Applicable to all areas of MCH care	Printed materials should be adapted to be understood by less educated health providers, like TBAs or empirical nurses in community settings. Electronic materials are more easily accessed in urban settings, in which health facilities are more likely to have Internet access. Printed materials are not easily accessed in rural community settings with bad communication systems.	The limitations are those imposed by the size and efficiency of the country's communications network, nowadays improved with Internet access. In most of the LMIC, this would mainly prevent reaching rural areas distant from urban centres.	Distribution of educational materials should be ideally combined with another CE strategy to be effective. Adapting to less skilled health providers, and original solutions to provide access to health providers working in rural settings, are relevant issues.
Audit and feedback	Applicable to health-care providers working in health facilities more than in community-based settings. The lack of routine data collection systems makes implementation difficult.	Potentially applicable to all areas of MCH care	The lack of routine data collection systems is more prevalent in community-based settings, in which the most disadvantaged health-care providers work, and the most unprivileged women and children live.	Only possible if routine data collection systems are implemented on a large scale. These systems should promote the routine collection of data on the use of the most important health-care practices in MCH. Health-care providers should accept the system and be trained in its use, and in necessary audit processes.	Potentially useful strategy, but difficult to implement on a large scale. Simple. routine data collection systems that can be implemented in community-based settings, should be implemented to allow this strategy. Only the most important health-care practices in MCH should be the focus of such a system.

Intervention	Applicability considerations		Equity considerations	Scaling up	Key messages for policy-makers
	To LMIC	To MCH			
Reminders	Applicable to health-care providers working at communities or health facilities (excluding computerised reminders)	Applicable to all areas of MCH care	Can be implemented in an equitable way, at all settings and for all kinds and levels of health-care providers. Literacy limitations in some empirical health providers should be overcome by the use of pictorials if needed.	Simple manual reminders (chart reminders, posters, etc) can be applicable on a large scale and at relatively low cost, in all settings.	Potentially useful strategy, relatively easy to be implemented on a large scale, in all settings. It is the most effective single strategy for guideline implementation. Simple manual reminders, easy to understand, to promote the use of priority health-care practices, could be a highly cost-effective strategy in LMIC.
Educational meetings (including local consensus processes and problem-based learning)	Applicable to health providers working in all settings. Small group interactive workshops are more difficult to implement in areas in which health providers are scarce and cannot be easily replaced during training activities.	Applicable to all areas of MCH care. Important for training in EOC, ENC, neonatal resuscitation skills if conducted as interactive workshops.	Health-care providers in rural settings are frequently the most disadvantaged and the most scarce at LMIC, and attend the most unprivileged population. The costs of conducting interactive workshops in these settings (or anywhere, but targeting rural health-care providers) would probably be high compared to urban settings. If specific measures are not taken, there is a risk that these settings would be less likely to be the target of this type of educational strategy.	Interactive workshops for small groups of trainees are costly. Training programmes using this strategy should consider preparing replicable workshops that can be conducted or tutored by widely available health-care professionals at the local level. Train-the-trainers model could be a strategy to make programmes more cost-effective.	Interactive workshops are important to effectively teach EOC, ENC and neonatal resuscitation skills. Specific measures should be taken to facilitate these activities in settings in which health-care providers are scarce and cannot easily participate in these intensive activities. Train-the-trainers model could be a strategy to make cost-effective, easily replicable programmes.

Intervention	Applicability considerations		Equity considerations	Scaling up	Key messages for policy-makers
	To LMIC	To MCH			
Local Opinion Leaders	Applicable to health-care providers working mainly at health facilities in urban settings. Health providers in community settings, working in more isolated conditions, would have difficulty to identifying local leaders. Moreover, large rural settings with difficult access would prevent efficient implementation.	Applicable to all areas of MCH care	The more isolated working conditions of health providers in rural settings, plus the difficulties of accessing those settings, would prevent equitable implementation.	This strategy could be scaled up in urban settings, but this is less likely at the rural level.	Potentially useful strategy, but less feasible in rural settings with health providers working in more isolated conditions. In urban settings, where health care is provided at health facilities, it could be a feasible and effective strategy.
Patient-mediated interventions and mass-media interventions	Applicable mainly in urban settings and in rural settings with good communication systems. Not applicable in populations in which women are not sufficiently educated and empowered to challenge the authority of the health providers.	Applicable to all areas of MCH care	The intervention would probably only be implemented in educated and empowered women, who usually are less disadvantaged.	Difficult to implement in rural settings, with less literated women and bad mass-communication systems. Likely to be resisted by health-care providers at all levels of care. Not generalizable in low-income countries with large proportions of illiterate women and bad mass-communication systems.	Less relevant strategy for countries with proportionately large rural populations, with large proportion of less literate women, or bad mass-media coverage. Mass-media interventions are attractive for middle-income countries with good mass-media coverage.

Intervention	Applicability considerations		Equity considerations	Scaling up	Key messages for policy-makers
	To LMIC	To MCH			
Multifaceted interventions	The applicability should be judged by the included components. Interventions that include interactive workshops, distribution of printed materials and manual reminders are applicable in all settings.	Applicable to all areas of MCH care	Should be evaluated upon the selected strategies that are integrated in the intervention. An equitable intervention might include replicable interactive workshops, distribution of printed materials and manual reminders.	Should be evaluated upon the selected strategies that are integrated in the intervention. An intervention including replicable interactive workshops (train-the-trainers methods), distribution of simple printed materials, and implementation of manual reminders, could be scaled up at in all settings. The costs of these combined strategies are higher and should be evaluated against the potential benefits.	An intervention including replicable interactive workshops (train-the-trainers methods), distribution of simple printed materials, and implementation of manual reminders could be a potentially relevant intervention to train in EOC, ENC, and neonatal resuscitation, and to develop and implement clinical guidelines.

Organisational interventions

Intervention	Applicability considerations		Equity considerations	Scaling up	Key messages for policy-makers
	To LMIC	To MCH			
Integration of primary health-care services	Highly relevant to LMIC. The intervention is applicable in settings where a rather developed and fragmented primary health-care system is present.	Highly relevant to MCH.	This strategy can potentially reduce inequity. One of its aims is to simplify and make access to health services more efficient for users in limited-resource settings, and who have difficult access to health-care facilities.	Implementing this strategy might require considerable planning and resources, as it requires significant changes to the organization of the delivery of health care.	Policy-makers and planners considering integration could introduce this strategy, using rigorous study design, to allow further evaluation and increase the base of studies from which to draw evidence.
Improving office systems	The implementation of simple strategies to better organize the delivery of preventive measures in primary care is relevant to LMIC. However, the relevance is restricted to settings where an organized primary health-care system is already in place.	Relevant to LMIC	This strategy can be targeted to the prevention of problems that are prevalent in poor settings.	The strategies are simple and scaling-up should not be difficult.	Simple changes to improve the organization of preventive services in primary care can increase coverage.
Changes in medical record systems	Limited applicability as the intervention requires highly qualified health professional to design and implement the systems.	Applicable to MCH	No clear relation to equity improvement	Scaling is difficult; it requires professionals with expertise in medical records.	This intervention does not seem attractive for implementation in LMIC.

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Checklists

1. OVERVIEWS OF SYSTEMATIC REVIEWS (SUCH AS THE POLICY BRIEF)

Should you have confidence in the overview?

1. Did the overview address explicitly a sensible range of policy or management questions?
2. Was the framework used to organize the questions and reviews sensible?
3. Were the criteria used to select reviews sensible?
4. Was the search for relevant reviews detailed and reasonably exhaustive?
5. Were assessments of the relevance and quality of the reviews reproducible?

What are the results?

6. What are the main results?
7. How much confidence can be placed in the results? (See Checklist 3 for assessing the quality of evidence and the strength of recommendations)

What are the implications of these results?

Based on what you know now, what are the main implications of this overview for decisions for which you are responsible?

8. Are the results applicable to your setting? (See Checklist 6 for assessing applicability.)
9. What assumptions have you made about your local context, including assumptions about the presence of modifying factors, need (prevalence, baseline risk or status), values (the relative importance of the potential outcomes or consequences), costs, and the availability of resources.
 - How confident are you in these assumptions?
 - Which of these assumptions might need to be confirmed with additional evidence?
 - What kind of evidence is needed?
10. Were all of the important policy or management options considered?
11. Were all of the important outcomes (consequences) considered?
12. Are the net benefits (the sum of the potential benefits and harms) worth the costs?
13. How confident are you in this judgement?

2. CHECKLIST FOR SYSTEMATIC REVIEWS (SUCH AS THE LAY HEALTH WORKER REVIEW)

Should you have confidence in the review?

1. Did the review address explicitly a sensible policy or management question?
2. Were the criteria used to select studies sensible?
3. Was the search for relevant studies detailed and reasonably exhaustive?
4. Were assessments of the relevance and quality of studies reproducible?

What are the results?

5. Are the results similar from study to study?
6. If not, is there a compelling explanation for the differences that were found?
7. What are the main results?
8. How much confidence can be placed in the results? (See Checklist 3 for assessing the quality of evidence and strength of recommendations.)

What are the implications of these results?

Based on what you know now, how would you respond to the questions that this review addresses within the context of your work?

9. Are the results applicable to your setting? (See Checklist 6 for assessing applicability.)
10. What assumptions have you made about your local context, including assumptions about the presence of modifying factors, need (prevalence, baseline risk or status), values (the relative importance of the potential outcomes or consequences), costs and the availability of resources
 - How confident are you in these assumptions?
 - Which of these assumptions might need to be confirmed with additional evidence?
 - What kind of evidence is needed?
11. Were all important outcomes (consequences) considered?
12. Are the net benefits (the sum of the potential benefits and harms) worth the costs?
13. How confident are you in this judgement?

3. QUALITY OF EVIDENCE AND STRENGTH OF RECOMMENDATIONS

(Note: this checklist has been provided to enable you to be aware of the questions that have been asked by the individuals who prepared the GRADE evidence profiles. Specially trained researchers are usually involved in the preparation of GRADE evidence profiles)

How confident are you that the estimated effects (size of the impact) are correct for each important outcome (consequence)?

Positive answers to the following questions would reduce your confidence:

1. Were the study designs that were used at high risk of bias (i.e. were there systematic errors)?
2. Did the studies have important limitations?
3. Were there important inconsistencies in the results across studies?
4. Were the estimates of effects imprecise?
5. Are the people and interventions dissimilar to your own setting?
6. Were surrogate or proxy outcome measures used?
7. Were indirect comparisons (between studies) used?
8. Was there a high risk of publication bias?

Positive answers to the following questions would increase your confidence:

9. Was there a strong association between the intervention (policy option) and the outcome?
10. Was there evidence of a dose-response relationship?

Overall, how confident are you that the estimated effects (size of the impact) are correct for all of the most critical outcomes (i.e. the most important consequences)?

11. How confident are you that the estimated effect is correct for the critical outcome for which you have the least confidence?

What would you recommend doing?

12. What policy or management option (or action) would you recommend?

How confident are you that the net benefits of implementing this recommendation are worth the costs? (Positive answers to the following questions would reduce your confidence.)

13. Is the evidence of low quality? (This might not lower your confidence, if your recommendations involve *not* doing something)
14. Are the estimates of the anticipated effects so imprecise that it is difficult to know whether the net benefits are worth the costs?
15. Is there substantial uncertainty about the values that different people who will be affected will place on the most important outcomes?
16. Are the expected net benefits small?
17. Are there substantial costs (including implementation costs)?

4. INSUFFICIENT EVIDENCE

Is there insufficient evidence to be confident about the impacts of implementing the policy or action?

Positive answers to the following questions suggest the need for well-designed field trials or planned delays² in rolling out or scaling up an intervention:

1. Is the intervention potentially ineffective or harmful?
2. Are there important uncertainties about potentially important benefits, harms or costs?
3. Would wide-scale implementation result in significant and irretrievable fixed costs?
4. Would evaluating the impact of the planned policy or action represent good value for money?
5. Are the necessary resources for undertaking a proper impact evaluation available? If not, can they be obtained?
6. Would it be possible to collaborate with other countries to strengthen the evaluation?
7. Is evaluating the impact of this policy or action a priority?

² Delays are common during the rolling out or scaling up phases of an intervention. Rigorous evaluations are possible if these interventions are planned (e.g., using random allocation to determine who gets the intervention first, or where it should be located) and the intended outcomes are measured

5. EQUITY

What impact is the policy or action likely to have on disadvantaged populations and equity in your own country or setting?

Disadvantages should be considered in relation to each of the following potentially relevant dimensions: place of residence, race (i.e., ethnic origin), occupation, gender, religion, education, socioeconomic status, and social network and capital (PROGRESS).

1. Are there plausible reasons for anticipating differences in the relative effectiveness of the intervention in disadvantaged settings within the country?
2. Are there likely to be different baseline conditions within the country, so that the problem would be more or less important in disadvantaged settings within the country?
3. Are there likely to be different baseline conditions in disadvantaged settings within the country, so that the absolute effectiveness would be different?
4. Are there important considerations that should be given to implementing the intervention to ensure that inequities are not increased and that they are reduced, if possible (e.g. in terms of ensuring access in disadvantaged settings?)

Would the intervention be likely to reduce or increase health inequities within the country, or would it result in no change?

6. APPLICABILITY

Are the results likely to be applicable to your setting?

1. Are there important differences in the structural elements of health systems (i.e., governance, financial and delivery arrangements) between where the research was done and where it could be applied that might mean an intervention could *not* work in the same way?
 - *e.g., Research on the effectiveness of bulk purchasing arrangements in lowering prices for prescription drugs was done in countries with no concentration in the ownership of pharmacies, whereas you may work in a country where a pharmacy monopoly exists*
2. Are there important differences in on-the-ground realities and constraints (i.e., governance, financial and delivery arrangements) between where the research was done and where it could be applied that might substantially alter the potential benefits of the intervention? And can these challenges be addressed in the short-term to medium-term?
 - *e.g., Research on the effectiveness of a team-based approach to maternity care in reducing both maternal and child morbidity was undertaken in countries with midwives and traditional birth attendants, whereas you may work in a country where neither type of health provider is common*
3. Are there likely to be important differences in the baseline conditions between where the research was done and where it could be applied? If so, this would mean that an intervention would have different absolute effects, even if the relative effectiveness was the same.
 - *e.g., Research on the effectiveness of a strategy for promoting HIV testing among pregnant women was completed in countries where less than 10% of pregnant women were offered HIV testing, whereas you may work in a country where 85% of pregnant women are offered HIV testing*
4. Are there important differences in the perspectives and influences of health system stakeholders (i.e., political challenges) between where the research was done and where it could be applied that might mean an intervention will not be accepted or taken up in the same way? And can these challenges be addressed in the short-term to medium-term?
 - *e.g. Research on the effectiveness (and safety) of nurse practitioners in substituting for physicians when providing routine medical care for children, was based in countries with shortages of physicians and weak medical associations, whereas you may work in a country with a surplus of physicians and a very strong and vocal medical association*

7. SCALING UP

Are there important challenges that will need to be addressed when rolling out or scaling up the policy or action?

1. How complex is the intervention and does this have implications for scale up?
2. What are the total costs of expanding coverage of the intervention and sustaining it and what are the implications for scale up?
3. What are the requirements that the intervention imposes on government capacity (e.g., effective regulatory capacity) and the implications for scale up?
4. What requirements does the intervention place upon managers, healthcare professionals/providers and users, and what are the implications for scale up?
5. Would widespread implementation of the intervention be likely to have important impacts on the healthcare system or other sectors and, if so, what are the implications for scale up?
6. Is the intervention likely to be difficult to sustain or are its effects likely to change over time? For example, is it likely that the intervention will have deteriorating benefits without the ongoing training and support necessary to ensure that it is properly implemented?