U.S. Government Evidence Summit:
Community and Formal Health System Support for Enhanced Community Health Worker Performance

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Final Report of Evidence Review Team 2

Which Formal Health System Support Activities Improve the Performance of Community Health Workers?

A Review of the Evidence and of Expert Opinion with Recommendations for Policy, Practice and Research

Fall 2012

EVIDENCE SYNTHESIS PAPER

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INTRODUCTION

The global shortage of skilled, motivated, and supported health workers is universally acknowledged as a barrier to achieving the Millennium Development Goals (MDG), and many countries are implementing large- scale community health worker (CHW) programs to extend the reach of services to currently underserved populations. CHWs are not a new strategy, and the literature from the 1980's and 1990's spoke to the problems of supporting this type of worker that was promoted as part of Alma Ata's declaration for primary health care. The GHI Evidence Summit defines a Community Health Worker as a broadly used term for:

> A health worker who receives standardized training outside the formal nursing or medical curricula to deliver a range of basic health, promotional, educational and mobilization services and has a defined role within the community system and larger health system. These workers have many different titles, including but not limited to village health workers, health promoters, community health agents, community health extension workers, or traditional birth attendants, who serve as extensions of the formal health system.

Community health workers, by definition, are linked to their communities, and thus should receive support from them, as well as the formal health system. This synthesis paper focuses on the supports the formal health system needs to provide to ensure effective CHW performance and thus contribute to reaching the MDGs. Despite many decades of experience, the ability of health systems to sustainably support CHWs still poses challenges.

This Evidence Review Team (ERT2) approached this task from several directions. We recognized widely used frameworks for health system strengthening and human resources for health from other international work, including that of WHO. We reviewed an initial set of recommended literature (from USAID) and refined our questions as we learned more. This paper synthesizes the results of a review of the evidence for formal health systems support, based on an initial set of 74 experimental studies compiled for the Evidence Review Team (ERT) by USAID and additional literature the ERT identified. We also incorporated comments submitted by participants in the CHW summit and appended an additional list of articles they recommended to the reference list included in this report.

Our time and resources were limited. This review is not a comprehensive "systematic review" of all available literature. Nor do we restrict our comments and findings to only what is supported by rigorous research. We combine literature review, expert opinion, and our own discussions in a synthetic report.

REFINING THE FOCAL QUESTIONS

Sharpening Our Evidence Review: Critical Revision of Review Questions

From the first Pre-summit meeting, this Evidence Review Team (ERT2) was tasked with addressing two Focal Questions:

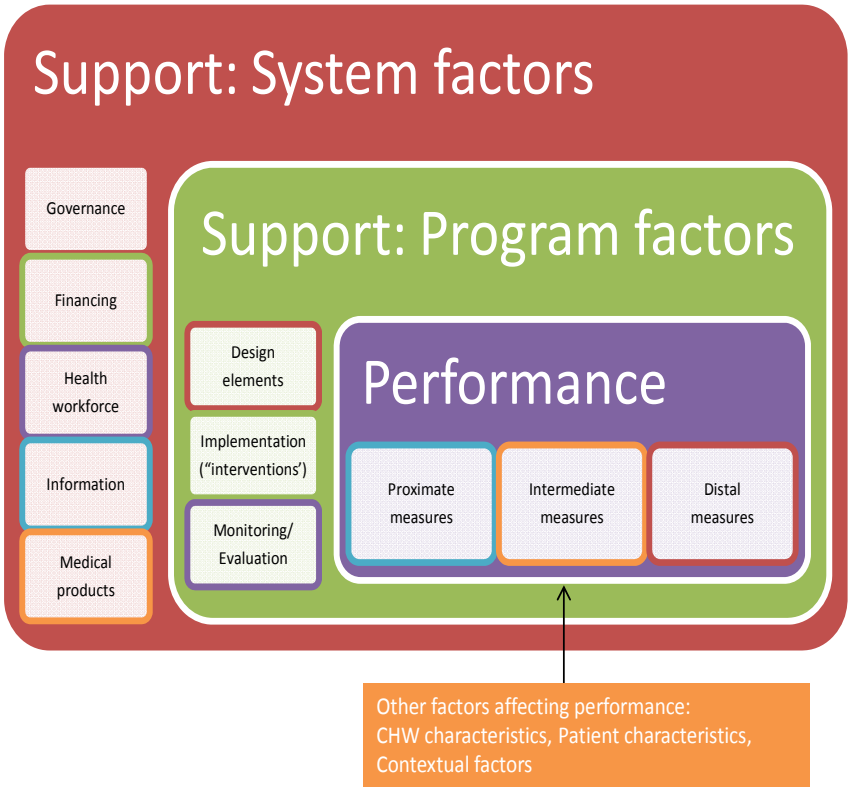
> *Focal Question 2: Formal Health System ERT: Which formal health system support activities improve the performance of community health workers?*
>
> *Focal Question 4: How are community and formal health system support activities structured and/or operationalized to improve CHW performance*?

The initial body of literature gathered for ERT2 review included a large number of papers that ERT2 members felt were not relevant to answering these questions, and did not necessarily capture the broader health systems issues at the heart of CHW performance support. The group discussed at length its understanding of the focal questions and

the review criteria, and sought to clarify the meaning of "formal health system support activities" and CHW "performance." ERT2 eventually proposed modified questions, developed a conceptual framework for organizing the literature findings, and expanded review criteria to include systematic reviews and studies with non-experimental designs. Through the conceptual framework (see

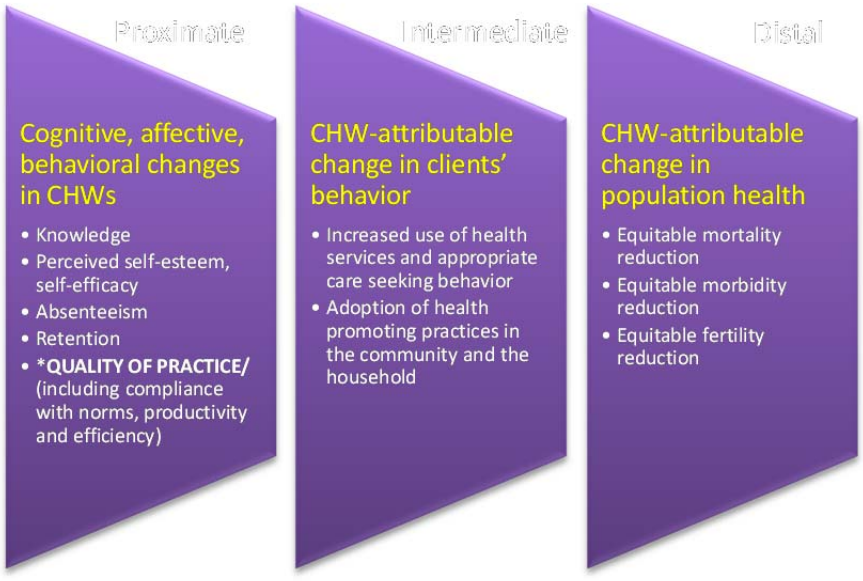
Figure **1** below), the ERT proposes three domains in which such formal health system performance factors could operate: the broader health systems elements themselves (analogous to the WHO building blocks); the interface between these elements and CHW programs at scale; and how these elements also influence CHWs as a group working at the point of service delivery. We do note, however, that this framework emphasizes the role of CHWs as part of the formal health system. Not all CHW programs would subscribe to this view. An alternative view, of the CHW as community member helping to manage interactions with the health system might result in a different presentation. This might be addressed better by some of the other ERTs.

Figure 1: Conceptual framework for health system support for enhancing CHW performance



CHW performance includes both efficacy of individual CHWs' activities as well as effectiveness of CHW programs or systems in improving desired outcomes, such as population-level health improvements (see Figure 2 below for an unpacking of CHW performance). For both individual CHW functioning and the functioning of CHW programs, performance can be thought of in terms of processes, outputs, and outcomes arranged in a causal sequence.

Figure 2: Unpacking CHW performance*



*Of particular importance because farthest along the pathway to changes in client behavior and population he

***Performance includes at the individual CHW, program and population levels**

It is useful to consider formal health system support activities along similar lines. That is, it is fairly obvious that just providing such inputs as training, supplies, supervision, etc., may be a necessary condition to enable CHWs to perform if we contrast the alternative as not providing inputs. We interpreted the intention of these questions as going beyond simply describing or enumerating "which formal health system support activities improve CHW performance".[1] To move beyond that basic level we thought it more useful to refine the questions at two broad levels – as outlined in

Figure **1** -- and to revise evidence review questions to reflect that consensus of ERT2. For example, Figure 1 includes under CHW program factors "design elements". We also noted that sometimes there is more linear process such as:

CHW program design→Initial program roll out→Health system factors affecting scale-up→Further program rollout→CHW program functioning→CHW performance

In this linear process, evidence affecting design of CHW programs which might relate to health system factors won't tell us much about how health system factors (at the level of the actual health system) operate on scaled-up CHW programs. We wanted to make sure our evidence review captured sufficiently the latter questions.

We worked with two related sets of questions. The first set of questions concerns **the design of CHW programs** (see Figure 3 for a schematic of these factors). We noted that much of the evidence we were identifying as relevant were studies and reports of testing different types of inputs to CHWs (for example, training materials, or drug supply kits) or different approaches to implementing CHW program processes (for example, use of information technology or

[1] Using, for example, WHO's health system "building blocks" one could say that some degree of all of them would improve CHW performance. Similarly WHO's normative guidelines on key elements needed for well-functioning human resources for health (see WHO "Working Together for Health" 2006 World Health Report, World Health Organization, Geneva) would elicit a similar response.

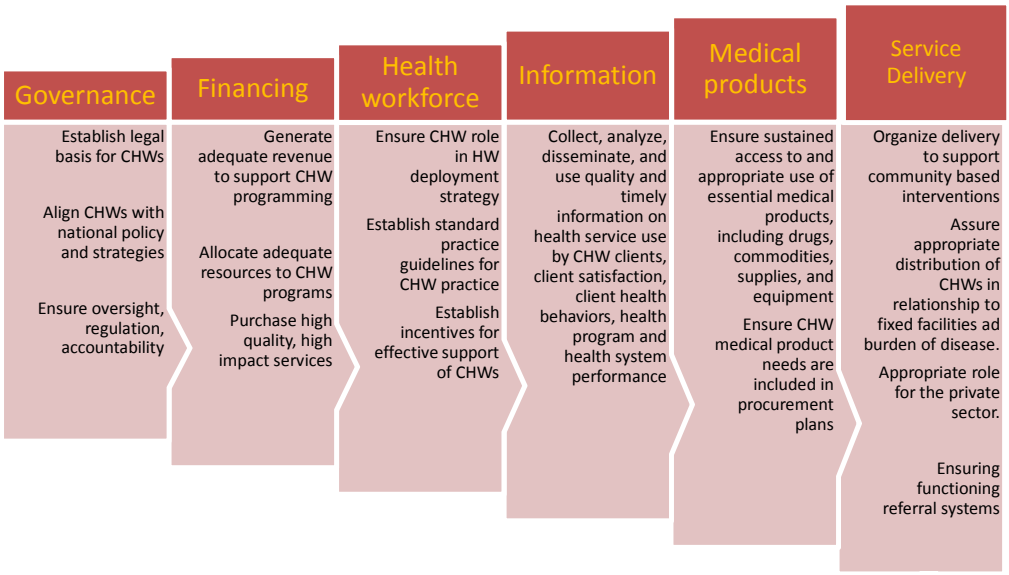
CHW supervisor processes). These studies were seeking to answer questions on a small scale or experimental level, such as how would a certain type of input or process improve performance? We felt these studies were similar in intent to clinical trials that seek to identify efficacious therapies. The enquiry they represent starts at a place past the initial question of "generically does this type of input (say training) improve CHW performance?" Rather, they ask, "how does a specific approach or innovation in providing this input do?" and in some cases they ask "Does an innovative approach do better than some more basic approach to providing it?"

Figure 3: Unpacking CHW program factors

ERT2 feels this type of evidence is relevant and important, but it doesn't take us far enough along the way to understanding inputs and processes at the systems level or how larger-scale system factors affect CHW performance. We felt that this was really the main concern of the evidence review and that we were likely to not give it sufficient weight if we didn't explicitly identify it.

The second set of questions focuses on **formal health system support activities' influence on CHW program performance at scale.** How do formal health system support activities affect the implementation and scale-up from CHW program design and initial rollout to larger scale CHW program implementation? For example, how do health system elements such as financing or distribution of drugs and supplies at system level influence CHW program performance, such as in the larger scale implementation of initial design? Within the conceptual framework the group felt that the health system building blocks were useful as categories of health system elements that help organize causal analysis (see Figure 4 below for health system factors unpacked).

Figure 4: Unpacking health system factors for CHW performance



A revised question for ERT2 was proposed:

"How can formal health systems do better to improve CHW performance; including aspects of program design, launch, scale-up, and continuous improvement."

Revision of our Approach to the Literature for Review

Following our rethinking of the questions, we revisited the experience of the initial round of the evidence reviews. The group felt that the emphasis on (a) published literature and (b) studies with some type of experimental design resulted in a bias towards work on the CHW design factors and the lower probability of identifying evidence on how formal health system support factors affect CHW performance at scale. The latter questions were less likely to be amenable to well-designed small studies, and more likely to be addressed in program and policy review reports.

To reflect these concerns, ERT2 members went back to review some of the larger multi-country review reports and also sought a wider base of studies which would be more likely to capture the system and program level factors. Also, in order not to reject such studies and reports for their lack of experimental design, we modified the questions reviewers would try to answer. These are given in Figure 5 below.

Figure 5: Some questions for reviewers of papers on larger scale CHW programs or multi-country reviews

1. Does the paper contain quantitative evidence of CHW performance? Clarify with examples of key indicators.
2. Does the paper contain qualitative evidence of CHW performance? Clarify with examples of key indicators.
3. Does the paper contain evidence from more than one country? List countries. Is the evidence comparable across countries or very different?
4. Does the paper contain a conceptual framework for the determinants of CHW performance? Is the conceptual framework used to structure the evidence presented and to draw inferences about the linkage between health system activities and CHW performance?
5. Does the paper report on studies using experimental methods with control groups? Clarify which methods are used.
6. How effective is the study in controlling for confounding factors which might explain performance results or the effects of health system factors. Classify as sufficiently effective, somewhat effective, not effective. Clarify.
7. What conclusions does the paper draw about the effect of health system support activities on CHW program performance? What conclusions related to the design of programs? What conclusions relate to the process of scaling up design through health systems?
8. Try to specify conclusions related to specific health system support activities, according to the building blocks. What findings or lessons related to specific building blocks come out of the paper?
9. What do you think are other key findings or conclusions of the paper relevant for ERT2?
10. Should any of the papers cited in the paper you reviewed be added to our list of papers to review?

LITERATURE REVIEW PROCESS

The USAID Evidence Summit planning team provided each ERT with an initial set of papers from which they could build a pool of literature. USAID's goal with this first set of papers was to produce an initial database of literature consisting of high-quality studies relevant to the focal questions. They approached the literature search with underlying belief that, if available, high-quality studies would provide the best evidence for making decisions and recommendations about policy and practice— which is the goal of the Evidence Summit. However, USAID recognized that the full body of evidence on CHW performance extends beyond papers with rigorous study designs and also beyond the published literature.

In the course of developing a literature search strategy, USAID learned of a systematic review being carried out by researchers at the CDC on the effectiveness and costs of interventions to improve health care provider performance and related health outcomes in low- and middle-income countries. The literature CDC identified included a subset of studies on improving CHW performance. Given significant overlap in goals of the CDC systematic review and goals of the Evidence Summit, USAID decided to build on the work CDC had done and, with CDC's permission, USAID utilized the studies that were specific to CHWs.

A challenge was that the CDC database only went through 5/31/2006, with the exception of those studies that had been identified through personal libraries, etc., through 9/15/2010. The USAID planning team updated the CDC search to include studies published through the present. However, USAID did not have resources to replicate the exact search, and instead completed a narrower search that stayed true "in spirit" to protocol of CDC search, knowing that this database would serve as a starting point and experts with knowledge in the field would point to additional literature on this topic.

The CDC search yielded 128 studies on CHWs. The USAID search, covering June 2006-December 2011, yielded 183 papers. Since several of the papers identified through the CDC systematic review were published after May 31, 2006, there were eight duplicate papers which were removed. This yielded a total of 303 papers.

Studies identified through CDC search had all been screened for relevance to the CDC systematic review, but not for relevance to the focal questions for the Evidence Summit. Therefore, each of the 303 papers was screened for relevance by two members of the USAID Evidence Summit planning team. If it was relevant, the reviewers made a recommendation as to which ERT the paper should be assigned. Any divergence in reviewer opinion on paper assignments were addressed and resolved by the full Evidence Summit planning group. This process resulted in 174 papers moving forward to the ERTs, of which 74 were assigned to ERT2.

These papers were randomly assigned to ERT members for review prior to the Pre-Summit meeting on March 26. This review process included a quality screen (see Annex 1). The ERT discussed these papers at the Pre-Summit meeting, and agreed that many of the papers were not relevant to answering the ERT2 focal questions. Therefore, each reviewer was asked to go back to his/her assigned papers and assess again for *relevance*, based on whether the paper included a measure of CHW performance and included any description of a formal health system support activity within any of the WHO health system building blocks or elements of CHW program design. If a paper was deemed relevant to the ERT2 focal questions, it went forward for further review and analysis. Of the 74 initial papers assigned to ERT2, 27 were ultimately deemed relevant based on this preliminary screen for relevance.

In addition to the original 74 papers several other papers were submitted to ERT2 via the Call for Evidence and via other ERTs. An additional 10 articles were received via the Call for Evidence and 20 articles were suggested to ERT2 by other ERTs following the Pre-Summit. Each of these 30 papers was also assessed for relevancy. Seven of the 10 papers received via the Call for Evidence and 16 of the 20 papers submitted following the Pre-Summit were deemed relevant. The group also decided to add 12 review articles to the pool of literature, which had been excluded from the initial literature search strategy. Thus, there were a total of 62 articles deemed relevant for more in-depth review.

Each of these 62 articles was reviewed by an ERT2 member, who rated its relevancy using a more specific relevancy rating scale (see Annex 1). The reviewer also summarized each paper's findings using a review template developed by the ERT to match the conceptual framework and focal questions (see Figure 5). One of the questions included in the review template asked whether there were any citations that should be added to the pool of literature. These recommendations generated an additional 29 articles. There were also five articles that were recommended to ERT2 (additional to the initial set of 20 suggested after the Pre-Summit). Three of these were deemed relevant.

ERT2 worked to gather these 34 articles, and obtained 27 of them to review for relevancy. Ten were identified as relevant and received a further review for key findings. These findings were combined with the findings identified from the reviews of the first 62 articles.

Source	Initial Number	Number relevant to ERT2
CDC + USAID literature reviews	74	27
Call for Evidence	10	7
Recommendations from other ERTs	25	19
Review articles	12	12
ERT members, based on citation review	29	10
Total	**150**	**75**

KEY FINDINGS

Building on our conceptual framework, we report below on key finding from the evidence review from three types of papers: 1) larger review articles and report which typically cover a number of countries over time; 2) published studies of specific program factors and how they affect CHW performance; and 3) published studies of the effect of

health system factors on CHW performance. As noted above, only half the studies reviewed were judged relevant. The scientific rigor and quality of research was variable amongst those reviewed.

Review Articles and Reports on CHW Performance

As part of the review process, ERT2 reviewed and synthesized major reviews of the CHW literature in order to elicit consistent themes and findings (Berman, 1987; Frankel, 1992; Haines, 2007; Kane, 2010; Lassi, 2011; Lehman and Sanders, 2007; Malacher, 2011; Prasad, 2008; UNICEF, 2004; Bhutta et al, 2010). These review articles spanned 25 years and encompassed studies of CHW programs in many different contexts. What is striking about these papers is the consistency with which common themes emerged as determinants of CHW performance. Though expressed in different ways, the common factors include:

- Community ownership and involvement in the CHW program
- Support from the local and national government
- Well designed and clearly defined job descriptions
- Appropriate pre-service education and continuing in-service training
- Effective linkages (integration of CHWs into) with the formal health system
- Supportive supervision and constructive feedback
- Adequate financial and non-financial incentives
- Adequate resources to ensure CHWs are properly equipped, supplied and supported
- Systematic monitoring and evaluation of CHW performance

While these factors are cited consistently, there is also consistent caution that they must be adapted to the context; e.g. “Studies also showed that if context differed, even with similar interventions, negative mechanisms could be triggered, compromising CHW performance.” (Kane, 2010).

Community ownership and involvement is the province of ERT 3 and so will not be discussed at length here. However, it does overlap with “health system” factors with respect to the selection and support of CHWs. The studies reviewed stress the importance of the CHW being from the community to be served and selected by the households that will be served. These principles are frequently violated in practice. Even where the CHW is from the community to be served, they are often selected by established formal or informal authority figures. The result can be that divisions within the community are reflected in CHW performance, as the CHW may neglect households or groups within the community not favored by the authority figure. There may also be concerns about sharing personal matters involving privacy or stigma with a well-known community member.

Almost all the reviews addressed the issue of selection criteria. World-wide, CHWs are overwhelmingly female (70%), though this again varies by context and the tasks assigned to the CHW. Many countries have established formal criteria for CHW selection, including age, sex, educational attainment and number of offspring. It is less clear that these selection criteria are essential to CHW performance depending on the complexity of the tasks they are assigned and the value in local context of other characteristics such as social status, perceived experience, etc. Strong community support for the CHW tends to outweigh specific eligibility criteria. Nonetheless, there is a strong argument for basic literacy and numeracy where that is feasible.

The support of local and national government is regularly mentioned as a determinant of CHW success. In part, this reflects the perceived importance of political will on the part of national and local leaders to have the program succeed. This translates into creating the authorizing framework for the CHW program, as well as resource allocation and accountability in the bureaucracy. Several articles mentioned the potential conflict between CHWs and health professionals. The support of local and national government can help mitigate this problem.

The specificity and appropriateness of job descriptions or task assignment for CHW was also mentioned repeatedly in the articles mentioned. No specific breadth or depth of work is proposed. Rather, the more important criteria seem to be (a) responsiveness to the health needs perceived by the community to be served, and (b) a scope of work that is feasible and manageable for the CHW given the time, skills, supplies and support available to the CHW. Conversely, lack of clarity as to the CHW's role, skill set or scopes of work that are perceived to be not adequately helpful to the community, overlap with the roles of other health providers, and inability to deliver on promised services undermine CHW performance.

The scope and duration of CHW pre-service education varies widely from as little as a week to several months. The content of training should reflect the scope of work assigned to the CHW as part of the over-all health strategy. Training in preventive and curative practices should be combined with communication, education, counseling and record-keeping skills. Training methodologies have evolved over time to give greater emphasis to role-playing, simulations, practice sessions, simulations and other practical applications relative to didactic approaches. The location of training (community-based or facility-based) depends on the skills to be imparted, with preference given to providing training where there will be the greatest opportunity to acquire needed knowledge and skills. For example, skills in community education are best acquired through practice in the community, whereas a facility may be better for gaining practice at assessing and treating sick children. Regular in-service training is recommended by all the reviews, though the content, duration and methods are context-specific.

The need for a clear relationship between the CHW and the formal health system is another consistent theme. In part, this serves to legitimize and give needed status to the CHW within the community to be served. Clearly defined linkages also serve to clarify the responsibilities of the CHW relative to other health providers, establish supervisory and support relationships, define modalities for in-service training, create referral mechanisms and establish pathways for supply of essential commodities. There are, however, different visions of this relationship and programs in different countries may reflect this. On one hand, CHWs may be seen to be part of the formal health system, extending services into community. In a contrasting vision, CHWs are seen primarily as community members managing the interface with the formal health system. These two views are posed as distinct here, but in practice they can be combined to varying degrees. There is no conclusive evidence supporting any specific view, but clarity, in any case, is desirable.

The importance of supportive supervision and constructive feedback to the CHW was emphasized in virtually every article reviewed. Supervision provides the opportunity for in-service training, coaching, data collection, and re-supply. Ideally, it consists of two-way communication, with the supervisor developing increasing understanding of the needs and challenges of CHW. Unfortunately, supervision is also frequently described in the literature as the weak link in CHW programs. Supervision is typically under-resourced, since it demands the time of health professionals who often have other responsibilities and are poorly prepared for the supervisory role. In addition, transport costs frequently serve as a barrier to supervising CHW who are not in close proximity to health facilities. This compounds the sense of isolation among CHW.

Adequate financial and non-financial incentives are needed to develop effective and sustainable CHW programs. While many CHW are volunteers, there is little evidence that such programs are sustainable and attrition is usually high. Payments to CHW that are inadequate, irregular or cease are counter-productive to performance. An array of non-monetary incentives has also been employed, including in-kind payments (e.g., bicycles), awards from the health system, community recognition, increased social status, and opportunities for career advancement. Which array of monetary and non-monetary incentives will be effective is context-dependent.

CHW programs must be adequately resourced to be effective. CHW need regular training, continuous supervision, reliable supply of commodities and equipment, access to transportation, and remuneration. While CHW programs may be cost-effective, they are not necessarily lower-cost than facility-based service delivery and demand generation when total cost is considered. Whether run by governments or NGOs, adequate budgets must be assigned to support CHWs.

Finally, monitoring and evaluation are essential to effective CHW programs. They provide the basis for early detection of problems and corresponding intervention. They are also the basis for adaptive learning that permits managers to adjust programs in light of experience. M&E requires both regular collection of valid data and use of the data to guide decision-making. M&E adds to the cost of CHW programs and must be included within CHW program budgets.

Published Studies on the Effects of Program Factors on CHW Performance

A review was undertaken to examine the effect of specific program factors on CHW performance. Program factors were categorized according to three areas: (1) design elements – role definitions and scope of practice, advancement opportunities, selection criteria, service mix, complexity of service package, integration with other health providers, and geographic distribution; (2) implementation of interventions – training, supervision, coaching, mentoring, incentives, and supply/logistic support; and (3) monitoring and evaluation activities – evaluating individual CHWs performance, monitoring individual CHWs performance, and evaluation of CHW program performance to assess relation of changes to program. After exclusion of 'synthesis and general review reports and articles', we reviewed in detail 75 papers and articles ranging from randomized trials, quasi-experimental design studies with pre and post interventions, with and without control groups, and case studies with expert opinion.

Based on the review of these articles, several common themes emerge regarding the association between specific types, or combinations of, program factors as related to CHW performance. It is, however, important to underscore that the majority of publications were relatively limited in scope (i.e., examined one or a few program factors, alone or combined) and many did not use rigorous scientific research methods. In fact, an assessment of Bhutta et al, 2010 review of CHW indicated that only 18% of the 271 articles described in the tables included a proximate measure of CHW performance. While 68% mentioned initial training, only 16% mentioned refresher training, 26% any supervision, and 13% incentives, and almost none had evaluated the effects of these program factors on performance. Nonetheless, several key findings across these articles include:

- Role definition is important in determining level of training requirements and how the CHW will be integrated into the health system with other providers (see for example, Bhutta, 2011; Delacollette, 1996; Fauveau, 1992);
- Training is necessary but not sufficient to translate knowledge into practice. CHWs benefited from a range of supports – job aids/tools, mentoring, supervision, performance feedback and monitoring – to ensure specific performance standards. It is however unclear from the literature what else is needed and how to assure arrangements of multiple supports to maximize practice standards (see for example, Elder, 1992; Fort and Voltero, 20004; Shah, Muno, and Winch, 2010; Thiam, 2007; Vijayaraghavan, 1986) ;
- Motivation is an important factor for ensuring ongoing productivity and quality of CHW performance. A range of motivational factors were examined, both financial and non-financial, and positive relations were often seen between these factors and performance (see, for example, Winch, 2010; Schneider, Hlophe & Rensburg, 2008; Sircar, 1991; Shankar, 2009).

As stated, there was no 'gold standard' of scientific research to reveal how these factors, either combined or compared to each other, affected overall CHW performance. Nor were there rigorous studies of the specific characteristics of these factors, such as length of training, types of supervision, etc., that identified more effective means of delivering many of these interventions. However, a range of studies and expert opinion appear to point to the importance of specific programmatic factors in influencing CWH performance.

Published Studies on the Effects of Health System Factors on CHW Performance

The main health system factors unpacked, as defined by the Conceptual Framework developed by the ERT2 review group, include issues related to governance, financing, health workforce, information, medical products and service delivery. Each of those factors can be further refined and unpacked. For example, CHW performance related to governance would include establishing a legal framework for CHWs, aligning CHWs with national policies and strategies and ensuring proper oversight with regard to regulation and accountability.

A majority of the literature focused on issues of health workforce and service delivery and to a lesser degree the lack of adequate financing for CHW programs. With regard to governance, there was recognition of the need for political will for a CHW program to be successful, but little evidence of national CHW programs or CHW programs taken to scale, and calls for more research on these issues (see for example, UNICEF, 2004; Schneider, 2008; Haines, 2007; Berman, 2008). There was very little information on CHW data collection or supply chains, but there was general recognition of their needs.

The final literature review addressing CHW performance related to health systems factors including studies in individual countries (Bhutta, 2011; Delacollette, 1996; El Arifeen, 2012; Fort & Voltero, 2004; Phillips, 1975; Schneider, 2008; Thiam, 2007) and multi-country review reports (Berman, 1987; Frankel, 1992; Haines, 2007; Kane, 2010; Lassi, 2011; UNICEF, 2004). The design of the studies in individual countries included cluster randomized trials, quasi-experimental programs, case studies, before and after reviews of programs.

Among the literature, there is consensus that CHWs "must be carefully selected, appropriately trained" (Lehmann & Saunders, 2007). There is also consensus that CHWs:

- expand access to health services in resource poor areas where formal health facilities are few;
- need clearly defined roles and responsibilities;
- need an adequate supply chain;
- need supportive management and appropriate supervision as well as availability of infrastructure support are critical for program success;
- should have a strong linkage with the community;
- should have a strong interface with the formal health system;
- do not replace the need for facility-based health services.

There is also evidence that CHW programs are less costly than facility-based services on a unit (cost per service or output) basis – but that does not mean they are a cheap alternative to formal health services. In fact, some programs failed to achieve their desired outcomes specifically because CHW programs were inadequately resourced (either financially or though non-recognition of the CHW by the formal health system) (see, for example, El Arifeen, 2012; Delacollette, 1996).

There is agreement in the literature that there needs to be more focused attention and research on issues related to adequate and consistent financing of CHW programs (both design and ongoing running costs). Indeed, there are many questions related to CHW remuneration, including whether to, who should, and how much, just to name a few (as indicated by (UNICEF, 2004; Schneider, 2008; Frankel, 1992; El Arifeen, 2012; Delacollette, 1996). We found no conclusive evidence about CHW remuneration that could universally guide program design and implementation. Many of the programs were focused in Asia, and there was a call for more research in Sub-Saharan Africa.

ASSESSMENT OF THE STATE OF THE ART IN RESEARCH AND EVIDENCE ON CHW PROGRAMS

Appraisal of the Literature

In our rethinking of the questions ERT2 should address, we emphasized the importance of understanding how health systems factors affect CHW program performance and how the influence of health system factors could be improved to enhance CHW program performance.

"How can formal health systems do better to improve CHW performance; including aspects of program design, launch, scale-up, and continuous improvement."

The literature has provided evidence that, on a smaller scale, the existence of CHWs can have an impact on the intermediate and distal measures of CHW performance – we know that a strategy that includes community-based workers can improve outcomes. Yet after numerous decades of experience with CHWs, we still know little about how weak health systems that provide limited geographical access and suffer from significant health worker shortages can take on the burden of supporting CHWs in order to overcome access issues. The literature reviewed tended to revolve around a few limited questions, and did not take on the various components of our conceptual framework, with few studies looking at actually proximate measures of CHW performance as resulting from changes in design or health systems factors, and then linking to more intermediate and distal measures.

Overall, we feel that the available literature offers virtually no rigorous evidence to respond to our question. Almost all of the relevant CHW literature on health system factors falls into two broad categories:

i. Cross-cutting major reviews of CHW literature which offer expert opinion about **what health systems should do** in support of CHW programs, based mainly on observational studies of what are deemed to be more and less successful programs.
ii. Smaller-scale experimental and quasi-experimental research reports which **test improvements in CHW program design factors**.

However, we do not need more rigorous studies to tell us that training or drugs are important for CHW performance. What is largely absent from the literature but are important for effective CHW programming are:

- Studies examining how much CHWs can effectively do, how their characteristics might affect performance, how differing CHW profiles might call for differing CHW program factors;
- Studies that include CHW performance standards to adequately evaluate and compare groups; and,
- Studies which provide rigorous causal evidence on how specific health system factors or combinations of those factors affect CHW performance at scale, as well as rigorous studies which test changes at scale in health system factors and how they affect CHW performance.
- Studies that examine how to improve efficiency & cost-effectiveness of CHW Programs, such as optimal number of tasks/interventions delivered; optimal supervisor to CHW ratio; optimal geographic/HH coverage for CHW; optimal remuneration (financial & non-financial) to maintain motivation & retention of CHWs.

ERT2 feels that studies focusing on programs operating at scale are what would be needed to address the main questions it sought to review.

The literature is replete with normative statements about what types of health system support are needed for success in CHW programs. When CHW program performance does not meet expectations, this is typically attributed mainly to one or several shortcomings in health system support and secondarily to shortcomings in CHW program design. Yet, there is no evidence of interventions to strengthen specific health systems support activities resulting in improved CHW performance at scale. And these are precisely the kinds of evidence needed if policy makers and planners intend to support health system strengthening strategies as part of efforts to sustain and improve CHW programs.

With the limited time available for this evidence summit, it was easiest to focus on the published literature which creates a bias towards experimental evidence with rigorous research designs and favors smaller scale experimental studies on CHW design factors in contrast to larger scale studies on health system factors where experimental design was not used. While such studies have their place, they may not be the most appropriate designs. Indeed, for understanding important factors with CHW programs, these designs may limit important learning on socio-cultural and other context factors, and it may be difficult to do experimental studies on scaled-up programs, as was recently noted in Rockers et al. review of evidence criteria related to health system factors more generally. This may mean that to answer the kinds of questions ERT2 has identified as important, we need to modify our expectations about research design.

Observations about the Nature of Support for Research and Evaluation

Can these shortcomings in the evidence be attributed at least in part to the support environment for research on CHWs? We would offer the following observations:

- Journal publications, which were the main source of articles in this review, may have a bias towards positive results and more specific, focused research designs which tend to favor formative studies of CHW program design;
- Rigorous and independent evaluation of large scale program performance and system interventions at scale is often not funded by donors and, when it is, it is often done retrospectively rather than prospectively, making it difficult to isolate specific health system factors and their effects;
- Design and implementation of interventions to strengthen health system factors at scale and link these interventions to changes in CHW program performance is technically difficult. Research sponsors and program implementers may be reluctant to engage with researchers and evaluators at an early stage, which would be important for development of sound evidence; and,
- The topic of health systems factors or health system strengthening (the intervention to improve health systems factors) has lacked some precision in distinguishing between efforts to increase inputs overall (more training, more supervision, more supplies, etc.) and efforts to change the ways in which health systems use inputs to improve processes, outputs and outcomes.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In reality, many countries are faced with acute shortage of health professionals (doctors, nurses and midwives). Among those workforce shortage countries, there are enormous disparities in health outcomes; e.g., among the 56 health workforce crisis countries, the child mortality rate ranges from 180 to 16 and contraceptive prevalence ranges from 1% to 69%. At least in part, this diversity reflects the degree to which countries have deployed other kinds of health workers – including community health workers – to compensate for the dearth of health professionals. Thus, notwithstanding the methodological shortcomings of the studies in the literature, there is consistency in the observed health system determinants of CHW performance; i.e., supervision, training, linkages to the formal health system, etc., and these are the same types of determinants we see for other types of workers. Other ERTs have examined the importance of community supports, and so we will not discuss them here.

Although CHWs should not be considered a solution to a weak health system, they can play an important role in health systems performance, in achieving coverage with key interventions that can influence outcomes. Fifty years of experience and the literature both are consistent in the identification of key CHW program factors that are necessary for CHW performance. Thus, while our review of the literature has not provided the kinds of evidence originally intended,

we still feel there is a strong case for encouraging countries that are still some years away from having adequate numbers of health professionals to deploy CHWs at scale and to do so in a way that reflects the accumulated body of knowledge.

However, it is important to recognize that previous efforts to expand CHW programs have often failed precisely because the health system was weak and not able to ensure these key CHW program design factors were in place and consistently implemented – adequate supervision, fair incentive systems, and consistent drug supplies. We do not need additional evidence to tell us that if these elements are missing, CHW programs do not achieve intended results. This is exactly why our ERT shifted the question of interest from "What formal health system support is needed for CHW performance?" to "How can health systems best consistently and sustainably support CHW performance?" We call for a different type of evidence, less focused on small studies concerned with specific types of in-service training or supervision, and more focused on how we can ensure in-service training and supervision are taking place. The scaling up of CHW programs as part of the over-all expansion of the health workforce should be seen as a process of continuous learning and experimentation – we call for growth of CHW programs accompanied by evaluation and learning processes that yield continuous adaptation. Conceptually, we can agree that supporting CHW program development can help strengthen health systems, but that weak health systems impede effective support for CHW programs. More evidence on this would help set and manage expectations.

The reality is that countries performing poorly on the MDGs need to act in the near term to counteract the health workforce shortages that are impinging on their ability to make progress. They will have to make decisions with less than perfect knowledge. However, they will also have to be ready to acknowledge that CHWs, to be effective, need formal health system support, and thus, their role within the formal health system recognized. Our conceptual framework for formal health system support unpacks the various layers of determinants and important considerations for CHW programming, which can be used as a basis for building in evaluation and learning into CHW program implementation.

Recommendations

Priorities for Policy and Action in Support of CHW Performance

- Any CHW program should include clear standards, competency-based capacity building, on-going mentoring and supervision, a defined scope of work, some kind of incentives (financial/non-financial), clear links to the formal health system care processes, and performance monitoring and improvement.
- Supportive regulatory frameworks and regulatory bodies (councils, unions, associations) for CHW practice need to be developed to establish defined scopes of practice, standardize training, clear career development paths and incentive systems. This will enhance the acceptance and 'respect' of the CHW role among other formal cadres and the community.
- Supervision is a continuous challenge; creative solutions or new approaches are needed to monitor, support and coach CHWs in a consistent manner.
- Develop guidelines for formal health system support planning and monitoring, including unit costing[2] and for remedial action for weak support.
- Continued advocacy is required to engage governments and formal cadres within the health system to support a fully prepared, integrated, and accepted CHW cadre.
- USAID should support CHW programs, contingent on significant efforts to address health system support necessary to ensure continuous provision of CHW program factors (see previous bullet)
- The reduction of support in the 1980s for CHW programs offers important lessons for today's revival of those programs. USAID should help convene a global advisory group to propose strategies for avoiding a repeat of that pattern – to focus on developing strategies to address the formal health system level support needed for

[2] Some work on costing of CCM is already being done.

functioning CHW programs. USAID should work with GHI countries to include strategies for CHW support in their country programs and monitor progress as part of its HRH strategies.

- Country health systems need to directly address the role they see for CHWs, and how they are integrated into the formal health system, and how their role is intended to evolve as the formal health system will be evolving.
- Assess at country level the extent to which multiple CHW initiatives in different regions or in the same region but focusing on different health programs may weaken health system support through diffusing effort or whether it has positive effects through allowing greater programmatic focus. If multiple initiatives are found to weaken health system support, consider strategies for integration or local variation and control.
- As we consider strengthening/formalizing the role of the CHW, we also need to see how this fits in with the broader aspect of strengthening the entire health system with sustainability in mind, and towards meeting specific MDG goals. The role of government funding sources, country ownership, and the role of the private sector are critical components that cannot be ignored.

Priorities for Improving Availability and Use of Evidence

- Promote best practices for CHW program performance evaluations and "basic minimum" of reporting standards on key elements which relate to health system factors, CHW program factors, proximate and intermediate outcome measures of CHW performance, and proximate outcomes where possible.
- Evaluate long-standing CHW programs that are operating at scale (e.g., Malawi, Ethiopia, Nigeria, etc.) to identify and test interventions to strengthen formal health system support
- Develop a global HR research agenda that focuses on key priority areas for the next 10 years that PEPFAR/GAVI/GFATM and other donors funding CHWs can support. This research agenda should focus on building evidence on how the formal health system can better support and improve CHW performance in a sustainable manner – this will include policy and implementation research.

REFERENCES

1. Berman P, Pallas S, Smith AL, Curry L, Bradley EH. Improving the Delivery of Health Services: A Guide to Choosing Strategies. The World Bank, 2011.
2. Berman PA, Gwatkin DR, Burger SE. Community-based health workers: head start or false start towards health for all? Soc Sci Med. 1987;25(5):443-59. Epub 1987/01/01.
3. Bhutta ZA, Lassi ZS, Pariyo G, Huicho L. Global Experience of Community Health Workers for Delivery of Health Related Millennium Development Goals: A Systematic Review, Country Case Studies, and Recommendations for Integration into National Health Systems. Karachi, Pakistan: World Health Organization, 2010.
4. Bhutta ZA, Soofi S, Cousens S, Mohammad S, Memon ZA, Ali I, et al. Improvement of perinatal and newborn care in rural Pakistan through community-based strategies: a cluster-randomised effectiveness trial. Lancet. 2011;377(9763):403-12. Epub 2011/01/18.
5. Chen L, Evans D, Evans T, Sadana R, Stilwell B, Travis P, et al. The world health report 2006: working together for health. Geneva, Switzerland: World Health Organization; 2006.
6. Delacollette C, Van der Stuyft P, Molima K. Using community health workers for malaria control: experience in Zaire. Bulletin of the World Health Organization. 1996;74(4):423-30. Epub 1996/01/01.
7. El Arifeen S, Mullany LC, Shah R, Mannan I, Rahman SM, Talukder MRR, et al. The effect of cord cleansing with chlorhexidine on neonatal mortality in rural Bangladesh: a community-based, cluster-randomised trial. The Lancet. 2012;379(9820):1022-8.
8. Elder JP, Louis T, Sutisnaputra O, Sulaeiman NS, Ware L, Shaw W, et al. The use of diarrhoeal management counselling cards for community health volunteer training in Indonesia: the HealthCom Project. The Journal of tropical medicine and hygiene. 1992;95(5):301-8. Epub 1992/10/01.
9. Fauveau V, Stewart MK, Chakraborty J, Khan SA. Impact on mortality of a community-based programme to control acute lower respiratory tract infections. Bulletin of the World Health Organization. 1992;70(1):109-16. Epub 1992/01/01.
10. Fort AL, Voltero L. Factors affecting the performance of maternal health care providers in Armenia. Human resources for health. 2004;2(1):8. Epub 2004/06/24.
11. Frankel S. Overview. The Community Health Worker: Effective Programmes for Developing Countries. USA: Oxford Medical Publications; 1992. p. 1-61.
12. Haines A, Sanders D, Lehmann U, Rowe AK, Lawn JE, Jan S, et al. Achieving child survival goals: potential contribution of community health workers. The Lancet. 2007;369(9579):2121-31
13. Kane SS, Gerretsen B, Scherpbier R, Dal Poz M, Dieleman M. A realist synthesis of randomised control trials involving use of community health workers for delivering child health interventions in low and middle income countries. BMC health services research. 2010;10:286. Epub 2010/10/15.
14. Lassi ZS, Haider BA, Bhutta ZA. Community-Based Intervention Packages for Reducing Maternal Morbidity and Mortality and Improving Neonatal Outcomes. Final Report 2011. International Initiative for Impact Evaluation, 2011.
15. Lehmann U, Sanders D. Community health workers: What do we know about them? The state of the evidence on programmes, activities, costs and impact on health outcomes of using community health workers. Geneva: World Health Organization, 2007.
16. Malarcher S, Meirik O, Lebetkin E, Shah I, Spieler J, Stanback J. Provision of DMPA by community health workers: what the evidence shows. Contraception. 2011;83(6):495-503.
17. Phillips JF, Silayan-Go A, Pal-Montano A. An experiment with payment, quota, and clinic affiliation schemes for lay motivators in the Philippines. Studies in family planning. 1975;6(9):326. Epub 1975/09/01.
18. Prasad BM, Muraleedharan VR. Community health workers: a review of concepts, practice and policy concerns. Chennai, India: Consortium for Research on Equitable Health Systems (CREHS), 2008.
19. Rockers PC, Feigl AB, Rottingen JA, Fretheim A, de Ferranti D, Lavis JN, et al. Study-design selection criteria in systematic reviews of effectiveness of health systems interventions and reforms: A meta-review. Health Policy. 2012;104(3):206-14. Epub 2012/02/14.

20. Schneider H, Hlophe H, van Rensburg D. Community health workers and the response to HIV/AIDS in South Africa: tensions and prospects. Health policy and planning. 2008;23(3):179-87. Epub 2008/04/05.
21. Shah R, Munos MK, Winch PJ, Mullany LC, Mannan I, Rahman SM, et al. Community-based health workers achieve high coverage in neonatal intervention trials: a case study from Sylhet, Bangladesh. Journal of health, population, and nutrition. 2010;28(6):610-8. Epub 2011/01/26.
22. Shankar AV, Asrilla Z, Kadha JK, Sebayang S, Apriatni M, Sulastri A, et al. Programmatic effects of a large-scale multiple-micronutrient supplementation trial in Indonesia: using community facilitators as intermediaries for behavior change. Food and nutrition bulletin. 2009;30(2 Suppl):S207-14. Epub 2010/05/26.
23. Sircar BK, Deb BC, Sengupta PG, Mondal S, Gupta DN, Sarkar S, et al. An operational study on implementation of oral rehydration therapy in a rural community of West Bengal, India. The Indian journal of medical research. 1991;93:297-302. Epub 1991/09/01.
24. Thiam S, LeFevre AM, Hane F, Ndiaye A, Ba F, Fielding KL, et al. Effectiveness of a strategy to improve adherence to tuberculosis treatment in a resource-poor setting: a cluster randomized controlled trial. JAMA : the journal of the American Medical Association. 2007;297(4):380-6. Epub 2007/01/25.
25. UNICEF. Community health workers: a review of concepts, practice and policy concerns. Kathmandu, Nepal: UNICEF Regional Office for South Asia, 2004.
26. Vijayaraghavan K, Rameshwar Sarma KV, Swaminathan MC. Impact of nutrition orientation to health guides on nutrition component of health guide scheme. The Indian journal of medical research. 1986;84:99-107. Epub 1986/07/01.

ANNEX 1: QUALITY AND RELEVANCY SCREENS FOR LITERATURE REVIEW

Quality Screen for Literature
Measured as Yes/No:

- Study design appropriate for hypothesis
- Study intervention implemented with fidelity
- Equivalence of comparison groups
- Endpoints (outcome measures) valid and relevant
- Appropriateness of analysis
- Generalizability of results
- Sustainability addressed

Rating on Relevance

1 = support activities not mentioned
2 = support activities mentioned but details of how activities conducted not described
3 = support activities described but not evaluated
4 = support activities evaluated but relationship to performance not analyzed
5 = support activities described and evaluated and relationship to performance was analyzed

ANNEX 2: ALL LITERATURE REVIEWED BY ERT2

1. In: Frankel S, editor. The Community Health Worker: Effective Programmes for Developing Countries. Oxford: Oxford University; 1992. p. 1-60.
2. Pilot Project "SCALE-Squared" Training Center Clas Las Moras - Huanuco: Mid-term Evaluation 2003-2005. Future Generations Peru; 2007. p. 43.
3. Improving Health Service Delivery in Developing Countries: From Evidence to Action. Washington, DC: The International Bank for Reconstruction and Development / The World Bank, 2009 978-0-8213-7888-5.
4. Agrasada GV, Gustafsson J, Kylberg E, Ewald U. Postnatal peer counselling on exclusive breastfeeding of low-birthweight infants: A randomized, controlled trial. Acta Pædiatrica. 2005;94(8):1109-15.
5. Ahmad J, Bhatnagar I, Khan ME. Increasing Access to Family Planning and Reproductive Health Services Through Community Health Workers: A Case Study of a Dual Cadre Model in India. Case Study Report. Washington, DC: The Population Council, Inc., 2012.
6. Ali M, Asefaw T, Byass P, Beyene H, Pedersen FK. Helping northern Ethiopian communities reduce childhood mortality: population-based intervention trial. Bulletin of the World Health Organization. 2005;83(1):27-33. Epub 2005/02/01.
7. Alto WA, Alk S, Pinau D, Polume H. Improving immunization coverage, a comparison between traditional MCH teams and MCH teams plus aid post orderlies. Papua and New Guinea medical journal. 1989;32(2):97-100. Epub 1989/06/01.
8. Arifeen SE, Blum LS, Hoque DME, Chowdhury EK, Khan R, Black RE, et al. Integrated Management of Childhood Illness (IMCI) in Bangladesh: early findings from a cluster-randomised study. The Lancet. 2004;364(9445):1595-602.
9. Bailey JE, Coombs DW. Effectiveness of an Indonesian model for rapid training of Guatemalan health workers in diarrhea case management. Journal of community health. 1996;21(4):269-76. Epub 1996/08/01.
10. Baral JP, Bhattarai S, Thapa MR, Ghimire K, Burathoki. Effectiveness of training of basic health workers in Leprosy Control Programme. Indian journal of leprosy. 1998;70 Suppl:23S-31S. Epub 2000/09/19.
11. Bari A, Sadruddin S, Khan A, Khan I, Lehri IA, Macleod WB, et al. Community case management of severe pneumonia with oral amoxicillin in children aged 2-59 months in Haripur district, Pakistan: a cluster randomised trial. Lancet. 2011;378(9805):1796-803. Epub 2011/11/15.
12. Bawa SB, Olumide EA. The effect of training on the reporting of notifiable diseases among health workers in Yobe State, Nigeria. The Nigerian postgraduate medical journal. 2005;12(1):1-5. Epub 2005/04/14.
13. Berman P, Pallas S, Smith A, Curry L, Bradley E. Improving the Delivery of Health Services: A Guide to Choosing Strategies. The World Bank, 2011.
14. Berman PA, Gwatkin DR, Burger SE. Community-based health workers: head start or false start towards health for all? Social science & medicine (1982). 1987;25(5):443-59. Epub 1987/01/01.
15. Bhandari N, Bahl R, Mazumdar S, Martines J, Black RE, Bhan MK, et al. Effect of community-based promotion of exclusive breastfeeding on diarrhoeal illness and growth: a cluster randomised controlled trial. Lancet. 2003;361(9367):1418-23. Epub 2003/05/03.
16. Bhandari N, Mazumder S, Bahl R, Martines J, Black RE, Bhan MK, et al. An educational intervention to promote appropriate complementary feeding practices and physical growth in infants and young children in rural Haryana, India. The Journal of nutrition. 2004;134(9):2342-8. Epub 2004/08/31.
17. Bhutta ZA, Lassi ZS, Pariyo G, Huicho L. Global Experience of Community Health Workers for Delivery of Health Related Millennium Development Goals: A Systematic Review, Country Case Studies, and Recommendations for Integration into National Health Systems. Karachi, Pakistan: WHO, Global Health Workforce Alliance, 2010.
18. Bhutta ZA, Soofi S, Cousens S, Mohammad S, Memon ZA, Ali I, et al. Improvement of perinatal and newborn care in rural Pakistan through community-based strategies: a cluster-randomised effectiveness trial. Lancet. 2011;377(9763):403-12. Epub 2011/01/18.
19. Bilal NK, Herbst CH, Zhao F, Soucat A, Lemiere C. Health Extension Workers in Ethiopia: Improved Access and Coverage for the Rural Poor. In: Chuhan-Pole P, Angwafo M, editors. Yes Africa Can: Success Stories from a

Dynamic Continent Washington DC: The International Bank for Reconstruction and Development / The World Bank; 2011. p. 492.
20. Charleston R. NEXOS: Promoting Maternal and Child Health Linked to Co-Management of Primary Health Care Services. Future Generations International: To Research, To Practice, To Teach - How Communities Change: USAID Child Survival and Health Program; 2009. p. 44.
21. Chen L, Evans D, Evans T, Sadana R, Stilwell B, Travis P. The world health report 2006: working together for health. Geneva, Switzerland: World Health Organization, 2006.
22. Chongsuvivatwong V, Bujakorn L, Kanpoy V, Treetrong R. Control of neonatal tetanus in southern Thailand. International journal of epidemiology. 1993;22(5):931-5. Epub 1993/10/01.
23. Chongsuvivatwong V, Mo-Suwan L, Tayakkanonta K, Vitsupakorn K, McNeil R. Impacts of training of village health volunteers in reduction of morbidity from acute respiratory infections in childhood in southern Thailand. The Southeast Asian journal of tropical medicine and public health. 1996;27(2):333-8. Epub 1996/06/01.
24. Coeytaux FM, Kilani T, McEvoy M. The role of information, education, and communication in family planning service delivery in Tunisia. Studies in family planning. 1987;18(4):229-34. Epub 1987/07/01.
25. Coutinho SB, de Lira PI, de Carvalho Lima M, Ashworth A. Comparison of the effect of two systems for the promotion of exclusive breastfeeding. Lancet. 2005;366(9491):1094-100. Epub 2005/09/27.
26. Cowan FM, Pascoe SJ, Langhaug LF, Mavhu W, Chidiya S, Jaffar S, et al. The Regai Dzive Shiri project: results of a randomized trial of an HIV prevention intervention for youth. AIDS (London, England). 2010;24(16):2541-52. Epub 2010/10/01.
27. Curtale F, Siwakoti B, Lagrosa C, LaRaja M, Guerra R. Improving skills and utilization of community health volunteers in Nepal. Social science & medicine (1982). 1995;40(8):1117-25. Epub 1995/04/01.
28. Darmstadt GL, Baqui AH, Choi Y, Bari S, Rahman SM, Mannan I, et al. Validation of community health workers' assessment of neonatal illness in rural Bangladesh. Bulletin of the World Health Organization. 2009;87:12-9.
29. Darmstadt GL, Choi Y, Arifeen SE, Bari S, Rahman SM, Mannan I, et al. Evaluation of a cluster-randomized controlled trial of a package of community-based maternal and newborn interventions in Mirzapur, Bangladesh. PloS one. 2010;5(3):e9696. Epub 2010/03/31.
30. Darmstadt GL, El Arifeen S, Choi Y, Bari S, Rahman SM, Mannan I, et al. Household surveillance of severe neonatal illness by community health workers in Mirzapur, Bangladesh: coverage and compliance with referral. Health policy and planning. 2010;25(2):112-24. Epub 2009/11/18.
31. Datiko DG, Lindtjorn B. Cost and cost-effectiveness of smear-positive tuberculosis treatment by Health Extension Workers in Southern Ethiopia: a community randomized trial. PloS one. 2010;5(2):e9158. Epub 2010/02/23.
32. Debpuur C, Phillips JF, Jackson EF, Nazzar A, Ngom P, Binka FN. The impact of the Navrongo Project on contraceptive knowledge and use, reproductive preferences, and fertility. Studies in family planning. 2002;33(2):141-64. Epub 2002/07/23.
33. Delacollette C, Van der Stuyft P, Molima K. Using community health workers for malaria control: experience in Zaire. Bulletin of the World Health Organization. 1996;74(4):423-30. Epub 1996/01/01.
34. Dias A, Dewey ME, D'Souza J, Dhume R, Motghare DD, Shaji KS, et al. The effectiveness of a home care program for supporting caregivers of persons with dementia in developing countries: a randomised controlled trial from Goa, India. PloS one. 2008;3(6):e2333. Epub 2008/06/05.
35. Dynes M, Buffington ST, Carpenter M, Handley A, Kelley M, Tadesse L, et al. Strengthening maternal and newborn health in rural Ethiopia: Early results from frontline health worker community maternal and newborn health training. Midwifery. 2012. Epub 2012/02/22.
36. El Arifeen S, Mullany LC, Shah R, Mannan I, Rahman SM, Talukder MRR, et al. The effect of cord cleansing with chlorhexidine on neonatal mortality in rural Bangladesh: a community-based, cluster-randomised trial. The Lancet. 2012;379(9820):1022-8.
37. Elder JP, Louis T, Sutisnaputra O, Sulaeiman NS, Ware L, Shaw W, et al. The use of diarrhoeal management counselling cards for community health volunteer training in Indonesia: the HealthCom Project. The Journal of tropical medicine and hygiene. 1992;95(5):301-8. Epub 1992/10/01.
38. Ertl V, Pfeiffer A, Schauer E, Elbert T, Neuner F. Community-implemented trauma therapy for former child soldiers in Northern Uganda: a randomized controlled trial. JAMA : the journal of the American Medical

Association. 2011;306(5):503-12. Epub 2011/08/05.
39. Fauveau V, Stewart MK, Chakraborty J, Khan SA. Impact on mortality of a community-based programme to control acute lower respiratory tract infections. Bulletin of the World Health Organization. 1992;70(1):109-16. Epub 1992/01/01.
40. Florez-Arango JF, Iyengar MS, Dunn K, Zhang J. Performance factors of mobile rich media job aids for community health workers. Journal of the American Medical Informatics Association : JAMIA. 2011;18(2):131-7. Epub 2011/02/05.
41. Foreit JR, Foreit KG. Quarterly versus monthly supervision of CBD family planning programs: an experimental study in northeast Brazil. Studies in family planning. 1984;15(3):112-20. Epub 1984/05/01.
42. Fort AL, Voltero L. Factors affecting the performance of maternal health care providers in Armenia. Human resources for health. 2004;2(1):8. Epub 2004/06/24.
43. Friedman I, Ramalepe M, Matjuis F, Lungile Bhengu L, Lloyd B, Mafuleka A, et al. Moving Towards Best Practice: Documenting and Learning from Existing Community Health/Care Worker Programmes. Durban 2007. p. 29.
44. Gill CJ, Phiri-Mazala G, Guerina NG, Kasimba J, Mulenga C, MacLeod WB, et al. Effect of training traditional birth attendants on neonatal mortality (Lufwanyama Neonatal Survival Project): randomised controlled study. BMJ (Clinical research ed). 2011;342:d346. Epub 2011/02/05.
45. Gilson L, Walt G, Heggenhougen K, Owuor-Omondi L, Perera M, Ross D, et al. National community health worker programs: how can they be strengthened? Journal of public health policy. 1989;10(4):518-32. Epub 1989/01/01.
46. Glenton C, Scheel IB, Pradhan S, Lewin S, Hodgins S, Shrestha V. The female community health volunteer programme in Nepal: Decision makers' perceptions of volunteerism, payment and other incentives. Social Science & Medicine. 2010;70(12):1920-7.
47. Gokcay G, Bulut A, Neyzi O. Paraprofessional women as health care facilitators in mother and child health. Tropical doctor. 1993;23(2):79-81. Epub 1993/04/01.
48. Greenwood AM, Bradley AK, Byass P, Greenwood BM, Snow RW, Bennett S, et al. Evaluation of a primary health care programme in The Gambia. I. The impact of trained traditional birth attendants on the outcome of pregnancy. The Journal of tropical medicine and hygiene. 1990;93(1):58-66. Epub 1990/02/01.
49. Gul A, Ali BS. The onset and duration of benefit from counselling by minimally trained counsellors on anxiety and depression in women. JPMA The Journal of the Pakistan Medical Association. 2004;54(11):549-52. Epub 2004/12/30.
50. Haider R, Kabir I, Huttly SR, Ashworth A. Training peer counselors to promote and support exclusive breastfeeding in Bangladesh. Journal of human lactation : official journal of International Lactation Consultant Association. 2002;18(1):7-12. Epub 2002/02/16.
51. Haines A, Sanders D, Lehmann U, Rowe AK, Lawn JE, Jan S, et al. Achieving child survival goals: potential contribution of community health workers. The Lancet. 2007;369(9579):2121-31.
52. Jacobs E, Brambila C, Vernon R. Reproductive Health Care in the Postnatal Period in Guatemala. The Population Council, Inc., August 5, 2002.
53. Jafar TH, Hatcher J, Poulter N, Islam M, Hashmi S, Qadri Z, et al. Community-based interventions to promote blood pressure control in a developing country: a cluster randomized trial. Annals of internal medicine. 2009;151(9):593-601. Epub 2009/11/04.
54. Jafar TH, Islam M, Hatcher J, Hashmi S, Bux R, Khan A, et al. Community based lifestyle intervention for blood pressure reduction in children and young adults in developing country: cluster randomised controlled trial. BMJ (Clinical research ed). 2010;340:c2641. Epub 2010/06/10.
55. Jakobsen MS, Sodemann M, Biai S, Nielsen J, Aaby P. Promotion of exclusive breastfeeding is not likely to be cost effective in West Africa. A randomized intervention study from Guinea-Bissau. Acta paediatrica (Oslo, Norway : 1992). 2008;97(1):68-75. Epub 2007/12/07.
56. Janowitz B, Chege J, Thompson A, Rutenberg N, Homan R. Community-Based Distribution in Tanzania:Costs and Impacts of Alternative Strategies to Improve Worker Performance. International Family Planning Perspectives. 2000;26(4):158-60 & 93-95.
57. Kane SS, Gerretsen B, Scherpbier R, Dal Poz M, Dieleman M. A realist synthesis of randomised control trials involving use of community health workers for delivering child health interventions in low and middle income

countries. BMC health services research. 2010;10:286. Epub 2010/10/15.
58. Khan AJ, Khan JA, Akbar M, Addiss DG. Acute respiratory infections in children: a case management intervention in Abbottabad District, Pakistan. Bulletin of the World Health Organization. 1990;68(5):577-85. Epub 1990/01/01.
59. Kidane G, Morrow RH. Teaching mothers to provide home treatment of malaria in Tigray, Ethiopia: a randomised trial. Lancet. 2000;356(9229):550-5. Epub 2000/08/19.
60. Ladzani R, Steyn NP, Nel JH. An evaluation of the effectiveness of nutrition advisers in three rural areas of northern province. South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde. 2000;90(8):811-6. Epub 2000/10/07.
61. Lassi ZS, Haider BA, Bhutta ZA. Community-Based Intervention Packages for Reducing Maternal Morbidity and Mortality and Improving Neonatal Outcomes. Final Report 2011. International Initiative for Impact Evaluation, 2011.
62. LeBan K. Understanding Community Components of a Health System: Draft for Input. CORE Group; 2011. p. 15.
63. Lehmann U, Sanders D. Community health workers: What do we know about them? The state of the evidence on programmes, activities, costs and impact on health outcomes of using community health workers. Geneva: World Health Organization, 2007.
64. Leite AJ, Puccini RF, Atalah AN, Alves Da Cunha AL, Machado MT. Effectiveness of home-based peer counselling to promote breastfeeding in the northeast of Brazil: a randomized clinical trial. Acta paediatrica (Oslo, Norway : 1992). 2005;94(6):741-6. Epub 2005/09/29.
65. Lewin S, Dick J, Zwarenstein M, Lombard CJ. Staff training and ambulatory tuberculosis treatment outcomes: a cluster randomized controlled trial in South Africa. Bulletin of the World Health Organization. 2005;83(4):250-9. Epub 2005/05/04.
66. Lewin S, Munabi-Babigumira S, Glenton C, Daniels K, Bosch-Capblanch X, van Wyk BE, et al. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. Cochrane database of systematic reviews (Online). 2010(3):CD004015. Epub 2010/03/20.
67. Limtragool P, Stoeckel J, Charoenchai A, Panichacheewakul P. Immunization: full coverage the aim. World health forum. 1992;13(1):15-9. Epub 1992/01/01.
68. Lipp A. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases: a review synopsis. Public health nursing (Boston, Mass). 2011;28(3):243-5. Epub 2011/05/04.
69. Malarcher S, Meirik O, Lebetkin E, Shah I, Spieler J, Stanback J. Provision of DMPA by community health workers: what the evidence shows. Contraception. 2011;83(6):495-503.
70. Mathur HN, Damodar, Sharma PN, Jain TP. The impact of training traditional birth attendants on the utilisation of maternal health services. Journal of epidemiology and community health. 1979;33(2):142-4. Epub 1979/06/01.
71. McPake B, Witter S, Ensor T, Fustukian S, Newlands D, Martineau T. Removing financial barriers to access reproductive, maternal and newborn health services: the challenges and policy implications for Human Resources for Health (HRH). Policy Brief. Edinburgh: Queen Margaret University, December 2011.
72. Mobeen N, Durocher J, Zuberi N, Jahan N, Blum J, Wasim S, et al. Administration of misoprostol by trained traditional birth attendants to prevent postpartum haemorrhage in homebirths in Pakistan: a randomised placebo-controlled trial. BJOG : an international journal of obstetrics and gynaecology. 2011;118(3):353-61. Epub 2010/12/24.
73. Morrow AL, Guerrero ML, Shults J, Calva JJ, Lutter C, Bravo J, et al. Efficacy of home-based peer counselling to promote exclusive breastfeeding: a randomised controlled trial. Lancet. 1999;353(9160):1226-31. Epub 1999/04/27.
74. Mtango FD, Neuvians D. Acute respiratory infections in children under five years. Control project in Bagamoyo District, Tanzania. Transactions of the Royal Society of Tropical Medicine and Hygiene. 1986;80(6):851-8. Epub 1986/01/01.
75. Mubi M, Janson A, Warsame M, Martensson A, Kallander K, Petzold MG, et al. Malaria rapid testing by community health workers is effective and safe for targeting malaria treatment: randomised cross-over trial in

Tanzania. PloS one. 2011;6(7):e19753. Epub 2011/07/14.
76. Muennoo C, Achwanichkul W, Sa-nguankiat S, Pubampen S, Maipanich W, Anataphruti M, et al. The impact of primary health care intervention on reinfection of soil-transmitted helminths in the community. The Southeast Asian journal of tropical medicine and public health. 1997;28(4):816-9. Epub 1998/07/10.
77. Mukanga D, Babirye R, Peterson S, Pariyo GW, Ojiambo G, Tibenderana JK, et al. Can lay community health workers be trained to use diagnostics to distinguish and treat malaria and pneumonia in children? Lessons from rural Uganda. Tropical Medicine & International Health. 2011;16(10):1234-42.
78. Munyao P, Luchters S, Chersich MF, Kaai S, Geibel S, Mandaliya KN, et al. Implementation of clinic-based modified-directly observed therapy (m-DOT) for ART; experiences in Mombasa, Kenya. AIDS care. 2010;22(2):187-94. Epub 2010/04/15.
79. Nsungwa-Sabiiti J, Peterson S, Pariyo G, Ogwal-Okeng J, Petzold MG, Tomson G. Home-based management of fever and malaria treatment practices in Uganda. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2007;101(12):1199-207. Epub 2007/10/20.
80. Ntsua S, Tapsoba P, Asare GQ, Nyonator F. Repositioning Community-based Family Planning in Ghana: A Case Study of Community-based Health Planning and Services (CHPS). Case Study Report. Washington, DC: The Population Council, Inc, 2012.
81. Odusanya OO, Oyediran MA. The effect of an educational intervention on improving rational drug use. The Nigerian postgraduate medical journal. 2004;11(2):126-31. Epub 2004/08/10.
82. O'Rourke K. The effect of hospital staff training on management of obstetrical patients referred by traditional birth attendants. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics. 1995;48 Suppl:S95-102. Epub 1995/06/01.
83. Ortiz C, Sylla A, Diadhou M, Dieng T, Mall I, Sloan NL. Preventing Postpartum Hemorrhage at the Community Level in Senegal with Misoprostol. Bethesda, MD: Health Systems 20/20 project, Abt Associates Inc.; December 2010.
84. Owais A, Hanif B, Siddiqui AR, Agha A, Zaidi AK. Does improving maternal knowledge of vaccines impact infant immunization rates? A community-based randomized-controlled trial in Karachi, Pakistan. BMC public health. 2011;11:239. Epub 2011/04/19.
85. Pagel C, Lewycka S, Colbourn T, Mwansambo C, Meguid T, Chiudzu G, et al. Estimation of potential effects of improved community-based drug provision, to augment health-facility strengthening, on maternal mortality due to post-partum haemorrhage and sepsis in sub-Saharan Africa: an equity-effectiveness model. Lancet. 2009;374(9699):1441-8. Epub 2009/09/29.
86. Pandey MR, Sharma PR, Gubhaju BB, Shakya GM, Neupane RP, Gautam A, et al. Impact of a pilot acute respiratory infection (ARI) control programme in a rural community of the hill region of Nepal. Annals of tropical paediatrics. 1989;9(4):212-20. Epub 1989/12/01.
87. Pazoki R, Nabipour I, Seyednezami N, Imami SR. Effects of a community-based healthy heart program on increasing healthy women's physical activity: a randomized controlled trial guided by Community-based Participatory Research (CBPR). BMC public health. 2007;7:216. Epub 2007/08/25.
88. Phillips JF, Silayan-Go A, Pal-Montano A. An experiment with payment, quota, and clinic affiliation schemes for lay motivators in the Philippines. Studies in family planning. 1975;6(9):326. Epub 1975/09/01.
89. Powell C, Grantham-McGregor S. Home visiting of varying frequency and child development. Pediatrics. 1989;84(1):157-64. Epub 1989/07/01.
90. Prasad BM, Muraleedharan VR. Community health workers: a review of concepts, practice and policy concerns. Chennai, India: Consortium for Research on Equitable Health Systems (CREHS), 2008.
91. Rahman A, Iqbal Z, Roberts C, Husain N. Cluster randomized trial of a parent-based intervention to support early development of children in a low-income country. Child: care, health and development. 2009;35(1):56-62. Epub 2008/11/11.
92. Rockers PC, Feigl AB, Rottingen JA, Fretheim A, de Ferranti D, Lavis JN, et al. Study-design selection criteria in systematic reviews of effectiveness of health systems interventions and reforms: A meta-review. Health policy (Amsterdam, Netherlands). 2012;104(3):206-14. Epub 2012/02/14.
93. Rodriguez-Garcia R, Aumack KJ, Ramos A. A community-based approach to the promotion of breastfeeding in

Mexico. Journal of obstetric, gynecologic, and neonatal nursing : JOGNN / NAACOG. 1990;19(5):431-8. Epub 1990/09/01.
94. Ronsmans C, Vanneste AM, Chakraborty J, van Ginneken J. Decline in maternal mortality in Matlab, Bangladesh: a cautionary tale. Lancet. 1997;350(9094):1810-4. Epub 1998/01/15.
95. Rotheram-Borus MJ, Li L, Liang LJ, Wen Y, Wu Z, Group NCHSPT. Attitudinal, behavioral, and biological outcomes of a community popular opinion leader intervention in China. AIDS education and prevention : official publication of the International Society for AIDS Education. 2011;23(5):448-56. Epub 2011/10/21.
96. Rotheram-Borus MJ, Wu Z, Liang LJ, Li L, Detels R, Guan J, et al. Reductions in sexually transmitted infections associated with popular opinion leaders in China in a randomised controlled trial. Sexually transmitted infections. 2011;87(4):337-43. Epub 2011/02/01.
97. Rowe AK, de Savigny D, Lanata CF, Victora CG. How can we achieve and maintain high-quality performance of health workers in low-resource settings? Lancet. 2005;366(9490):1026-35. Epub 2005/09/20.
98. Roy SK, Jolly SP, Shafique S, Fuchs GJ, Mahmud Z, Chakraborty B, et al. Prevention of malnutrition among young children in rural Bangladesh by a food-health-care educational intervention: a randomized, controlled trial. Food and nutrition bulletin. 2007;28(4):375-83. Epub 2008/02/16.
99. Schneider H, Hlophe H, van Rensburg D. Community health workers and the response to HIV/AIDS in South Africa: tensions and prospects. Health policy and planning. 2008;23(3):179-87. Epub 2008/04/05.
100. Schroeder DG, Pachon H, Dearden KA, Kwon CB, Ha TT, Lang TT, et al. An integrated child nutrition intervention improved growth of younger, more malnourished children in northern Viet Nam. Food and nutrition bulletin. 2002;23(4 Suppl):53-61. Epub 2002/12/31.
101. Shah PM, Selwyn BJ, Shah K, Kumar V. Evaluation of the home-based maternal record: a WHO collaborative study. Bulletin of the World Health Organization. 1993;71(5):535-48. Epub 1993/01/01.
102. Shah R, Munos MK, Winch PJ, Mullany LC, Mannan I, Rahman SM, et al. Community-based health workers achieve high coverage in neonatal intervention trials: a case study from Sylhet, Bangladesh. Journal of health, population, and nutrition. 2010;28(6):610-8. Epub 2011/01/26.
103. Shankar AV, Asrilla Z, Kadha JK, Sebayang S, Apriatni M, Sulastri A, et al. Programmatic effects of a large-scale multiple-micronutrient supplementation trial in Indonesia: using community facilitators as intermediaries for behavior change. Food and nutrition bulletin. 2009;30(2 Suppl):S207-14. Epub 2010/05/26.
104. Shargie EB, Morkve O, Lindtjorn B. Tuberculosis case-finding through a village outreach programme in a rural setting in southern Ethiopia: community randomized trial. Bulletin of the World Health Organization. 2006;84(2):112-9. Epub 2006/02/28.
105. Singh MM, Devi R, Gupta S. Effectiveness of training on the knowledge of vitamin A deficiency among Anganwadi workers in a rural area of north India. Indian journal of public health. 1999;43(2):79-81. Epub 2001/03/13.
106. Singhal N, McMillan DD, Cristobal FL, Arciaga RS, Hocson W, Franco J, et al. Problem-based teaching of birth attendants in the Philippines. Health care for women international. 2001;22(6):569-83. Epub 2002/07/27.
107. Sircar BK, Deb BC, Sengupta PG, Mondal S, Gupta DN, Sarkar S, et al. An operational study on implementation of oral rehydration therapy in a rural community of West Bengal, India. The Indian journal of medical research. 1991;93:297-302. Epub 1991/09/01.
108. Thiam S, LeFevre AM, Hane F, Ndiaye A, Ba F, Fielding KL, et al. Effectiveness of a strategy to improve adherence to tuberculosis treatment in a resource-poor setting: a cluster randomized controlled trial. JAMA : the journal of the American Medical Association. 2007;297(4):380-6. Epub 2007/01/25.
109. Thomson A, Khogali M, de Smet M, Reid T, Mukhtar A, Peterson S, et al. Low referral completion of rapid diagnostic test-negative patients in community-based treatment of malaria in Sierra Leone. Malaria journal. 2011;10:94. Epub 2011/04/19.
110. Townsend JW, Lechtig A, Pineda F, Arroyo JJ, Klein RE, De León Arribas JR. Cost-effectiveness of family planning services in the SINAPS primary health care program in Guatemala. In: Sirageldin I, Salkever D, Osborn R, editors. Evaluating population programs: international experience with cost-effectiveness analysis and cost-benefit analysis. New York, NY: St. Martin's Press; 1983. p. 458-75.
111. UNICEF. Community health workers: a review of concepts, practice and policy concerns. Kathmandu, Nepal:

UNICEF Regional Office for South Asia, 2004.
112. Van Roekel K, Plowman B, Griffiths M, Vivas de Alvarado V, Matute J, Calderón M. BASICS II Midterm Evaluation of the AIN Program in Honduras, 2000. Survey Report. Arlington, VA: Published by the Basic Support for Institutionalizing Child Survival Project (BASICS II) for the United States Agency for International Development, July 2002.
113. Varma JL, Das S, Sankar R, Mannar MG, Levinson FJ, Hamer DH. Community-level micronutrient fortification of a food supplement in India: a controlled trial in preschool children aged 36-66 mo. The American journal of clinical nutrition. 2007;85(4):1127-33. Epub 2007/04/07.
114. Vernon R, Rocuts K, Medina JE. The Provision of Natural Family Planning Services at Public Health Centers in Colombia. International Family Planning Perspectives. 1987;13(4):121-7.
115. Vijayaraghavan K, Rameshwar Sarma KV, Swaminathan MC. Impact of nutrition orientation to health guides on nutrition component of health guide scheme. The Indian journal of medical research. 1986;84:99-107. Epub 1986/07/01.
116. Walley JD, Khan MA, Newell JN, Khan MH. Effectiveness of the direct observation component of DOTS for tuberculosis: a randomised controlled trial in Pakistan. Lancet. 2001;357(9257):664-9. Epub 2001/03/15.
117. Wesson J, Olawo A, Bukusi V, Solomon M, Pierre-Louis B, Stanback J, et al. Reaching providers is not enough to increase IUD use: a factorial experiment of 'academic detailing' in Kenya. Journal of biosocial science. 2008;40(1):69-82. Epub 2007/04/21.
118. Winch PJ, Bagayoko A, Diawara A, Kane M, Thiero F, Gilroy K, et al. Increases in correct administration of chloroquine in the home and referral of sick children to health facilities through a community-based intervention in Bougouni District, Mali. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2003;97(5):481-90. Epub 2004/08/17.
119. Winch PJ, Gilroy KE, Wolfheim C, Starbuck ES, Young MW, Walker LD, et al. Intervention models for the management of children with signs of pneumonia or malaria by community health workers. Health policy and planning. 2005;20(4):199-212. Epub 2005/06/21.
120. Xiaoming S, Yong W, Choi K-H, Lurie P, Mandel J. Integrating HIV Prevention Education into Existing Family Planning Services: Results of a Controlled Trial of a Community-Level Intervention for Young Adults in Rural China. AIDS and Behavior. 2000;4(1):103-10.
121. Xu Z. China: lowering maternal mortality in Miyun County, Beijing. World health statistics quarterly Rapport trimestriel de statistiques sanitaires mondiales. 1995;48(1):11-4. Epub 1995/01/01.
122. Yeboah-Antwi K, Pilingana P, Macleod WB, Semrau K, Siazeele K, Kalesha P, et al. Community Case Management of Fever Due to Malaria and Pneumonia in Children Under Five in Zambia: A Cluster Randomized Controlled Trial. PLoS Med. 2010;7(9):e1000340.

ANNEX 3: ADDITIONAL REFERENCES PROVIDED BY SUMMIT PARTICIPANTS

1. Rowe A. et al. A multifaceted intervention to improve health worker adherence to integrated management of childhood illness guidelines in Benin. American Journal of Public Health 2009; 99(5):837-46.
http://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2008.134411

2. Osterholt DM et al. Improving pneumonia case management in Benin: a randomized trial of a multi-faceted intervention to support health worker adherence to integrated management of childhood illness guidelines. Human Resources for Health 2009; August 27:7(7)
http://www.human-resources-health.com/content/7/1/77

3. Frimpong, J. A., Helleringer, S., Awoonor-Williams, J. K., Yeji, F. and Phillips, J. F. (2011), Does supervision improve health worker productivity? Evidence from the Upper East Region of Ghana. Tropical Medicine & International Health, 16: 1225–1233. doi: 10.1111/j.1365-3156.2011.02824.x

4. Altobelli, L. C. (Future Generations). 2008. Case study of CLAS in Peru: Opportunity and empowerment for health equity. Geneva: World Bank.

5. Fiedler, J. L., Villalobos, C. A., and A. C. De Mattos. An activity-based cost analysis of the Honduras Community-Based, Integrated Child Care (AIN-C) programme *Health Policy Plan. (2008) 23(6): 408-427 first published online August 28, 2008 doi:10.1093/heapol/czn018*

6. Dieleman, M., Gerretsen, B., & van der Wilt, Gert Jan. (2009). Human resource management interventions to improve health workers' performance in low and middle income countries: A realist review. *Health Research Policy and Systems / BioMed Central, 7*(1), 7-7. doi: 10.1186/1478-4505-7-7
http://www.biomedcentral.com/content/pdf/1478-4505-7-7.pdf

7. John Snow International (JSI). 2008. Essential Services for Health in Ethiopia: Final report: November 2003-September 2008. Boston, MA: JSI.
http://www.jsi.com/JSIInternet/Inc/Common/_download_pub.cfm?id=10111&lid=3

8. John Snow International. 2004. Essential Services for Health in Ethiopia & Oromia Regional Health Bureau: Health facility survey. Addis Ababa, Ethiopia: JSI.
http://www.ethiopianreview.com/pdf/001/Oromia%20HF%20Survey.pdf

9. John Snow International. 2005. Twelve baseline health surveys: household, health facility, health systems performance, health care financing. Addis Ababa, Ethiopia: JSI.

10. Dick, J., Clarke, M., van Zyl, H., & Daniels, K. (2007). Primary health care nurses implement and evaluate a community outreach approach to health care in the South African agricultural sector. *International Nursing Review, 54*(4), 383-390. doi: 10.1111/j.1466-7657.2007.00566.x

11. Ndiaye, S. M., Quick, L., Sanda, O., & Niandou, S. (2003). The value of community participation in disease surveillance: A case study from Niger. *Health Promotion International, 18*(2), 89-98. doi: 10.1093/heapro/18.2.89 http://heapro.oxfordjournals.org/content/18/2/89.long

12 Rwakimari, J. B., Hopkins, D. R., and E. RUIZ-TIBEN (2006). Uganda's Successful Guinea Worm Eradication Program. *American Journal of Tropical Medicine and Hygiene, 75*(1), 3-8. http://www.ajtmh.org/content/75/1/3.full.pdf+html