

HEART

HEALTH & EDUCATION ADVICE & RESOURCE TEAM

Helpdesk Report: Cost-effectiveness of village health workers

Date: 25 February 2015

Query: Provide a review of evidence of the cost effectiveness of village health workers (VHWs) in improving coverage of health services, and improving health status, with reference to VHW programmes that are comparable to the VHW in Zimbabwe and the Zimbabwe context. The findings of the review should be contextualised by comparing them with the cost effectiveness of other health interventions. The added cost effectiveness of using VHWs as part of other health interventions would also be helpful.

In the review, include evidence on the most effective approaches of managing and paying VHWs for example:

-Managing – supervised by the health facility (HF), HF community committee, other development committee, or a senior VHW

-Paying – no payment; in kind incentives only; payment by the community; payment of fixed stipend; payment based on results. If paid, the amount paid.

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1. Overview

The literature tends to use the term community health workers (CHWs) generally to encompass village health workers and other regional variations of a similar role. The reviews often use the term broadly where different country programs operate differently in terms of amount of training, payment and other operational details. Section 2 of this report draws conclusions from reviews which don't necessarily distinguish between different program types. Further sections aimed to draw on examples from programs similar to the Zimbabwe VHW program, ie. 3-8 weeks training and similar roles.

Cost effectiveness findings:

- A community-based strategy for the treatment of severe acute malnutrition in southern Bangladesh was estimated to cost US\$26 per disability-adjusted life year (DALY) averted, compared with US\$1344 per DALY averted for inpatient treatment (Puett et al, 2013).

- A comparison of cost effectiveness between a BRAC tuberculosis program run using CHWs and a government program run without CHWs found the government program to be 50% more expensive for similar outcomes. The cost per patient cured was US\$64 in the BRAC area compared to US\$96 in the government area (Islam et al, 2002).
- Women's groups led by community health workers to provide education to reduce neonatal and maternal mortality led to a substantial reduction in both the neonatal and maternal mortality rate. The program was cost-effective with an incremental cost of \$211 per life year gained amongst neonates in rural Nepal (Borghi et al., 2004).
- Community Health Extension workers in Kenya are trained for 10 days. Incremental cost per life year gained was estimated in three districts at \$3,396 (Southwest Sumabala), \$2,470 (Takala) and \$82 (Kasarani) (McPake et al, forthcoming).
- A VHW program in Myanmar estimates its costs per beneficiary for malaria services to be \$6.50. WHO estimates of providing malaria services for universal coverage is \$18-20 (Community Partners International, 2012).
- An operational costing model devised by the CHW task force at the Earth Institute (2013) estimated costing of a CHW program per population served, per year for Zimbabwe to be \$6.61.
- Research looked at training CHWs about hypertension in order to improve adherence to medications in South Africa. Lifetime costs are estimated at \$6.56 per patient. The CHW intervention leads to an incremental cost-effectiveness ratio of \$320/DALY averted.
- Data from community-based child survival interventions show cost per death averted ranges from \$4 to \$5,398 for specific CHW-provided interventions and from \$407 to \$4,817 for integrated community-based approaches. The cost per life-year gained ranges from \$72 to \$181 for specific interventions and from \$34 to \$70 for integrated community-based approaches. In terms of DALYS averted, the costs are \$1 to \$110 for specific interventions and \$43 to \$93 for integrated programs. When compared to international standards for cost-effectiveness based on WHO and World Bank-established criteria, these interventions and programs are either cost-effective or highly cost-effective (Perry and Zulliger, 2012).

Cost effectiveness of other health interventions is a very big area and it was beyond the scope of this report to fully investigate this. A few examples were included for some reference:

- Cost effectiveness of different strategies to reduce hypertension in Pakistan estimated annual costs per participant associated with the combined home health education (HHE) plus trained GP, HHE alone, and trained GP alone were \$3.99, \$3.34, and \$0.65, respectively. HHE plus trained GP was the most cost-effective intervention, with an incremental cost-effectiveness ratio of \$23 per mm Hg reduction in systolic BP compared with usual care.
- Using standard management plus 800microg of sublingual misoprostol for postpartum hemorrhage treatment was estimated to cost \$6 per DALY (Sutherland et al, 2010).
- A review of the cost effectiveness of malaria interventions estimated median costs of protecting one person for one year: \$2.20 for insecticide-treated nets, \$6.70 for indoor residual spraying, \$0.60 for Intermittent preventive treatment (IPT) in infants, and \$2.06 for IPT in pregnant women. The median financial cost of diagnosing a case of malaria was \$4.32; treating an episode of uncomplicated malaria, \$5.84; and treating an episode of severe malaria, \$30.26.

The literature often discusses *how* CHWs are supervised rather than *by who*. One review was found that looked at the impact of supervision (Hill and Benton, 2010). Promising interventions identified include:

- Group supervision using revolving tools that focus on issues such as goal setting and problem solving.
- Stronger peers providing support to weaker peers through on-the-job training and mentoring. - Community supervision through community monitoring of CBA performance.
- Improving the quality of supervision by employing a full time central supervisor of supervisors who can mentor supervisors, model good behaviour and problem solve.

Information on supervision included in this report was largely descriptive rather than addressing effectiveness. Perry et al. (2014) outline different approaches to CHW supervision including: External Supervision from Health Center or District Health Office, Group Supervision (a successful example is noted from Mozambique, community supervision (successful in Cameroon, Nigeria and Uganda). The CHW task force CHW subsystem model suggests supervision from the primary healthcare facility (Earth Institute, 2012).

Evidence on the most effective approaches to paying CHWs includes:

- One review found very few examples of long-term CHW programs that rely exclusively on volunteer CHWs and also very few examples of CHW programs in which CHWs are paid through community financing. Non-financial incentives, such as badges, uniforms, special kits, community recognition, release from community work responsibilities, preferential access to health services, and so forth can go a long way toward giving volunteer CHWs who work only a few hours a week a sense of appreciation that motivates them to continue their work (Perry and Zulliger, 2012).
- In Bangladesh, BRAC CHWs work as volunteers and receive no salary. They earn income from the sale of drugs and health commodities and receive incentive from certain performance based tasks. They receive Tk. 150 per patient who completed treatment for TB under their observation. Under urban MNCH program, CHWs are also provided with incentives for identification, referral and provision of services. BRAC have achieved extensive coverage and have been associated with marked improvements in women and children's health (GHWA, 2009).
- Village health volunteers (VHVs) in Thailand receive no monetary incentive provided to the VHVs, except for free health services for themselves and their immediate family members. There is convincing evidence about the impact of the VHV worker program on health indicators such as malaria control, management of Tuberculosis and HIV/AIDs and other infectious diseases like avian H5N1 from the published studies (GHWA, 2009).
- Fee-for-service payments or payments associated with drug sales may encourage inappropriate treatment at the expense of prevention and overuse of medications. Non-financial approaches to improving performance such as use of visual identification (badges, T-shirts etc), acquisition of skills, and flexible hours, may have less potential to distort care than fee-for-service payments or those associated with drug sales (Haines et al, 2007).
- The CHW task force CHW subsystem model suggests a mix of paid community extension workers with community health volunteers could provide the best operational mix, with regard to achieving high coverage, equitable reach and cost-efficiency (Earth Institute, 2012).
- Monetary incentives can increase retention but often bring problems because the money may not be enough, may not be paid regularly, or may stop altogether. Monetary incentives may also cause problems among different cadres of development workers who are paid and not paid. However, there are some success stories of programs paying CHWs. Many programs have used in-kind incentives effectively. Non-monetary incentives are critical to the success of any CHW program.

- CHWs need to feel that they are a part of the health system through supportive supervision and appropriate training (Bhattacharyya, 2001).
- Kumar et al (2014) found that current non-financial incentives in east and southern Africa like bicycles and t-shirts undervalue the time of the CHWs and makes programs difficult to sustain.
 - Research on the correlation between incentives and performance (task completion) in Zambia found that CHWs who were paid a monetary incentive performed better than volunteer CHWs who received only gifts in kind (Kok, 2014).
 - 'Shasthya Shebikas' in Bangladesh earn some income with providing certain health services and selling of commodities. Those who reported competition with others (pharmacies, village doctors, TBAs) were reported to be less likely to be active but competition was not an important predictor of retention. CHWs in Mali who obtained income by selling drugs had to compete with informal vendors that sold drugs in smaller, cheaper quantities (Kok, 2014).
 - In three studies, CHWs reported to be demotivated because of unmet promises regarding allowances or stipends (Kok, 2014).
 - In 34 studies, CHWs reported that trust and respect from the community was an important non-financial incentive enhancing their motivation. Social rewards included more greetings, more honor and more participation in decision making. This social prestige might be a stronger factor in rural settings, because of the existence of more stable communities with stronger social fabric (Kok, 2014).
 - In South Africa it was found that CHWs within both NGO and national programs need to be remunerated a living wage to ensure motivation to the tasks required and to avoid attrition from programs (Aridi et al, 2014).

Bhattacharyya (2001) notes that: in the end, the effectiveness of a CHW comes down to his or her relationship with the community.

2. Reviews

How effective are community health workers? An Overview of Current Evidence with Recommendations for Strengthening Community Health Worker Programs to Accelerate Progress in Achieving the Health-related Millennium Development Goals.

Perry H & Zulliger R (2012) Johns Hopkins Bloomberg School of Public Health.

http://www.coregroup.org/storage/Program_Learning/Community_Health_Workers/review%20of%20chw%20effectiveness%20for%20mdgs-sept2012.pdf

Note this report uses a broad definition of community health workers with varying amounts of training. This should be considered when applying to the Zimbabwe context.

Measuring the cost effectiveness of CHW programs, particularly large-scale programs, is a daunting task for many reasons. Obtaining the full costs of routine health programs is frequently an extremely challenging task, and measuring changes in health status in populations served by health programs is methodologically challenging, especially in resource constrained settings. Finally, attributing change in health status to the health program as opposed to other influences is a methodological challenge as well, not to mention assessing the value of the specific contribution made by CHWs within the context of the health program. Randomized controlled trials are not appropriate for assessing large-scale effectiveness of complex health interventions such as CHW programs embedded within primary health care programs.

The literature suggests a considerable dearth of CHW cost effectiveness information. Assessing cost-effectiveness only in terms of health impact fails to capture total benefits of these programs in terms of the individual and social non-health benefits that CHW programs

may provide, particularly in terms of responding to the felt needs of community members and community empowerment.

CHW cost effectiveness is influenced by a broad array of contextual factors and the outcomes of many of their more promotive and preventive services are difficult to quantify.

Cost effectiveness studies identified by this paper tend to be small-scale. There are very few published studies of the comparative cost-effectiveness of decentralised programs that use CHWs to provide primary health care services.

It is quite clear that CHWs can deliver highly cost-effective interventions of various types that improve the health of geographically defined populations, from promotion of healthier behaviours to provision of preventive services to treatment. Similar evidence of cost-effectiveness is often not available for facility-based approaches, where most health care resources are invested. Part of the reason for this is that there is almost no evidence from resource-constrained settings that facility-based interventions by themselves improve geographically defined health outcomes. Where the cost-effectiveness of CHW-provided interventions is compared with that for facility-based interventions, the CHW provided interventions are, with rare exception, found to be more cost-effective. In terms of the cost per DALY averted or cost per life saved, CHW-provided interventions are almost all classified as cost-effective or highly cost-effective according to generally recognised global standards.

A table (starting p37) summarises cost effectiveness data from different studies of interventions and programs delivering community-based child survival interventions. The cost per death averted ranges from \$4 to \$5,398 for specific CHW provided interventions and from \$407 to \$4,817 for integrated community-based approaches. The cost per life-year gained ranges from \$72 to \$181 for specific interventions and from \$34 to \$70 for integrated community-based approaches. In terms of DALYS averted, the costs are \$1 to \$110 for specific interventions and \$43 to \$93 for integrated programs. When compared to international standards for cost-effectiveness based on WHO and World Bank-established criteria, these interventions and programs are either cost-effective or highly cost-effective.

There is a common perception that CHW programs are cheap. In fact, they are expensive when their total cost at the population level – whether district, regional or national – is calculated. Nonetheless, they are the most cost-effective alternatives that are currently available. But without taking into account the full costs of large-scale CHW programs, which include not only training but supervision and support (including ensuring that supplies and commodities are available), the effectiveness of large-scale CHW programs cannot be sustained and hence their cost-effectiveness declines as well. However, it is noted that CHWs tend to be a good investment where alternatives for those in remote areas do not exist.

Table 4 (beginning page 55) provides an overview of some of the evidence, examples of country experiences, and references that provide insights into drivers of CHW performance.

On effective linkages with the formal health system for supervision, continuing education, receipt of supplies and medicines, and referral of patients: CHWs should be formally introduced to the health system and its staff in the clinics and health posts with a clear delineation of their responsibilities and capabilities. They should have appropriate supplies, and re-supply systems should exist to enable them to provide the services for which they received training. They should be perceived by other health workers as an integral and essential member of the health team and as the foundation of the health system.

On supportive supervision and constructive feedback: Supervision has often been the weakest element of CHW programs, particularly for CHWs working in remote rural areas. In large-scale CHW programs, supervision is almost always inadequate, and those responsible

for supervision frequently have other responsibilities, usually for patient care at a peripheral health facility. They generally have had no formal training in nor special inclination for supervision of CHWs, and often have limited capacity to travel to the communities where CHWs work. Weak management and organisational structure can lead to poor quality of work performed by CHWs, low morale, absenteeism and attrition.

On adequate financial and non-financial incentives: There is no clear consensus on the appropriateness of CHWs working without remuneration. There are, however, very few examples of long-term CHW programs that rely exclusively on volunteer CHWs and also very few examples of CHW programs in which CHWs are paid through community financing. Non-financial incentives, such as badges, uniforms, special kits, community recognition, release from community work responsibilities, preferential access to health services, and so forth can go a long way toward giving volunteer CHWs who work only a few hours a week a sense of appreciation that motivates them to continue their work.

Cost-Effectiveness of Community Health Worker Programmes in LMIC

McPake B, Edoke I, Witter S, Gama E, Kielmann K, Taegtmeier M, Tulloch O, Dielman M, Vaughan K, Kok M. (Forthcoming) GHWA.

This literature review cannot answer the cost-effectiveness question that many global and national organisations are asking and on which scale-up is predicated. Available literature on cost effectiveness of CHWs was found to be surprisingly thin, given the large number of CHW programs operating at scale globally. Existing evidence suggests that CHWs can be a cost-effective intervention, particularly for TB, but also potentially for malaria, MNCH and other program areas. These findings may relate to what has been studied, rather than the inherent value of the intervention areas themselves. More research is needed – ideally mixed methods - that embeds the programs in their context and seeks to understand how CHWs may affect the wider health system, if there are fundamental aspects of different health areas that lend themselves to a cost-effective use of CHWs, and what broader societal costs and benefits they incur. More rigour in core cost-effectiveness assessment and reporting is also called for.

Three countries - Ethiopia, Indonesia and Kenya- were selected for in-depth analysis. The study estimated the incremental cost-effectiveness ratio (ICER) of the three CHW programs – the Health Extension Workers in Ethiopia, the Bidan Desa (Village Midwives) in Indonesia, and the Community Health Extension Workers in Kenya.

Costs inputs differed across the study countries, reflecting differences in the design and operational features of the CHW models in each country. For example, pre-service training costs were considerably higher for Health Extension Workers (HEWs) in Ethiopia compared to initial training costs in Kenya, capturing differences in the length of pre-service training (1 year in Ethiopia versus 10 days in Kenya). Annual salary costs for village midwives (VMWs) in Indonesia were considerably higher than annual salary cost for the HEWs in Ethiopia, reflecting differences in the educational attainment between the two cadres of health workers, and local economies. Annual salary costs constitute the highest proportion of total cost, accounting for 38% of total cost of the Ethiopia program. Supervision costs and the cost of constructing health posts each account for 21% and 18% of total costs. In Southwest Sumba, costs of health post construction account for the highest proportion of total cost (51%) while financial incentives and allowances for VMWs account for the highest proportion of total costs in Takala district in Indonesia. In Kenya cost of stationeries and registers contributes the highest proportion to total cost accounting for over 50% of total costs.

All three programs were found to be cost-effective, though with differences in incremental cost-effectiveness ratios that relate in part to the way in which effects were measured and in part to the underlying difference in cost structure. The results should therefore be seen as

part of an on-going discussion about how to use and improve CHW strategies, rather than as an answer in and of themselves.

Incremental cost per life year gained was estimated at \$999, \$3,396, \$2,470 and \$82 in Shebedino (Ethiopia), Southwest Sumba, Takala and Kasarani (Kenya) districts, respectively. Overall, the CHW program in Takala district had the highest total costs and benefits while Southwest Sumba had the highest ICER. The lowest ICER was observed in Kasarani district.

Using country GDP per capita as the reference willingness-to-pay threshold value, the CHW program in Shebedino district has a 100% probability of being considered cost-effective at three times GDP per capita (but virtually none at one times GDP per capita). In both Southwest Sumba and Takala district, the CHW program has a very high probability of being considered cost-effective (approximately 80% and 100%, respectively). Similar results are observed in Kasarani district where the CHW program has a 100% probability of being cost-effective at threshold values well below the country's GDP per capita. However, when annual salary of CHWs and other additional costs (bicycles, motorbikes and airtime allowances) are included in the analysis, the CHW program has a less than 10% chance of being cost-effective. The probability of the program being cost-effective rises steeply to 100% at a willingness-to-pay threshold of less than twice the country's GDP per capita.

Broader assessment of impacts would most likely have increased their effectiveness. It should also be highlighted that the CHWs did not work alone, nor generate their results alone, but were part of a coherently structured approach in which they operated as a team, working with community-based volunteers and supervised by district staff. The package should therefore be assessed as a whole, in terms of cost-effectiveness. Whether other national programs are similarly structured will be important to consider when reflecting on the generalisability of these findings. It is possible that by choosing programs for which some effectiveness evidence was available, the researchers were more likely to select well-functioning programs. However, the findings are consistent with the evidence base that exists, thin as it is.

This study shows that the ICER is most sensitive to uncertainty in the estimation of life years gained (LYG) and additional lives saved. Given that LYG and additional lives saved are two parameters that were estimated with the least degree of certainty (i.e. indirectly from coverage data, sometimes obtained from suboptimal studies in the case of Kenya), there may be value in further research on the effectiveness of CHW programs. This will in turn improve policy decisions on the cost-effectiveness of CHW programs. It is important, however, to note that the social, political, and policy contexts within which the selected CHW programs are operating are evolving, hence attempting to define 'ideal case scenario' features is complex: the configuration of specific design features that work in one context may not work in another because of contextual variability across countries.

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

GHWA (2009) WHO

http://www.who.int/workforcealliance/knowledge/publications/CHW_FullReport_2010.pdf?ua=1

Authors of this review found a dearth of data on the cost effectiveness of CHW programs. Although it was not the aim of this review, but economic studies should accompany trials to establish the cost effectiveness of different CHW interventions, because CHWs are more accessible and acceptable to clients in their communities, and they are expected to improve the overall coverage of services as well as equity.

Bangladesh

A case study from Bangladesh, describes the BRAC CHW program which has similar characteristics to the VHW program in Zimbabwe. The BRAC program has trained community health workers who are known as Shastho Shebika (SS) and is responsible for treating the essential 10 diseases: anemia, cold, diarrhea, dysentery, fever, goiter, intestinal worms, ringworm, scabies and stomatitis. They sell medications for these ailments for a nominal fee. Each CHW is responsible for approximately 300 households and visits about 15 households each day. In addition to treating the 10 diseases and referring patients, the SS work in many different programs (treatment of tuberculosis cases through directly observed therapy, control of diarrheal disease, immunization, family planning and prevention of arsenic poisoning), encourage people to seek care at BRAC and government clinics, and assist at satellite clinics that focus on antenatal care and immunization.

They receive 18 days basic training and 3 days TB management training. They have refresher training 1 day a month. The SS are women chosen by the community and are members of the BRAC-sponsored village organizations. SS are volunteers, they support themselves through the sale of commodities provided by BRAC, such as oral contraceptives, birth kits, iodized salt, condoms, essential medications, sanitary napkins and vegetable seeds. The SS use a system of verbal referral.

Supervision of the SS is done by the program officers at BRAC, the Shasthyo Kormis (SK). SK are paid health care workers associated with BRAC and have a minimum of ten years of school education. Each SK supervises 25 to 30 SSs. An SK visits households three days a week during which time she reviews the work done by SS related to Directly Observed Treatment Support (DOTS), family planning, and Expanded Program on Immunization (EPI) motivation and maintenance of their registers. In the remaining three days she provides ANC and PNC services to women, manages health forums and enrolls births. During this time she also reviews the activities of SS with regard to diverse services provided by the SSs. Thus, this helps her supervise the SS. Each SS is visited by a program officer (PO) at an average of three to four times a month. The visit of 25% of households by the PO is also a part of routine screening.

SS work as volunteers and receives no salary, they basically earn income from the sale of drugs and health commodities and receive incentive from certain performance based tasks. Incentive mechanism in BRAC was started in 1984 particularly for the TB control program for detecting higher number of cases from the community. Until previously, the program was based on voluntary mechanism and SS were benefiting from the sales of medicines and commodities provided by BRAC and as a part of non-monetary reward, motivational factors like enthusiasm to work for the betterment of the community was involved and social prestige and fame were important inspirational factors that were involved. The subset of SS who also works for DOTS program receives Tk. 150 for the patient who completed the treatment for TB under her observation. Under urban MNCH program, CHWs are also provided with incentives for identification, referral and provision of services.

BRAC has achieved extensive coverage and has been associated with marked improvements in women and children's health. Oral rehydration therapy was first used clinically for diarrheal illness in Bangladesh, and BRAC was the first organization to implement a community-based program promoting oral rehydration therapy on a wide scale. Reductions in neonatal, post-neonatal and infant mortality were observed in study districts after the introduction of the oral therapy extension program.

Thailand

Village health volunteers in Thailand are trained in primary health care aspects for 7 days and later on, specialised on-the-job training is provided for 15 days. They are trained for motivation sessions, concepts of primary health care, prevention of disease including water supply, sanitation, immunization and other controls, treatment of health problems including

first aid, symptomatic and supportive treatments and herbal medicine, promotion of health including nutrition, reduction of mental stress and family planning.

VHVs work under the direct supervision of a primary health care officer at the sub-district level, whereas the district health officer serves as a second-level supervisor. There is no formal evaluation or performance monitoring to assess the quality of VHVs' work. Each village has a lead VHV who organises the other VHVs into a team, and, in effect, also serves as an informal supervisor. They are usually the most senior among VHVs in the village. The VHV leader also supervises other VHVs and briefs them on any training or communication received.

There is no monetary incentive provided to the VHVs, except for free health services for themselves and their immediate family members. More specifically, VHVs are exempted from the annual fee that is required for the universal coverage of health care or what is called the "30-baht healthcare scheme". They also have full and free access to health services at the district hospital. They also have special quotas for VHV families to apply to government nursing. As a part of non-monetary reward, VHVs receive public recognition from both the community as well as the formal health sector. They also experience enhanced social standing, greater respect from their community and personal satisfaction, and some of them have also been elected to the local government. VHVs are treated as part of the formal health system, and the district health services use them in the out-patient department at health centers, when there is a surge of work or a personnel shortage. Furthermore, VHVs are also acknowledged for their work in various ways. The "best VHV of the year" is selected and announced annually at a national ceremony attended by all VHVs in the country on the 20th of March, which is designated as "Village Health Volunteer Day" to celebrate and recognise their work.

There is convincing evidence about the impact of the VHV worker program on health indicators such as malaria control, management of Tuberculosis and HIV/AIDS and other infectious diseases like avian H5N1 from the published studies. In addition, the decentralization of health care system in Thailand has proved the inherent sustainability of the CHW program which continues to show improvement in the health scenario of the country by consistently decreasing the burden of diseases prevalent in the country. However, the referral system needs to be further strengthened and the formal evaluation of the CHWs should also be done on a regular basis to further improve their performance. The researchers also recommend that the funding of CHW programs which at times become insufficient to run training programs, be increased keeping in view the crucial role played by the VHVs in the country's preventive and curative health care system.

Uganda

The Ugandan CHW program has similarities with the Zimbabwe VHW context in terms of role and training. The Ugandan CHWs officially do not receive a stipend and mechanisms to support them are left at the discretion of the communities they serve as well as NGOs operating in their areas. Some projects provide CHWs with T-shirts, gum-boots, rain jackets, bicycles, transport allowances and lunch allowance. CHW supervisors provide support and guidance, monitor patients, provide supplies, monitor program performance, and tracking supplies released. Supervision of community health workers is done in both a supportive and fault finding way. In the sensitisation meetings with the village members, there is some form of yard stick establishment which can be used to hold these community health workers responsible and accountable. The beneficiaries report their complaints to the local council leadership or the nearest health facility. Also the nearest health facility which is supposed to supervise the activities of these community health workers can conduct a spot check. The other way in which faults are found is when the registers have some shortcomings. In cases of failure, a replacement is sought. Cases of community health workers charging fees for the services, delayed referrals, discrimination, extra have all been rectified through this joint supervision.

Are vaccination programmes delivered by lay health workers cost-effective? A systematic review

Corluka A, Walker DG, Lewin S, Glenton C, Scheel IB. (2009). *Human Resources for Health*, 7 (81)

<http://www.human-resources-health.com/content/pdf/1478-4491-7-81.pdf>

Of the 2616 records identified, only three studies fully met the inclusion criteria, while an additional 11 were retained as they included some cost data. Methodologically, the studies were strong but did not adequately address affordability and sustainability and were also highly heterogeneous in terms of settings and lay health worker (LHW) outcomes, limiting their comparability. There were insufficient data to allow any conclusions to be drawn regarding the cost-effectiveness of LHW interventions to promote vaccination uptake. Studies focused largely on health outcomes and did illustrate to some extent how the institutional characteristics of communities, such as governance and sources of financial support, influence sustainability.

The included studies suggest that conventional economic evaluations, particularly cost-effectiveness analyses, generally focus too narrowly on health outcomes, especially in the context of vaccination promotion and delivery at the primary health care level by LHWs. Further studies on the costs and cost-effectiveness of vaccination programmes involving LHWs should be conducted, and these studies should adopt a broader and more holistic approach.

3. Cost effectiveness

Cost-effectiveness of the community-based management of severe acute malnutrition by community health workers in southern Bangladesh

Puett C, Sadler K, Alderman H, Coates J, Fiedler JL, Myatt M. (2013) *Health Policy Plan*. 2013 Jul;28 (4):386-99. doi: 10.1093/heapol/czs070. Epub 2012 Aug 9.

<http://heapol.oxfordjournals.org/content/28/4/386.short>

This study assessed the cost-effectiveness of adding the community-based management of severe acute malnutrition (CMAM) to a community-based health and nutrition program delivered by community health workers (CHWs) in southern Bangladesh.

Save the Children (US) employed a cadre of CHWs to deliver preventive and curative care to children in underserved areas of southern Bangladesh. Each worker was paid a monthly stipend of 800 Taka (US\$11.80). In the intervention upazila, all CHWs received training, with monthly refreshers, and ongoing supervisory support to implement the community case management of severe acute malnutrition (SAM), for children 6–36 months of age.

The cost-effectiveness of this model of treatment for SAM was compared with the cost-effectiveness of the 'standard of care' for SAM (i.e. inpatient treatment), augmented with community surveillance by CHWs to detect cases, in a neighbouring area. An activity-based cost model was used, and a societal perspective taken, to include all costs incurred in the program by providers and participants for the management of SAM in both areas. Cost data were coupled with program effectiveness data. The community-based strategy cost US\$26 per disability-adjusted life year (DALY) averted, compared with US\$1344 per DALY averted for inpatient treatment. The average cost to participant households for their child to recover from SAM in community treatment was one-sixth that of inpatient treatment.

These results suggested that this model of treatment for SAM is highly cost-effective and that CHWs, given adequate supervision and training, can be employed effectively to expand access to treatment for SAM in Bangladesh.

Cost-effectiveness of community health workers in tuberculosis control in Bangladesh

Islam MA; Wakai S, Ishikawa N, Chowdhury AMR, Vaughan JP. (2002) Bulletin of the World Health Organization, 80 (6). pp. 445-50. ISSN 0042-9686.

<http://www.scielosp.org/pdf/bwho/v80n6/v80n6a07.pdf>

The paper aimed to compare the cost-effectiveness of the tuberculosis (TB) program run by the Bangladesh Rural Advancement Committee (BRAC), which uses community health workers (CHWs), with that of the government TB program which does not use CHWs.

Each BRAC health centre had a medical doctor or a manager and services were mainly provided by CHWs under the supervision of paramedics (program organisers). The CHWs were mostly illiterate women who each covered about 200 households. Details on training were not provided in this report.

Patients receiving treatment were asked to deposit 200 Takas (US\$4; about four days' wages), and to sign a bond to guarantee treatment completion. From the bond, 125 Takas were given to the CHW and the remaining 75 Takas were refunded to the patient after completing treatment. Patients unable to pay the deposit received a waiver.

TB control statistics and cost data for July 1996 - June 1997 were collected from both government and BRAC thanas (subdistricts) in rural Bangladesh. To measure the cost per patient cured, total costs were divided by the total number of patients cured.

In the BRAC and government areas, respectively, a total of 186 and 185 TB patients were identified over one year, with cure rates among sputum-positive patients of 84% and 82%. However, the cost per patient cured was US\$64 in the BRAC area compared to US\$96 in the government area.

The government program was 50% more expensive for similar outcomes. Although both the BRAC and government TB control programs appeared to achieve satisfactory cure rates using DOTS (a five-point strategy), the involvement of CHWs was found to be more cost-effective in rural Bangladesh. With the same budget, the BRAC program could cure three TB patients for every two in the government program.

Achieving child survival goals: potential contribution of community health workers

Haines A, Sanders D, Lehmann U, Rowe AK, Lawn E, Jan S, Walker D, Bhutta Z. (2007). The Lancet; Volume 369, Issue 9579, 23–29 June 2007, Pages 2121–2131

http://chwcentral.org/sites/default/files/Haines_Achieving%20child%20survival%20goals.pdf

This paper recognised the need for evaluating large scale CHW interventions on the basis of its impact on child survival and its cost effectiveness and to elucidate factors associated with success and sustainability. An economic analysis was done on five community health care programs that delivered primary health care services and one training centre for community health workers in the Western Cape Province of South Africa. Adjusting for inflation, the cost of contracts with community health workers seemed lower than with the public sector clinics. Unfortunately, there was no assessment of cost effectiveness.

An evidence review found persuasive evidence on cost-effectiveness in a cluster trial that assessed the establishment of women's groups led by community health workers to provide education to reduce neonatal and maternal mortality. The program achieved a substantial reduction in both the neonatal and maternal mortality rate and was cost-effective with an incremental cost of \$211 per life year gained amongst neonates in rural Nepal (This research is outlined in the following abstract).

Most of the early studies implied that volunteers are the ideal to which most schemes for community health workers aspire and assume that there is a sufficient pool of willing people to take part in voluntary social service in rural areas and informal settlements. However, most programs pay their community workers either a salary or an honorarium and almost no examples exist of sustained community financing, aside from the possibly unique example of China's "barefoot doctors" who were remunerated from the surplus produced by collectivised production units. Even non-governmental organisations tend to find ways of financially rewarding their community workers.

Even when the workload is light and can be fulfilled on a part-time basis, the costs entailed by lost economic opportunities may be too high. Job-seeking motivation in voluntarism has been noted in schemes in Nigeria and India where community health workers are paid a small honorarium. Other financial incentives range from a small salary from the state to payments for attendance at training sessions. A high attrition rate contributes to decreased stability of the program, increases training costs because of the need for continuous replacement, and makes the program difficult to manage. Fee-for-service payments or payments associated with drug sales may encourage inappropriate treatment at the expense of prevention and overuse of medications.

Non-financial approaches to improving performance such as use of visual identification (badges, T-shirts etc), acquisition of skills, and flexible hours, may have less potential to distort care than fee-for-service payments or those associated with drug sales.

The paper further suggests that policymakers should consider using a mix of financial and non-financial incentives tailored to local circumstances combined with assessment. Rationalisation of the tasks and improvement of the performance of health workers in the community is another method that has the potential to increase the coverage of effective interventions in a short time frame.

There is a need to ensure that training programs focus on the acquisition of competencies for the detection of key clinical signs. Training programs should also consider local symptom terminology and illness beliefs, which can affect the diagnosis of disease. Programs should be tailored to the literacy level of the community health workers.

The authors concluded that supervision, as an intervention, deserves special attention, highlighting randomised trial evidence suggesting the potential to improve motivation and provide professional development. It is vital that the supervisor acts as a role model. The biggest challenge in supervision is scaling-up from successful small-scale programs to national programs. Particularly in rural communities, supervisors may provide the only point of contact with the health system. Clear strategies and procedures for supervision need to be defined and the skills taught should encourage participation by supervisees. Peer support, through group meetings, may also make an important contribution to morale and motivation.

The paper concludes by suggesting that the health personnel need skills in assessing community situations, interacting and negotiating with people in groups as well as with individuals, and teaching using participatory techniques. Training institutions need to make greater use of problem-solving teaching approaches in which students are asked to collect and analyse information and devise relevant and appropriate solutions. Training of community health workers and facility-based health personnel should be harmonised to ensure that there is mutual understanding of roles and responsibilities and that any guidelines for practice are consistent.

Economic assessment of a women's group intervention to improve birth outcomes in rural Nepal

Borghi J et al. (2005). The Lancet, 366: 1882–84.
<http://www.thelancet.com/pdfs/journals/lancet/PIIS0140673605677586.pdf>

The researchers did a cost-effectiveness analysis alongside a cluster-randomised controlled trial of a participatory intervention with women's groups to improve birth outcomes in rural Nepal. The average provider cost of the women's group intervention was US\$0.75 per person per year (\$0.90 with health-service strengthening) in a population of 86 704. The incremental cost per life-year saved (LYS) was \$211 (\$251), and expansion could rationalise on start-up costs and technical assistance, reducing the cost per LYS to \$138 (\$179). Sensitivity analysis showed a variation from \$83 to \$263 per LYS for most variables. This intervention could provide a cost-effective way of reducing neonatal deaths.

It Takes a Village Health Worker: A Local-Global Approach to Community Health and Malaria Control in Burma / Myanmar

Community Partners International. 2012.

<http://cpintl.org/sites/default/files/bookPdf/VHW%20program%20brief%2012march2012.pdf>

The Village Health Worker (VHW) malaria program is reported here to deliver high quality care more efficiently than comparable regional providers. The WHO estimates the cost of providing malaria services in order to achieve universal coverage at \$18-20 per beneficiary. The Global Health Access Program, the health branch of Community Partners International, who run the program state that their VHW-managed malaria program, which adheres to WHO standards, costs \$6.50 per beneficiary.

One Million Community Health Workers, technical task force report

CHW Technical Task Force. (2013). Earth Institute, Columbia University.

http://www.millenniumvillages.org/uploads/ReportPaper/1mCHW_TechnicalTaskForceReport.pdf

The purpose of this report is to provide the broad operational and cost considerations in mobilizing support for a large increase in public sector CHW cadres across Africa.

The recommendations of the report suggest the key ingredients of a locally adaptable CHW subsystem that can scale to 1 million CHWs, at a ratio of 1 CHW per 650 rural inhabitants in Africa, along with the primary health care system by 2015. These findings are based upon observations of the Millennium Villages Project across ten sub-Saharan African countries, a range of NGO-driven international CHW programs; national guidelines for primary health systems, and input and review by a wide array of CHW technical experts, UN agencies including the WHO, and the Nigerian National Primary Health Care Development Agency.

This report focuses on describing the coordinated operational considerations involved in ensuring that a national CHW cadre emerges with the support of their communities as a vital extension of the primary health care system. This "CHW subsystem" includes the requisite training, supervision, supplies, incentives, community engagement structures, information and feedback tools. The CHW subsystem is a component of the public primary health care system, with which it should be fully integrated, in order to facilitate strong referral and counter-referrals and to support each of the aforementioned facets of the subsystem.

The average health expenditure level for low-income countries is approximately US\$27 per capita. An analysis undertaken by the WHO for the Taskforce on Innovative Health Financing in 2009 estimated that low-income countries would need to spend an average of \$54 per capita in order to have a fully functioning health system.

Many studies have cited the positive impact of adequate supervision and strong information usage in policy decisions on health outcomes. However, many evaluations of existing CHW programs cite a lack of proper supervision as a common barrier to delivery of community health services, often due to poor planning, work overload and poor funding for supervision components.

The CHW subsystem model suggests supervision from the primary healthcare facility. Direct supervision of CHWs through facility-based staff would also be crucial to providing a strong linkage to the primary health care system. Team-based care approaches combining community input with CHWs, other community health providers and facility-based clinical providers can improve quality of care.

On remuneration the report suggests a mix of paid community extension workers with community health volunteers could provide the best operational mix, with regard to achieving high coverage, equitable reach and cost-efficiency.

The example of the operational model does not give details of length of time for training. It suggests something more sophisticated than the VHW model in Zimbabwe. However, costing of a CHW program per population served, per year for Zimbabwe is estimated to be \$6.61.

Hypertension education and adherence in South Africa: a cost-effectiveness analysis of community health workers

Gaziano TA, Bertram M, Tollman SM, Hofman KJ. (2014). BMC Public Health, 14 (240). <http://www.biomedcentral.com/content/pdf/1471-2458-14-240.pdf>

This paper aims to determine whether training CHWs about hypertension in order to improve adherence to medications is a cost-effective intervention among community members in South Africa.

The researchers used an established Markov model with age-varying probabilities of cardiovascular disease (CVD) events to assess the benefits and costs of using CHW home visits to increase hypertension adherence for individuals with hypertension and aged 25–74 in South Africa. Subjects considered for CHW intervention were those with a previous diagnosis of hypertension and on medications but who had not achieved control of their blood pressure. Results are reported in incremental cost-effectiveness ratios (ICERs) in US dollars per disability-adjusted life-year (DALY) averted.

The annual cost of the CHW intervention was found to be about \$8 per patient. This would lead to over a 2% reduction in CVD events over a life-time and decrease DALY burden. Due to reductions in non-fatal CVD events, lifetime costs are only \$6.56 per patient. The CHW intervention leads to an incremental cost-effectiveness ratio of \$320/DALY averted. At an annual cost of \$6.50 or if the blood pressure reduction is 5 mmHg or greater per patient the intervention is cost-saving.

The authors conclude additional training for CHWs on hypertension management could be a cost-effective strategy for CVD in South Africa and a very good purchase according to World Health Organization (WHO) standards. The intervention could also lead to reduced visits at the health centres freeing up more time for new patients or reducing the burden of an overworked staff at many facilities.

4. Management/supervision

Supervision: A Review: Innovations at Scale for Community Access and Lasting Effects

Hill A, Benton L. (2010). inSCALE. (Draft not for citation)

<http://www.malariaconsortium.org/inscale/local/downloads/lit-review-supervision-zelee-hill-and-lorna-benton.pdf>

Most studies examining the impact of supervision suffer from methodological limitations and care must be taken in interpreting their results. Overall there is some evidence of a benefit of supervision on a range of outcomes; and studies suggest that combined innovations are more effective than single strand strategies and that basic program elements, such as the availability of drugs, must be in place for supervision to be effective. When supervision quality is poor the quantity appears to have no impact on performance. The few well documented examples of supportive supervision suggest that it can impact performance, but that it can be difficult to implement. Supportive supervision approaches vary in their component parts. Many of the components (e.g. increasing supervisor autonomy through a list of authorised contacts) have not been tested and could be adapted as one or as a package of innovations.

After reviewing the evidence the following promising innovations were identified:

- Group supervision using revolving tools that focus on issues such as goal setting and problem solving.
- Stronger peers providing support to weaker peers through on the job training and mentoring. Community supervision through community monitoring of CBA performance.
- Reduced frequency of supervisory visits with between visit activities such as self assessment (with possible audio recording of consultations) and regular phone calls from a supervisor.
- Improving the quality of supervision by employing a full time central supervisor of supervisors who can mentor supervisors, model good behaviour and problem solve.

5. Payment/incentives

Sources of community health worker motivation: a qualitative study in Morogoro Region, Tanzania

Greenspan JA, McMahon SA, Chebet JJ, Mpunga M, Urassa, DP, Winch PJ. (2013) Human Resources for Health 2013, 11:52

<http://www.human-resources-health.com/content/11/1/52>

This study aimed to explore sources of CHW motivation to inform programs in Tanzania and similar contexts.

Semi-structured interviews with 20 CHWs were conducted in Morogoro Region, Tanzania. Interviews were digitally recorded, transcribed, and coded prior to translation and thematic analysis. The authors then conducted a literature review on CHW motivation and a framework that aligned with our findings was modified to guide the presentation of results.

Sources of CHW motivation were identified at the individual, family, community, and organizational levels. At the individual level, CHWs are predisposed to volunteer work and apply knowledge gained to their own problems and those of their families and communities. Families and communities supplement other sources of motivation by providing moral, financial, and material support, including service fees, supplies, money for transportation, and help with farm work and CHW tasks. Resistance to CHW work exhibited by families and community members is limited. The organizational level (the government and its development partners) provides motivation in the form of stipends, potential employment, materials, training, and supervision, but inadequate remuneration and supplies discourage CHWs. Supervision can also be dis-incentivising if perceived as a sign of poor performance.

The paper concluded by suggesting that Tanzanian CHWs who work despite not receiving a salary have an intrinsic desire to volunteer, and their motivation often derives from support received from their families when other sources of motivation are insufficient. Policy-makers and program managers should consider the burden that a lack of remuneration imposes on the families of CHWs. In addition, CHWs' intrinsic desire to volunteer does not preclude a desire for external rewards. Rather, adequate and formal financial incentives and in-kind alternatives would allow already-motivated CHWs to increase their commitment to their work.

Community Health Worker Incentives and Disincentives: How They Affect Motivation, Retention, and Sustainability

Bhattacharyya K, Winch P, LeBan K, Tien M, (2001). Arlington, Virginia, Basic Support for Institutionalizing Child Survival Project (BASICS II)
http://pdf.usaid.gov/pdf_docs/PNACQ722.pdf

This paper examines experience with various incentives for CHWs and their impact on retention of CHWs and the sustainability of CHW programs. It reviews the types of incentives that are needed to motivate involvement, to retain CHWs once they have been trained, and to sustain their performance at acceptable levels. Although there are important lessons to learn from other community-based development workers, this paper focuses primarily on community-based workers who provide some type of health or nutrition service.

The most important conclusion of this review is that there is no tidy package of three incentives that will ensure motivated CHWs who will continue to work for years. Rather, a complex set of factors affects CHW motivation and attrition, and how these factors play out varies considerably from place to place. However, program planners can draw on the extensive experience of the public health community with CHW programs. A summary of the main conclusions of the review follows.

CHWs do not exist in a vacuum. They are part of and are influenced by the larger cultural and political environment in which they work. The process of health sector reform, the adoption of the IMCI strategy, and the progress made by community-based nutrition programs have generated renewed interest in the potential contribution of CHWs. Health sector reform has changed the supervisory structure within health systems and given more autonomy to peripheral health facilities. It has also decentralised the control of health funds, allowing greater flexibility in spending for various types of CHW incentives. The IMCI strategy includes a training curriculum on assessing and treating mild and moderate childhood illnesses. Such training allows CHWs to play a curative role, which is usually what communities demand. Policies on CHW distribution of antimicrobials and antimalarials can have tremendous effects on their relationship with the community.

The motivation and retention of CHWs is influenced by who they are in the community context. The inherent characteristics of CHWs, such as their age, gender, ethnicity, and even economic status, will affect how they are perceived by community members and their ability to work effectively.

At the micro level, the specific tasks and duties of CHWs affect their motivation and retention. When given too many tasks, CHWs feel overwhelmed with information or may spend so much time in training that they rarely practice what they have learned. Often the catchment areas they cover are too large with too many households, making it difficult for a CHW to spend the time or find the transportation to go to all the households. Many CHWs are restricted to preventive and promotive roles that leave them unable to respond to community demands for curative care (and usually medicines).

Monetary incentives can increase retention. CHWs are poor people trying to support their families. But monetary incentives often bring a host of problems because the money may not be enough, may not be paid regularly, or may stop altogether. Monetary incentives may also cause problems among different cadres of development workers who are paid and not paid.

However, there are some success stories of programs paying CHWs. Many programs have used in-kind incentives effectively.

Non-monetary incentives are critical to the success of any CHW program. CHWs need to feel that they are a part of the health system through supportive supervision and appropriate training. Relatively small things, such as an identification badge, can provide a sense of pride in their work and increased status in their communities. Appropriate job aides such as counseling cards and regular replenishment of supplies can help ensure that CHWs feel competent to do their jobs. Peer support can come in many forms, such as working regularly with one or two other CHWs, frequent refresher training, or even CHW associations.

In the end, the effectiveness of a CHW comes down to his or her relationship with the community. Programs must do everything they can to strengthen and support this relationship. First, program planners must recognize the social complexity of communities and that communities are not all alike. Different communities will need different types of incentives, depending on the other job opportunities available, prior experience with CHWs, the economic situation of the community, and other factors. Unfortunately, very little experience or guidance is available on how best to differentiate communities. It is important to involve communities in all aspects of the CHW program but especially in establishing criteria for CHWs and making the final selection. Programs can provide opportunities for quick visible results that will promote community recognition of CHWs' work. CHWs must be trained in appropriate and respectful interactions with all community members and in how to respond to difficult people or situations. Community-based organizations, such as religious groups or youth clubs, can provide support to CHWs and significantly lessen their load by taking on health education activities.

Many successful programs use multiple incentives over time to keep CHWs motivated. A systematic effort that plans for multiple incentives over time can build up a CHW's continuing sense of satisfaction and fulfillment.

Interventions to Improve Motivation and Retention of Community Health Workers Delivering Integrated Community Case Management (iCCM): Stakeholder Perceptions and Priorities

Strachan DL, Kallander K, ten Asbroek AH, Kirkwood B, Meek SR, Benton L, Conteh L, Tibenderana, J. & Hill, Z. (2012). American Journal of Tropical Medicine and Hygiene. 87 (5 Suppl), 111-119.

http://www.chwcentral.org/sites/default/files/Strachan_Interventions%20to%20improve%20motivation%20and%20retention%20of%20CHWs%20delivering%20iCCM.pdf

Despite resurgence in the use of community health workers (CHWs) in the delivery of community case management of childhood illnesses, a paucity of evidence for effective strategies to address key constraints of worker motivation and retention endures. This work reports the results of semi-structured interviews with 15 international stakeholders, selected because of their experiences in CHW program implementation, to elicit their views on strategies that could increase CHW motivation and retention. Data were collected to identify potential interventions that could be tested through a randomised control trial. Suggested interventions were organised into thematic areas; cross-cutting approaches, recruitment, training, supervision, incentives, community involvement and ownership, information and data management, and mHealth. The priority interventions of stakeholders correspond to key areas of the work motivation and CHW literature. Combined, they potentially provide useful insight for programs engaging in further enquiry into the most locally relevant, acceptable, and evidence-based interventions.

Stakeholders' suggestions resonate with key areas of the work motivation and CHW literature; namely, needs satisfaction, CHW identity and context; motivation and incentives;

and, CHWs and their community. It has been suggested that programs seeking to positively influence CHW motivation and retention need to adopt a multi-level approach. Although there are a range of specific individual interventions that have stakeholder support, tailoring an appropriate package, which is feasible in context and balances the needs of the program with the needs of CHWs while achieving community support for the program is considered the approach most likely to result in a positive and enduring impact on the motivation and retention of CHWs.

6. Documents on management and payment

Developing and Strengthening Community Health Worker Programs at Scale. A Reference Guide and Case Studies for Program Managers and Policymakers

Perry H, Crigler L, Hodgins S. 2014. Jhpiego Corporation.

http://www.mchip.net/sites/default/files/mchipfiles/MCHIP_CHW%20Ref%20Guide.pdf

This guide presents suggested issues and principles to consider and, when possible, brings in relevant program experience, noting challenges in scaling up and sustaining large-scale public sector CHW programs in the 1970s and 1980s. A systems perspective to the national and local contexts is required to understand the adaptive, dynamic, and complex nature of large-scale public sector CHW programs. The most effective program planning mechanism is a feedback loop, where community-level information is fed through the multiple sublevels (e.g., district, regional) to the national level, where policy, funding, and evaluation can be continually revised.

Recommendations on CHW supervision include:

- Build upon what exists: Understanding what is already functioning and building upon it is important. Do not create parallel systems.
- Use a bottom-up approach: Engaging CHWs and communities in the design and process of supervision will encourage participation.
- Focus on planning and monitoring the implementation: Plans to supervise are frequently made but not carried out, and the implementation process itself is not monitored. Therefore, supervision becomes the lowest priority to program implementers.
- Engage all levels for accountability: Supervisors alone (regardless of who is supervising) should not bear all of the responsibility. Supervisors of supervisors, CHWs, communities, and even clients can share in both the process and making each other accountable for its completion.
- Develop capacity at all levels in data management, teamwork, and problem-solving: Basic data use, teamwork, and problem identification, prioritisation, and resolution are skills that everyone, including community members and engaged clients, can use to solve problems.
- Regular supervision is important. Monthly visits are best.

Although it is most common to see a nurse or other health worker from a peripheral facility tasked with the supervision of CHWs, it is not necessarily the only option. Alternative supervision approaches can include group supervision (in which multiple CHWs gather to meet with the facility health worker in either the health center or a village); peer supervision (in which peers take on some of the supervision role through peer-to-peer learning, support, and problem-solving); and community supervision (community groups, health committees, or community associations take on some of the monitoring and feedback role in supervision). In many countries, NGOs and multilateral partners also provide support for supervision and training of CHWs.

Approaches to CHW supervision:

External Supervision from Health Center or District Health Office

In some CHW programs, CHWs work at health posts but conduct home visits and supervise volunteers out in the communities. Supervisory visits are planned quarterly, although some programs attempt this supervision on a monthly basis depending on the distances, the availability of health staff to supervise, and the numbers of CHWs to be supervised.

Group Supervision of CHWs

Group supervision involves a group of CHWs meeting together with a supervisor. Meetings usually include regular supervisory activities (collecting data, discussing problems, and continuing education) in a group rather than in an individual context. Group supervision meetings can occur at health centers or in villages, and this approach has been implemented in many ways. In Mozambique, the international NGO World Relief pioneered the care group model as part of its Vurhonga Child Survival Project in Mozambique (1995-2003). A care group consists of 10 to 15 community-based health volunteers who regularly meet with a supervisor once or twice a month for training, supervision, and support. Care group volunteers, who visit with 10 to 15 of their neighbours every 2 to 4 weeks, provide peer support, develop a strong commitment to health activities, and find creative solutions to challenges by working together as a group. Care groups are the core element in an emerging model for organising, training, supervising, and motivating volunteers in a cost-effective, sustainable manner. Care groups achieve broad, deep, and lasting community change. The Care group model highlights the motivational benefits of working in a team and its efficiency in terms of time and logistics. Groups are reported as a useful arena for problem solving, allowing for both peer support and technical guidance from a supervisor.

Community Supervision of CHWs

Innovative approaches to supervision include engaging the community and having community organisations play a greater role in providing feedback and guidance to CHWs and their supervisors. The role that communities can play in the supervisory process differs by context and community, but can often involve community members helping to set and clarify expectations of what kinds of services the CHW will provide, agreeing on how the CHW will respond to issues within the community, and deciding how the community can support and help the CHW by participating in the management and care process. A community action cycle, wherein the community works together to identify and prioritize problems, plan and implement solutions, and evaluate progress can contribute to the creation of demand for services: "The key to the success of community empowerment was the moment when the community engaged with the problem-posing, problem-solving process and recognized that they could collectively change their circumstances." Although this action cycle might not be considered part of traditional supervision, these inputs and support mechanisms contribute to the improved supervision of workers more generally.

The Community-Directed Interventions (CDI) Program in multiple countries in Africa uses an approach in which communities are given important responsibilities for the planning and implementation of highly targeted interventions aimed at priority diseases. The approach encourages communities to take ownership of the clinical intervention process, defining who, when, and where the intervention will be implemented, how it will be monitored, and what financial incentives or other support will be provided to CHWs, who are selected by the community. An evaluation of the CDI program conducted in 35 health districts in Cameroon, Nigeria, and Uganda, revealed that community participatory processes were important, and CHWs were deeply committed to the CDI process. By engaging and empowering communities, the CDI program has prompted an eagerness on the part of communities to participate in the provision of multiple interventions, leading to cost savings for the health system, as well as increased health system impact. This experience indicates that communities can become strong and active partners in CHW programs. Communities can select, motivate, and supervise CHWs if a linkage is provided to health programs for training,

technical support, and technical supervision. The effectiveness of supervision by communities depends on the degree to which the community is able to obtain appropriate information on CHW functioning and access to resources that can motivate CHWs for outstanding performance and sanction them for sub-standard performance. This approach is most feasible when community groups, such as community health committees or mothers' groups, are already active in other areas of community management, such as income generation schemes or water and sanitation management. This approach can strengthen existing community systems, but may not be appropriate when there are weak social connections, such as in urban settings where the population may be transient. In some cases, such as Rwanda, community health committees are directly involved in the financial management of performance-based incentives and provide administrative oversight to CHWs, but play little role in the supportive supervision of CHWs.

Community supervision with public health care providers in Uganda: A randomized field experiment on community-based monitoring and evaluating of public primary health care providers found that providers who were monitored and supported by the community tried harder to serve their clients, resulting in increased utilisation and improved health outcomes for community members. The experiment focused on the accountability relationship between the citizen-clients, and their ability to hold providers accountable for quality service provision. To test whether community-based monitoring works, local NGOs facilitated village and staff meetings in which members of the community discussed the baseline status of health service delivery. These committees also discussed how the primary health care providers working in the MOH system compared to other providers, and how the public providers could improve health service provision. The purpose of this open-dialogue discussion was to initiate a process of community-based monitoring that was then sustained by the community. This community-based approach successfully increased both quality and quantity of primary care provision at government health centers. Utilization increased by 20%. Waiting time and staff absenteeism also improved significantly. Such an approach could be used to monitor the work of CHWs as well.

Cell phone technology could aid both the CHW and the community in communicating service needs and supply stock outs in advance, thus preparing the CHW's supervisor in the facility what supplies that should be on hand before the CHWs make their group visit. Cell phones can also be used by supervisors to provide on-the-job skills coaching for CHWs and by CHWs among themselves to enable them to support each other and ask questions when they encounter difficulties. The development of an effective supportive supervision system takes time (at least two years) and significant financial resources. It is not a quick fix. Decision-making authority must be decentralized to frontline supervisors. CHW program implementers should first select which of the range of supportive supervision mechanisms and tools are appropriate for the context, then adapt and test them, and then use this experience to gradually strengthen the program of supervision.

The chapter on incentives highlights the fact that there is no easy, one-to-one relationship between incentives, motivation, and practice. Local relationships, contexts, histories, beliefs, and expectations can each have a dramatic effect on how and why a particular mix of program features may or may not work to incentivise CHWs in a particular place and time. Many of the factors for consideration are features of the broader health system or social and economic context. It is argued that although programs cannot change or predict many of these factors, they can anticipate and manage them, which is especially important because the "stick" factors – the factors that keep one in a job –are generally much weaker for CHWs than they are for health care professionals. Thus, it is critical to pay careful attention to all the factors that motivate CHWs to engage, remain in, and perform their best in this important work.

In the appendices of this report are cases studies.

Afghanistan has a relatively low amount of training as in Zimbabwe. CHWs receive three separate 3-week modules with a month of field experience in the village in between. Trainers attempt to visit all the trainees in their villages during the month of field experience. Afghan CHWs have been volunteers from the beginning of the program. This policy has been reviewed and reaffirmed periodically because the issue of salary is constantly raised. Attempts to encourage financial support for CHWs from the community itself have never been very successful. Since 2008, CHWs have received allowances to cover travel and food for all monthly meetings at the facility and any training courses they attend. In some provinces, CHWs participate in the polio campaign and in the National Immunization Days, and for this they receive an honorarium. In some areas, CHWs may receive financial or “in-kind” rewards for referrals of particular categories of patients. Each health facility supporting health posts has a Community Health Supervisor (CHS). CHSs visit monthly each health post where a pair of CHWs is based, and the CHWs come monthly to the “parent” health facility where the CHS is based for a joint meeting with the other CHWs.

CHWs now provide a major portion of primary health care (PHC) services in Afghanistan and are widely recognized as one of the important contributors to Afghanistan’s marked improvement in health status during the past decade.

CHWs in **Bangladesh** receive 4 weeks training. Known as community health volunteers they are given small loans to establish revolving funds, which they use to make some money by selling health products at a small markup. Direct supervision is conducted by higher-level CHWs called Shasthya Kormis (SKs). Other program staff at BRAC also provide supervisory support. The program is self-sustaining and is widely perceived to have made an important contribution to Bangladesh’s remarkable progress in reducing under-5 mortality and to its national TB control program.

Indonesia’s CHWs (*kaders*) receive one week of training and over time accumulate the skills and equipment necessary to carry out a set of tasks, including growth monitoring and promotion, treating common illnesses such as diarrhea, and preventing disease and malnutrition. The *kaders* provide voluntary service without financial compensation. However, *kaders* may receive informal types of compensation, such as free medical treatment from higher levels in the health system. There is a high cultural value placed on doing something for one’s neighbors, so volunteering as a *kader* is highly esteemed. While the nearest subdistrict-level health center (*puskesmas*) provides technical guidance and support, the real accountability of the *kaders* is to the village committee that appointed and supports them in their work. *Kaders* undertake to do “welfare work” for their community, and the monthly *posyandu* session is seen as an important function and contribution to the welfare of the community.

A **Zimbabwe** case study reports that the Ministry of Health and Child Welfare (MOHCW) conducts an initial 8-week VHW training. This consists of a period of classroom training followed by a period of practical training. Refresher trainings are conducted as needed and when funds are available. VHWs receive a quarterly allowance of \$42, though remuneration is often irregular. They are also provided with a bicycle and a medical supply kit. There is no information available about the impact of this program.

Which intervention design factors influence performance of community health workers in low- and middle-income countries? A systematic review.

Kok MC, Dieleman M, Taegtmeier M, Broerse JEW, Kane SS, Ormel H, Tijn MM and de Koning KAM. (2014) Health Policy and Planning, doi: 10.1093/heapol/czu126.

<http://heapol.oxfordjournals.org/content/early/2014/12/11/heapol.czu126.full>

A systematic review of 140 quantitative and qualitative studies identified factors related to the nature of tasks and time spent on delivery, human resource management, quality assurance,

links with the community, links with the health system and resources and logistics having an influence on CHW performance.

Incentives

Eighty-one studies presented information on incentives given to CHWs. There were a range of different incentives, sometimes combined in packages including: financial incentives, such as fixed salaries for those CHWs that were employees of the government or an NGO, regular and irregular allowances, performance based financial incentives, income from selling services (fees) and income from selling commodities, and non-financial incentives, such as material incentives (goods, rewards), access to training, supervision and supplies, preferential treatment and community trust and respect. (Dis)satisfaction related to incentives could lead to lower or higher motivation and influence CHW performance. In 25 studies, CHWs reported that they were dissatisfied with the incentives they received, whether financial or non-financial. Sixteen studies reported CHWs' satisfaction with incentives.

Remuneration was often reported as an important (de)motivator. However, other incentives remained important. For example, an evaluation of a CHW program in Kenya revealed that 65% of the interviewed CHWs acknowledged that reimbursements motivated them to continue serving while others said that material incentives contributed to motivate them (38.5%) or would improve their motivation (76%). In some studies, CHWs reported to prefer financial above non-financial incentives. Accredited Social Health Activists (ASHAs) in India reported financial incentives (82%), being in a government job (67%), contributing to charity (44%) and improved self-esteem (37%) as motivating factors. The majority of ASHAs were satisfied and 44% reported to be willing to continue without incentives. HSAs in Malawi were demotivated because they had to spend their own money to run village clinics.

Research on the correlation between incentives and performance (task completion) in Zambia found that CHWs who were paid a monetary incentive performed better than volunteer CHWs who received only gifts in kind. However, the data also showed that greater monetary incentives did not necessarily correlate with better performance, especially when compared with other factors that influence performance. CHWs in child health in Kenya were performing better in their consultations with children and had a higher adherence to guidelines when they thought that they received four to five benefits (including making money) than those that thought they received fewer than four benefits.

'Shasthya Shebikas' in Bangladesh earn some income with providing certain health services and selling of commodities. Those who reported competition with others (pharmacies, village doctors, TBAs) were reported to be less likely to be active but competition was not an important predictor of retention. CHWs in Mali who obtained income by selling drugs had to compete with informal vendors that sold drugs in smaller, cheaper quantities.

Two studies reported on a negative side of performance-based payments of ASHAs in India. ASHAs could earn money for bringing people to the clinic and helping with biomedical interventions. They could not earn money for encouraging village health meetings nor discussing health issues on social change more generally, although this was part of their role. This resulted in an over-focus on paid tasks.

In three studies, CHWs reported to be demotivated because of unmet promises regarding allowances or stipends.

In 34 studies, CHWs reported that trust and respect from the community was an important non-financial incentive enhancing their motivation. Social rewards included more greetings, more honor and more participation in decision making. This social prestige might be a stronger factor in rural settings, because of the existence of more stable communities with stronger social fabric. In some cases, social rewards were culturally determined. One study reported that social prestige and community approval were correlated with CHW retention. A

cross-sectional study on Care Facilitators (CFs) working in HIV home-based care in Zimbabwe found that the more the communities accepted, appreciated and supported the CFs in their activities, the more CFs were motivated to perform.

In several studies, CHWs reported their willingness to help and care for other people as an incentive that enhanced their motivation. For example, CBSVs in Ghana reported that altruism towards the community was a vital factor to take on and remain in the role as CBSV. Moreover, seeing the health and education of the community improve also emerged as a motivator.

In various studies, CHWs reported that personal development or knowledge gain served as an incentive. CHWs in South Africa reported that although being CHW was not held in high esteem, one motivator was the development of a professional identity, especially for those working as counsellors, and they desired to advance in that role.

Some studies referred to preferential treatment such as free care and school fees support, as an incentive for CHWs. In four studies, CHWs reported that their CHW job would result in future other employment and this was a motivating factor. In a few studies, CHWs reported to be demotivated because of a lack of career advancement.

Supervision

In a total of 80 studies, it was stated that a supervision structure was available, but most of them were lacking information on its precise structure and its implementation. The review identified a few aspects of supervision being related to CHW performance: whether the CHW program setup involved any form of supervision and the frequency and location of supervision.

Community reproductive health workers (CRHWs) in Uganda found supervision increased credibility and recognition, it made them feel part of the team. The ways in which supervision was motivating or demotivating CHWs was sometimes associated with the skills and attitude of supervisors. Community home-based care workers in South Africa reported problems with supervisors, such as lack of management skills (40%) and 'selfishness' (38%). CBSWs in Ghana felt demotivated by the supervision they received: 'They (current supervisors) seem to forget that the work is a voluntary one and as such we should be treated well and encouraged'. The CBSWs identified the need for good quality supervision to increase retention: 'Even if there is no money in it you would feel that you are being supervised and that would motivate you to do the work well'.

The studies showed a variety in frequency of supervision. There were two studies that researched the effect of frequency of supervision on CHW performance. One study showed that a lower frequency of supervision resulted in lower performance of CHWs in Madagascar while another study in Kenya found no effect of frequency of supervision on CHW guideline adherence.

Only one study referred to the location of supervision. In rural Zambia, supervision in the health centre was not appreciated by CHWs as they felt they missed out on providing care to their own village.

In summary, many studies reported supervision to be important to increase CHW performance, although details of the supervision structure and its implementation contributing to success were scarce. CHWs who perceived their supervision as insufficient often reported to be demotivated.

A comparative study of an NGO-sponsored CHW programme versus a ministry of health sponsored CHW programme in rural Kenya: a process evaluation

Aridi JO, Chapman SA, Wagah MA, Negin J. (2014). Human Resources for Health, 12 (64).

<http://www.human-resources-health.com/content/pdf/1478-4491-12-64.pdf>

The varied performance of CHW programs in different contexts has highlighted the need for implementation of research that focuses on program delivery issues. This paper presents the results of process evaluations conducted on two different models of CHW program delivery in adjacent rural communities in Gem District of Western Kenya. One model was implemented by the Millennium Villages Project (MVP), and the other model was implemented in partnership with the Ministry of Health (MoH) as part of Kenya's National CHW program (Ndere).

Remuneration and motivation

The WHO recommends that CHWs receive payment for their work or appropriate incentives. However, Ndere CHWs were volunteers, whereas Sauri CHWs were paid a monthly allowance of KSh 4,000 (US\$ 45) by the MVP. Almost all of the Ndere CHWs felt the government should compensate them for their work. The Ndere CHWs also expressed the need to be given support and materials to do their work. The Ministry officials interviewed concurred with the Ndere CHW views.

Notably, although the Sauri CHWs received a relatively generous remuneration package compared to the Ndere CHWs, many Sauri CHWs felt that remuneration was insufficient for their task profile which some asserted could not be completed on a part-time basis. A district-level MoH official also indicated that the amount that was recently suggested and agreed by the government as a token; KSh 2,000 (US\$ 23) - was insufficient.

Interviews with national policy-makers, however, revealed the difficulties in implementing the recommended policy of providing even KSh 2,000 (US\$ 22.50) to CHWs:

'There was a policy that every constituency was to budget KSh 2,000 to allow for the recruitment of 10 CHWs. However the politicians realized that there was no mechanism in place for paying CHWs and no mechanism for distributing the money because the money was only for 10 out of 50 CHWs within the CUs. So they instead decided to use this money to pay and deploy a CHEW (community health extension workers) salary (of KSh 16,000).' (National policy-maker from the MoH)

'Given difficulties in rolling out payment within the government system, the Ndere CHWs claimed that the fact that they are volunteers interfered with the quality of their work, and lowered their morale. They often cited difficulties in balancing their commitment to their CHW work with livelihood activities such as farming'

'Not being paid affects my CHW work because sometimes I should also look at how I can get money by participating in casual work so it becomes difficult to combine these two activities.' (Ndere CHW Interview number 5)

'Sometimes I feel that instead of taking two hours doing voluntary work, I should attend to my business. So instead of visiting the sick, sometimes I just attend to my business because we are not being paid anything.' (Ndere CHW Interview number 7)

However, some CHWs mentioned that they sometimes are motivated by the social recognition that they received while doing their work, for instance been recognised at village gatherings such as the chief's baraza.

Despite these exceptions, overall the evaluation suggested that both Sauri and Ndere CHWs were primarily motivated by financial incentives. Remuneration, however, needs to be

commensurate with the workload that CHWs are able to perform. The Sauri CHWs received almost double the rate suggested by the 2010 policy guidelines, but in certain contexts indicated that the remuneration that they were receiving for their work was incommensurate with the work that they were doing - particularly during scheduled campaign events aiming at universal household coverage.

Management and supervision

Ndere CHWs were supervised by a combination of the health workers based at the nearby Ndere Health Facility and members of the respective CHCs. Health facility staff met with them on a monthly basis to discuss their reports, and the supervisor oversaw their activities.

There seemed to be a good relationship between the CHWs and their facility-based supervisors. However, some CHWs mentioned that sometimes the facility-based supervisors do not spend adequate time with them working on community issues and are largely absent from the field. Such feedback is not uncommon; where lack of health personnel coupled with poorly defined supervisory tasks have been identified as factors inhibiting the delivery of effective CHW supervision. The Ndere CHWs were also assisted in their tasks at the community level by the CHC members.

This national policy-maker informed of some additional problems with using community health extension workers as supervisors:

'CHEWS do not know how to facilitate the community health workers. They work in a very top-down fashion in their management and they do not know how to engage CHWs and facilitate them to do their work better. Instead, they just give the answers. Facilitation skills are lacking. They are also not trained.' (National policy-maker at the Ministry of Health)

The Sauri CHWs, on the other hand, were subject to a more rigorous supervision strategy. CHWs reported that they are supervised by Health Facilitators as well as the health facility staff when they work at the health facility once a week. The CHWs reported biweekly supervisory meetings as well as support in the field when needed. In the field, they mentioned that they are also overseen by the CHCs who, unlike the CHCs in Ndere, were expected to play a more active supervisory role. In focus groups and interviews, there was some evidence of tensions between the CHCs and CHWs with respects to supervision. Specifically, it was not always clear how the CHC role should be worked into supervision of CHWs, particularly given the unstructured nature of CHW work.

In contrast, with respects to supervision by MVP Health Facilitators, none of the Sauri CHWs interviewed reported negatively on the quality of supervision they received, although informants may have been reluctant to express criticism due to the internal nature of the evaluation.

The MVP Health Facilitators utilised mobile telephony as a supervisory tool. The Child Count rapid SMS system provides alerts to Health Facilitators when CHWs have difficult cases.

The CHWs describe how their supervisors carry out supervision through the use of the toll-free numbers, which their supervisors use to call them and discuss challenges while they are making their household visits and hence removing the need to be physically present with the CHWs.

Conclusion

CHWs within both NGO and national programs need to be remunerated a living wage to ensure motivation to the tasks required and to avoid attrition from programs.

With respect to supervision, most studies have identified lack of supervision and support as one of the biggest problems in CHW program implementation. On the whole, innovations

such as the use of mobile telephony solutions to issue alerts to supervisors appeared to strengthen CHW supervision, as did the MVP's policy towards frequent (biweekly) supervisory meetings and regular contact with CHWs in the field. Moreover, the existence of toll-free communication lines between CHWs and CHW supervisors in the MVP site was highly effective in monitoring CHW activities. Clearly, although many inroads have been made towards strengthening supervision within national programs, there are a number of problems remaining. In addition to this, essential elements such as deployment of CHEWs, transport costs of CHW supervisors, areas of coverage and supervisory tasks of the CHW supervisors would benefit from clearer definition by the national policy.

Access to healthcare through community health workers in East and Southern Africa

Kumar M, Nefdt R, Ribaira E and Diallo K. (2014). UNICEF.

http://www.unicef.org/health/files/Access_to_healthcare_through_community_health_workers_in_East_and_Southern_Africa.pdf

The main objective of this report is to elucidate the current state of community provision of health services beyond public facilities, through the vehicle of CHWs. Understanding the role of each CHW cadre in the ESAR countries is intended to clarify the current and potential roles of CHWs in contributing to national healthcare systems. In addition to a comprehensive literature review, the study used a cross-sectional survey with close- and open-ended questions administered to UNICEF Country Offices and other key informants to investigate and map CHW characteristics and activities throughout the region.

Incentives

In many countries, public sector health expenditure is lower than required to support all health service provision in the country. Since CHWs are often viewed as non-essential health workers, simply requesting that countries reallocate limited public funds to pay for them is unlikely to succeed. Similarly, donors are often more focused on funding quantifiable items (commodities like drugs or services like maternal deliveries) instead of human resources. Moreover, when donors do fund human resources, there is often a strong focus on supporting perceived 'high-quality' health professionals, such as doctors and nurses, rather than CHWs as a form of task shifting. There are also concerns about the quality of care CHWs may provide.

As a result, about half of all CHW cadres are unpaid, including one-third of full-time CHWs. Non-financial incentives may work if CHWs are integrated into a healthcare career ladder and have the possibility of future paid employment, or if they are helped to set up other income-generating ventures. Current non-financial incentives like bicycles and t-shirts undervalue the time of the CHWs and makes programs difficult to sustain. The resulting dropout rates lead to a need for repeated recruitment and training of new CHWs, further driving up costs of such programs. Half of the CHW programs surveyed (both paid and unpaid) raised incentives and retention as a main challenge. This suggests that incentives for CHWs are an issue that the global public health community must resolve as a top priority.

Supervision

Insufficient supervision was listed as a major challenge to program success and growth for 13 of 37 CHW cadres in the survey. This was often linked to problems of integration with public health facilities (primary health care units) and public sector commodity supply chains. Current supervision practices provide a clear opportunity for change. The means of supervision and the perception of current work overload for supervisors will need to be addressed. If supervisory practices were improved, this could lead to several gains for patients and the healthcare system including:

- Improved quality of care: Supervisors will be able to target underperformers for additional training or removal from the program, and overachievers for possible performance-based rewards.
- Reduced stock-outs: A 'pull' system where CHWs notify supervisors when their commodity supplies are low would allow

for a more consistent service provided to patients. • Enhanced adherence to follow up: Effective supervision and record-keeping (often one of the incentives of supervisory visits) can allow tracking of patients and monitoring of adherence to treatment and referral recommendations from CHWs. Patients needing disease management at the community level could also be recommended to CHWs.

7. Some cost effectiveness data for comparison

Cost-Effectiveness of Community-Based Strategies for Blood Pressure Control in a Low-Income Developing Country, Findings From a Cluster-Randomized, Factorial-Controlled Trial

Jafar TH, Islam M, Bux R, Poulter N, Hatcher J, Chaturvedi N, Ebrahim S, Cosgrove P. (2011). *Circulation*,124(15): p. 1615-25.

<http://circ.ahajournals.org/content/124/15/1615.long>

Evidence on economically efficient strategies to lower blood pressure (BP) from low- and middle-income countries remains scarce. The Control of Blood Pressure and Risk Attenuation (COBRA) trial randomized 1341 hypertensive subjects in 12 randomly selected communities in Karachi, Pakistan, to 3 intervention programs: (1) combined home health education (HHE) plus trained general practitioner (GP); (2) HHE only; and (3) trained GP only. The comparator was no intervention (or usual care). The reduction in BP was most pronounced in the combined group. The present study examined the cost-effectiveness of these strategies.

Total costs were assessed at baseline and 2 years to estimate incremental cost-effectiveness ratios based on (1) intervention cost; (2) cost of physician consultation, medications, diagnostics, changes in lifestyle, and productivity loss; and (3) change in systolic BP. Precision of the incremental cost-effectiveness ratio estimates was assessed by 1000 bootstrapping replications. Bayesian probabilistic sensitivity analysis was also performed. The annual costs per participant associated with the combined HHE plus trained GP, HHE alone, and trained GP alone were \$3.99, \$3.34, and \$0.65, respectively. HHE plus trained GP was the most cost-effective intervention, with an incremental cost-effectiveness ratio of \$23 (95 confidence interval, 6–99) per mm Hg reduction in systolic BP compared with usual care, and remained so in 97.7 of 1000 bootstrapped replications.

The article concludes that the combined intervention of HHE plus trained GP is potentially affordable and more cost-effective for BP control than usual care or either strategy alone in some communities in Pakistan, and possibly other countries in Indochina with similar healthcare infrastructure.

Coverage, Adherence and Costs of Intermittent Preventive Treatment of Malaria in Children Employing Different Delivery Strategies in Jasikan, Ghana

Patouillard E, Conteh L, Webster J, Kweku M, Chandramohan D, Greenwood B. (2011). *PLoS ONE*, 6(11)

<http://www.plosone.org/article/fetchObject.action?uri=info:doi/10.1371/journal.pone.0024871&representation=PDF>

Intermittent preventive treatment of malaria in children (IPTc) involves the administration of a course of anti-malarial drugs at specified time intervals to children at risk of malaria regardless of whether or not they are known to be infected. IPTc provides a high level of protection against uncomplicated and severe malaria, with monthly sulphadoxine-pyrimethamine plus amodiaquine (SP&AQ) and sulphadoxine-pyrimethamine plus piperazine being the most efficacious regimens. A key challenge is the identification of a cost-effective delivery strategy.

A community randomized trial was undertaken in Jasikan district, Ghana to assess IPTc effectiveness and costs using SP&AQ delivered in three different ways. Twelve villages were randomly selected to receive IPTc from village health workers (VHWs) or facility-based nurses working at health centres' outpatient departments (OPD) or EPI outreach clinics. Children aged 3 to 59 months-old received one IPT course (three doses) in May, June, September and October. Effectiveness was measured in terms of children covered and adherent to a course and delivery costs were calculated in financial and economic terms using an ingredient approach from the provider perspective.

The economic cost per child receiving at least the first dose of all 4 courses was US\$4.58 when IPTc was delivered by VHWs, US\$4.93 by OPD nurses and US\$ 5.65 by EPI nurses. The unit economic cost of receiving all 3 doses of all 4 courses was US\$7.56 and US\$8.51 when IPTc was delivered by VHWs or facility-based nurses respectively. The main cost driver for the VHW delivery was supervision, reflecting resources used for travelling to more remote communities rather than more intense supervision, and for OPD and EPI delivery, it was the opportunity cost of the time spent by nurses in dispensing IPTc.

In conclusion: VHWs achieve higher IPTc coverage and adherence at lower costs than facility-based nurses in Jasikan district, Ghana.

Cost and cost-effectiveness of community-based care for tuberculosis in Cape Town, South Africa

Sinanovic E, Floyd K, Dudley L, Azevedo V, Grant R, Maher D. (2003). The International Journal of Tuberculosis and Lung Disease, 7(9 suppl 1).

<http://www.ncbi.nlm.nih.gov/pubmed/12971655>

The objective of this study was to evaluate the affordability and cost-effectiveness of community involvement in tuberculosis (TB) care.

A cost-effectiveness analysis was designed comparing treatment for new smear-positive pulmonary and retreatment TB patients in two similar townships, one providing clinic-based-care with community-based observation options available for its TB patients (Guguletu) and one providing clinic-based care only, with no community-based observation of treatment (Nyanga). Costs were assessed from a societal perspective in 1997 US dollars, and cost-effectiveness was calculated as the cost per patient successfully treated.

TB treatment in Guguletu was found to be more cost-effective than TB treatment in Nyanga for both new and retreatment patients (dollars 726 vs. dollars 1201 and dollars 1419 vs. dollars 2058, respectively). This reflected both lower costs (dollars 495 vs. dollars 769 per patient treated for new cases; dollars 823 vs. dollars 1070 per patient treated for retreatment cases) and better treatment outcomes (successful treatment rate 68% vs. 64% and 58% vs. 52% for new and retreatment patients, respectively). Within Guguletu, community-based care was more than twice as cost-effective as clinic-based care (dollars 392 vs. dollars 1302 per patient successfully treated for new patients, and dollars 766 vs. dollars 2008 for retreatment patients), for similar reasons (e.g., for new cases, dollars 314 vs. dollars 703 per patient treated, successful treatment rate 80% vs. 54%).

The paper concludes that community involvement in TB care can improve the affordability and cost-effectiveness of TB treatment in urban South Africa. Expansion in the Western Cape and in similar areas of the country is worthy of serious consideration by planners and policy-makers.

Community-based distribution of misoprostol for treatment or prevention of postpartum hemorrhage: cost-effectiveness, mortality, and morbidity reduction analysis

Sutherland T, Meyer C, Bishai DM, Geller S, Miller S. (2010). *International Journal of Gynaecology and Obstetrics*, 108(3):289-94.

<http://www.ncbi.nlm.nih.gov/pubmed/20079493>

This research aimed to compare the cost-effectiveness of community-based distribution of misoprostol for prevention with misoprostol for treatment of postpartum hemorrhage (PPH).

A Monte Carlo simulation depicted mortality and anemia-related morbidity attributable to PPH among 3 scenarios of 10,000 women delivering at home in rural India: (1) standard management; (2) standard management plus 800microg of sublingual misoprostol for PPH treatment; and (3) standard management plus 600microg of prophylactic oral misoprostol. The model included costs of drugs, birth attendant training, and transport for women who did not respond to misoprostol.

Results: Misoprostol lowered mortality by 70% and 81% in scenarios 2 and 3, respectively. Scenarios 2 and 3 raise costs by 6% and 35%, respectively. Incremental cost per disability-adjusted life year (DALY) saved is estimated at \$6 and \$170, respectively.

In conclusion, both interventions were more effective at decreasing mortality and anemia than standard management. The most efficient scale-up plan would focus initially on increasing coverage with the treatment strategy (\$6 per DALY).

Costs and cost-effectiveness of malaria control interventions - a systematic review

White MT, Conteh L, Cibulskis R and Ghani AC. (2011). *Malaria Journal*, 10(337).

<http://www.malariajournal.com/content/pdf/1475-2875-10-337.pdf>

The control and elimination of malaria requires expanded coverage of and access to effective malaria control interventions such as insecticide-treated nets (ITNs), indoor residual spraying (IRS), intermittent preventive treatment (IPT), diagnostic testing and appropriate treatment. Decisions on how to scale up the coverage of these interventions need to be based on evidence of program effectiveness, equity and cost-effectiveness.

A systematic review of the published literature on the costs and cost-effectiveness of malaria interventions was undertaken. All costs and cost-effectiveness ratios were inflated to 2009 USD to allow comparison of the costs and benefits of several different interventions through various delivery channels, across different geographical regions and from varying costing perspectives.

Fifty-five studies of the costs and forty three studies of the cost-effectiveness of malaria interventions were identified, 78% of which were undertaken in sub-Saharan Africa, 18% in Asia and 4% in South America. The median financial cost of protecting one person for one year was \$2.20 (range \$0.88-\$9.54) for ITNs, \$6.70 (range \$2.22- \$12.85) for IRS, \$0.60 (range \$0.48-\$1.08) for IPT in infants, \$4.03 (range \$1.25-\$11.80) for IPT in children, and \$2.06 (range \$0.47-\$3.36) for IPT in pregnant women. The median financial cost of diagnosing a case of malaria was \$4.32 (range \$0.34-\$9.34). The median financial cost of treating an episode of uncomplicated malaria was \$5.84 (range \$2.36-\$23.65) and the median financial cost of treating an episode of severe malaria was \$30.26 (range \$15.64-\$137.87). Economies of scale were observed in the implementation of ITNs, IRS and IPT, with lower unit costs reported in studies with larger numbers of beneficiaries. From a provider perspective, the median incremental cost effectiveness ratio per DALY averted was \$27 (range \$8.15-\$110) for ITNs, \$143 (range \$135-\$150) for IRS, and \$24 (range \$1.08-\$44.24) for IPT.

A transparent evidence base on the costs and cost-effectiveness of malaria control interventions is provided to inform rational resource allocation by donors and domestic health budgets and the selection of optimal packages of interventions by malaria control programs.

8. General guidance

Deployment of community health workers across rural sub-Saharan Africa: financial considerations and operational assumptions

McCord GC, Liu A, Singh P. (2012) Bulletin of the World Health Organization 2012;91:244-253B.

<http://www.who.int/bulletin/volumes/91/4/12-109660/en/>

This paper provides cost guidance for one adaptable configuration of a CHW “subsystem”: a provider system housed within a larger primary-health-care system that includes clinics and referral hospitals. Costing is done by function (e.g. diagnosing and treating malaria) and by local epidemiologic characteristics (e.g. each country’s prevalence of HIV infection), so that components and assumptions can be easily modified. National scale-up of CHW programs and of primary health care systems more broadly is likely to reduce the incidence of many of the diseases discussed in this paper. This model allows costs to be easily recalculated as incidence rates change. New functions, such as the care of patients with chronic conditions, could be added and costed once a vetted CHW protocol for these functions has emerged.

In summary, the paper recommends that countries wishing to develop a CHW strategy perform a similar costing exercise to design program budgets. According to previous studies, investment in a well-organised and comprehensive CHW subsystem that is embedded in a primary health care system can reduce maternal and child morbidity and mortality. This assessment suggests that the costs of the core elements of such a system are a fraction of the costs of primary health care services overall. This costing exercise sets the stage for a costing framework that can be used to determine the cost–benefit and cost–effectiveness of CHW programs.

Community health workers in global health: scale and scalability

Liu A, Sullivan S, Khan M, Sachs S, Singh P. 2011. The Mount Sinai Journal of Medicine, 78(3), 419-35.

<http://www.ncbi.nlm.nih.gov/pubmed/21598268>

Authors abstract. Unable to access full paper.

Community health worker programs have emerged as one of the most effective strategies to address human resources for health shortages while improving access to and quality of primary healthcare. Many developing countries have succeeded in deploying community health worker programs in recognition of the potential of community health workers to identify, refer, and in many cases treat illnesses at the household level. However, challenges in program design and sustainability are expanded when such programs are expanded at scale, particularly with regard to systems management and integration with primary health facilities. Several nongovernmental organisations provide cases of innovation on management of community health worker programs that could support a sustainable system that is capable of being expanded without being stressed in its functionality nor effectiveness therefore, providing for stronger scalability. This paper explores community health worker programs that have been deployed at national scale, as well as scalable innovations found in successful nongovernmental organisation-run community health worker programs. In exploration of strategies to ensure sustainable community health worker programs at scale, we reconcile scaling constraints and scalable innovations by mapping strengths of

nongovernmental organisations' community health worker programs to the challenges faced by programs currently deployed at national scale.

A novel community health worker tool outperforms WHO clinical staging for assessment of antiretroviral therapy eligibility in a resource-limited setting

Macpherson P, Lalloo DG, Thindwa D, Webb EL, Squire SB, Chipungu GA, Desmond N, Makombe SD, Taegtmeier M, Choko AT, Corbett EL. (2014). *Journal of Acquired Immune Deficiency Syndromes*. 1;65(2):e74-8
<http://www.ncbi.nlm.nih.gov/pubmed/23846567>

The accuracy of a novel community health worker antiretroviral therapy eligibility assessment tool was examined in community members in Blantyre, Malawi. Nurses independently performed World Health Organization (WHO) staging and CD4 counts. One hundred ten (55.6%) of 198 HIV-positive participants had a CD4 count of <350 cells per cubic millimeter. The community health worker tool significantly outperformed WHO clinical staging in identifying CD4 count of <350 cells per cubic millimeter in terms of sensitivity (41% vs. 19%), positive predictive value (75% vs. 68%), negative predictive values (53% vs. 47%), and area under the receiver-operator curve (0.62 vs. 0.54; $P = 0.017$). Reliance on WHO staging is likely to result in missed and delayed antiretroviral therapy initiation.

Outreach services to improve access to health care in South Africa: lessons from three community health worker programmes

Nxumalo N, Goudge J, Thomas L. (2013). *Global Health Action*, volume 6, 2013.
<http://www.globalhealthaction.net/index.php/gha/article/view/19283>

This article examines three South African CHW programs, a small local non-governmental organisation (NGO), a local satellite of a national NGO, and a government-initiated service, that provide a range of services from home-based care, childcare, and health promotion to assist clients in overcoming poverty-related barriers to health care.

Case Study 1

The Khanya program was an independent NGO, initiated by a local community member that relied on funding primarily from the Gauteng Department of Health & Social Development. The organisation aimed to improve general health outcomes, primarily through home-based care (HBC), tracing patients on chronic treatment, and facilitation of support groups. The CHWs were residents of the community they served. CHWs attended the 69-day training workshop provided by the National Department of Health. The curriculum included HBC, TB DOTS, disabilities, child and family health, pregnancy, and preparedness for disease outbreaks. Having completed the course, qualified CHWs were paid a monthly stipend. Very limited ongoing CHW training was available, with no opportunity for internal career progression. In addition to the CHWs, the sole staff member was the manager (who initiated the program) who was responsible for fundraising, operational management, supervision, and mentorship of the CHWs. A government-employed health promoter offered occasional support to the CHWs during their home visits.

Case Study 2

The Zola program was established and coordinated by the Gauteng Department of Health & Social Development's HIV/AIDS Directorate and was administered by the local government. It was funded as part of a national government employment generation scheme. The CHWs, recruited from the local community, attended a required 5-day training course on HIV/AIDS, TB and cancer as well as learning about strategies to support the community's access to other services. The CHWs, paid a monthly stipend, conducted door-to-door dissemination of HIV/AIDS-related information, providing advice on how households could access the range of government sectors such as housing, social welfare, water and sanitation. One manager was

responsible for supervision and day-to-day running of the program. Similar to the Khanya case study, the organisation did not offer any internal career progression opportunities for CHWs.

Case Study 3

The Eden program, located in the Eastern Cape, was a satellite organisation of a 'parent' national child and youth care NGO. Its core objective was to improve child health outcomes in households infected and affected by HIV/AIDS. CHWs, paid a stipend, linked neglected or abused children with health and legal services, and provided day-to-day care for child-headed households. After a community-aligned recruitment process, the selected CHWs were required to complete 14 training modules, as well as ongoing assessments, over the 2 years. Content of the modules included the basics of child and youth care work, children's rights, behaviour management, and lifespan development. CHWs received extensive supervision and mentorship; mentors focused on their technical skills and well-being, and various managers were responsible for coordinating different aspects of the program. Internal career progression was encouraged which led to the retention of skilled staff.

Discussion

CHWs in the Eden program made a difference in the lives of individuals and other family members. The ongoing training equipped them with the skills to respond to children's and their families' needs as well as to negotiate with service providers. The progress of each client was carefully assessed and regularly monitored. The CHWs in the Gauteng case studies lacked the resources to implement such a model. The manager of the Khanya program was unable to provide training, mentorship, and support to CHW as well as the overall management. Similarly, in the Zola Program, although closely associated with local government, training and supervision were neglected.

Internationally, strong evidence shows that well-established supervision and training mechanisms are central to the success of CHWs' programs.

Slow global progress to address the social determinants of health is indicative of the poor governance particularly at a local level. In South Africa, the lack of accountability has compromised the envisaged role of ward councilors in addressing the needs of the community. The councilors in Zola and Khanya did little to hold civil servants accountable to provide basic services or to support the programs in more specific ways. This in turn curtailed the ability of the CHWs to provide effective outreach services.

The success of the Eden program was due to a range of factors. It received sufficient funding to be able to establish an effective local organisational structure (with mentors, coordinators, and an overall manager). The local office was able to use resources to support the CHW in ways relevant to the local context. The program managers understood the need to view clients holistically, that the social determinants of ill-health are intertwined, and therefore facilitating access to a social grant (to enable access to transport and food) may be the only way to ensure sustained access to care.

The study highlights the importance of a locally based organisation with capacity and resources to provide an enabling and supportive environment for CHWs. District and sub-district health structures in South Africa struggle to provide adequate facility-based care. Under the new policies, without sufficient investment in capacity and sufficient resources to support the outreach teams, the current reforms are unlikely to achieve their objectives. It is also questionable whether the current NGO sector should be seen as an appropriate mechanism to provide support to the outreach teams. South African NGOs in this CHW sector are generally small, with poor management systems. Fragmentation results in the duplication of services which, in some cases, are poorly aligned to national priorities. However, the Eden program provides important relief to a particular community. It is a valuable case study with lessons for both government and NGO-run programs.

Motivation and sustainability of care facilitators engaged in a community home-based HIV/AIDS program in Masvingo Province, Zimbabwe

Osawa E, Kodama T, Kundishora E. (2010). *AIDS Care*, 2010 22:895-902.

<http://www.ncbi.nlm.nih.gov/pubmed/20635254>

Community home-based HIV/AIDS programs with care facilitators (CFs) are key interventions for dealing with both the shortage of health professionals (e.g., physicians, nurses, midwives, etc.) and the current HIV/AIDS epidemic in many parts of Africa. Zimbabwe, one of the sub-Saharan countries is not an exception. The Zimbabwe Red Cross Society started a community home-based HIV/AIDS program with CFs in 1992. This paper describes the results of a cross-sectional study conducted to examine the factors influencing the motivational outcome and self-assessed performance of CFs from one province involved in this program. Self-administered questionnaires provided to CFs were analysed by chi-square test and multiple linear regression. The response rate was 71.7% (15 male, 104 female). Results showed that 46.8% of CFs in rural areas had worked more than five years whilst only 18.5% of CFs in urban areas did ($p < 0.05$). The motivational outcome and self-assessed performance of CFs were significantly associated with perception toward family and community environment ($\beta = 0.462$, $SE = 0.092$, $p < 0.001$ and $\beta = 0.496$, $SE = 0.173$, $p < 0.001$, respectively) and perception toward organisational characteristics, especially managerial support, like attention from a manager, clear instruction, and goals, had an impact to CFs motivational outcome. These findings suggest that organisations need to create the policy consistent with community need and provide clear goal and instruction to improve to motivation and performance of CFs.

10. Additional information

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