

Increasing access to Family Planning (FP) and Reproductive Health (RH) services through task-sharing between Community Health Workers (CHWs) and community mid-level professionals in large-scale public-sector programs

A Literature Review to Help Guide Case Studies

Population Council

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I. Introduction

This paper is the first deliverable of the USAID funded project “*Increasing access to Family Planning (FP) and Reproductive Health (RH) services through task-sharing between Community Health Workers (CHWs) and Community mid-level professionals in large-scale public-sector programs.*” The results of this review will be used to design case studies and technical assistance in Ethiopia, Ghana, and India, and operations research in Kenya and Pakistan.

Two sources of information have been used in this review. Many relevant studies on community-based distribution of family planning programs were published prior to 2000, as were studies of CHW programs that include family planning and selective reproductive health services. These older studies were collected from books and articles from library collections. Both gray (unpublished reports, non-refereed articles and conference proceedings) and published literature (refereed journals and books) from 2000 to 2010 was obtained by on-line search. Search engines used included Google, Google Scholar, Yahoo, PubMed, K4H, PopLine, the British Medical Journal (BMJ), Population Reference Bureau, Global Atlas of the Health Workforce, Science Direct; and, information presented on the websites and documents of the World Health Organization, United Nations, World Bank, Family Health International, CARE, Pathfinder, and Population Council, as well as Ministries of Health of various countries in Africa and Asia. Also, electronic correspondence was used to contact Population Council personnel in Ethiopia, Ghana, India, Kenya, and Pakistan.

Search terms included: Community health worker, community-based delivery, community-based health worker, community-based distributor of family planning (CBD) lay health worker, health extension worker, mid-level and low-level provider, non-professional health workers, role expansion, task sharing, task shifting, role expansion, and single- and dual cadre programs.

A total of 171 articles and reports were identified of which 78 of the most useful and accessible documents were used in this review.

II. Background

In most developing countries, fertility, contraceptive use and reproductive health status in rural areas lags far behind urban populations. Urban–rural fertility differences range from two to three children per woman in Ethiopia (DHS, 2006), Ghana (DHS, 2009a), Kenya (DHS, 2010), and Nigeria (DHS, 2009b), to one to two children in Pakistan (DHS, 2008) and India (DHS, 2007). Fertility and family planning differences are even larger between poor and more affluent rural residents. The poorest rural wealth quintiles in Ethiopia, Ghana, and Kenya have modern contraceptive use levels that range from less than five to about 15 percent, while modern contraceptive use among the wealthiest rural quintiles ranges from about 20 to 50 percent (The

Futures Group, 2010). Higher fertility and lower contraceptive use translates into more unwanted pregnancies and higher infant and maternal mortality rates among the rural poor (Rutstein, 2005).

Hospitals and health centers alone cannot serve the reproductive health needs of rural communities, which comprise 65 to 85 percent of the population in the poorest countries in Sub-Saharan Africa and South Asia. Even the largest countries suffer critical shortages of physicians, nurses and midwives, typically having fewer than two health professionals per 1,000 population, and these professionals are overwhelmingly based in urban areas (Mohr, 2006).

Lack of medical training capacity and the emigration of professionals to North America and Europe pose continuing barriers to increasing the size of health workforces in developing countries, while difficult living conditions and lack of access to modern medical technologies dissuade health professionals from working in rural areas (Buchan & Dovlo, 2004) (Anarfi, Quartey, & Agyei, 2010). For example, in Ghana in 1997, 1087 of the 1247 (87.2 percent) general physicians worked in urban regions, although 66 percent of the population is rural (Dussault & Franceschini, 2006). Moreover, stationing physicians and nurses in remote rural areas may not be the best way to utilize a scarce and expensive resource. Realizing the full potential of high level workers, such as physicians, requires that they be supported by laboratories and equipment often unavailable at the community level.

Community-based programs providing family planning services and information began to appear in rural areas to complement facility-based services in the 1950s. They included community-based distribution of family planning (CBD) and community health workers (CHWs). Community-based distribution of contraceptives first appeared in India and other Asian countries in the late 1950's, and by the late 1960's had spread to Africa and Latin America (Foreit R. & Frejka, 1998). These programs used either non-professional health workers, such as auxiliary nurses, or non-health workers, such as community volunteers, to provide family planning information and a limited range of contraceptives. In addition, CHWs provided a wide variety of maternal and child health and other types of preventive and primary care services.

Many large scale CBD programs have and continue to be successful. An evaluation of the Lady Health Worker (LHW) program in rural Pakistan showed that women in areas served by LHWs had a contraceptive prevalence rate of 30 percent compared to 21 percent in comparison rural areas (Douthwaite & Ward, 2005). Multipurpose CHW programs have also recorded successes. One of the best documented is the Community-based Health Planning and Services (CHPS) program in Ghana. In program areas, from 1998-2008, under-five mortality declined from 108 per 1,000 live births to 80 per 1,000 and the total fertility rate (TFR) declined from 4.6 children per woman to 4 per woman (CHPS Project, 2010) (Nyonator, Awoonor-Williams, Phillips, Jones, & Miller, 2005) (Phillips, Bawah, & Binka, 2006).

By the mid-1990's, CBD programs were being asked to better integrate into health systems, and their continued relevance, scale and cost were being questioned. Increased contraceptive prevalence rates led to questioning of the need to continue CBD distribution. Many programs were also non-sustainable without donor support. They tended to be vertically organized, independent of facilities, dependent on dedicated donor funding, and largely implemented by non-governmental organizations (NGOs) outside of the public health system. The result was fragmentation of effort and a lack of sustainability.

In contrast to traditional CBD, interest in CHWs has remained high. Integrated community-level services for RH/FP, MCH, and HIV/AIDS has been recommended as a key strategy for national health systems strengthening within WHO's "Framework for Action" (WHO, 2007a) and is highlighted in the U.S. Government's Global Health Initiative (GHI) (U.S. Government, 2011). Further emphasis to CHW deployment has come from the recent focus on task shifting and task sharing) which are treated synonymously in much of the CHW literature. Defined as the *rational redistribution of tasks among health workforce team* (WHO, 2008a), task shifting/sharing has been widely endorsed, including forming community-level health teams as a key element for successful village level programs (UNFPA, 2009).

Literature reviews conclude that CHWs have often shown convincing effects on program outputs, outcomes, and impacts. For example, one review (Lehmann & Sanders, 2007) concludes that "...there is robust evidence that CHWs can undertake actions that lead to improved health outcomes..." while a second commentator states "*There is no longer any place for discussion of whether CHWs can be key actors in achieving adequate health care*" (Frankel & Doggett, 1992). However, the same authors also concede that many programs are not successful and call for careful planning and research to identify and overcome problems. "*What does emerge is the inescapable conclusion that in almost all areas CHWs are failing to achieve the contribution which is clearly their potential, and which is an essential pre-condition of health for all*" (Frankel and Dogget 1992).

Although this review includes information from several countries, we mainly focus on CHW programs in countries that will participate in this research activity. Program models in Ethiopia, Ghana, and India include mid- and lower-level workers, while Kenya and Pakistan are single cadre programs consisting of mid-level workers.

- *Ethiopia*: The Health Extension Program (HEP) includes mid-level health extension workers (HEWs), and lower level Trained Birth Attendants (TBAs), multipurpose community health workers (CHWs), and some community-based reproductive health workers (CBRHAs) absorbed from an NGO program.
- *Ghana*: The Community-Based Health Program (CHPS) includes mid-level Community Health Officers (CHOs) and Community Volunteers (CVs).

- *India:* The National Rural Health Mission's (NRHM) *Janani Suraksha Yojana (JSY)* program includes Auxiliary Nurse Midwives (ANMs) and Accredited Social Health Activists (ASHAs).
- *Kenya:* The Community Midwife (CM) model includes self-employed professional midwives working in their home communities
- *Pakistan:* The National Program for Family Planning and Primary Health Care (NP for FP and PHC) includes Lady Health Workers (LHWs)

III. Problem

The CHW literature, although voluminous, suffers from problems that make reaching conclusions about Community health programs difficult. There are many variations in CHW program organization and emphasis. There is no standard nomenclature; most documents are found in the gray literature, few report meaningful data, and the relatively small number of research studies and evaluations of CHW programs seldom use rigorous designs. Importantly, there is no framework detailing causal connections between inputs, processes, relationships, and outcomes of community programs.

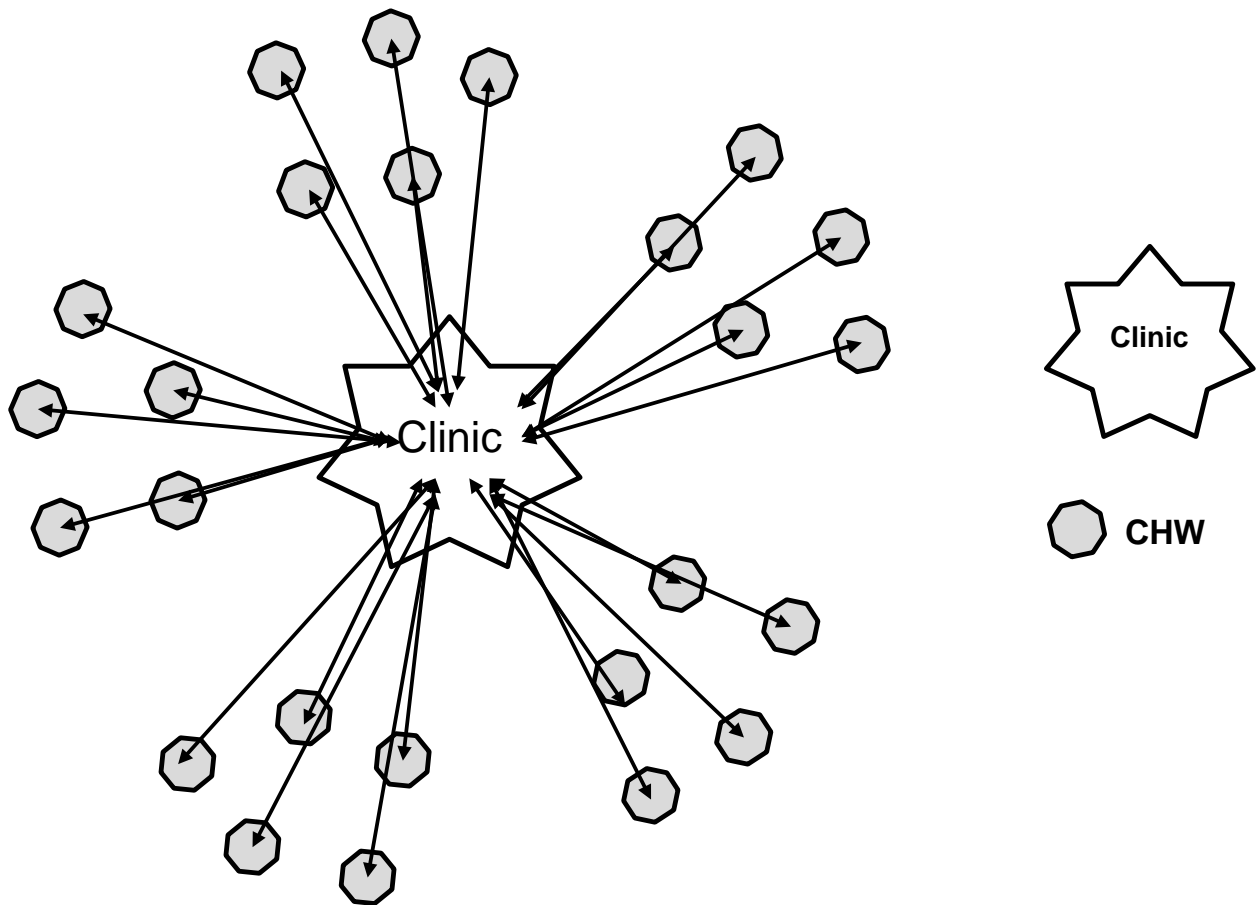
IV. Nomenclature and Taxonomy

At least two general types of CHW programs can be distinguished. Integration of services and the idea of a service delivery *team* rather than CHWs working individually have resulted in programs that employ more than one level of worker who provide services outside of clinical settings. A community volunteer with minimal training may be responsible for health education and referral within their community, while a professionally trained mid-level health worker with greater responsibilities provides services to more than one community - we will refer to this as a *dual cadre model*. The dual cadre model is not a recent development. Starting in the 1960's "mobile clinics" brought sterilization and IUD services to rural villages in Colombia, Korea, Peru and Turkey. In these programs the local CBD distributor "mobilized" clients to come to the clinic at the location and on the date that services were provided by a higher level worker (Gillespie, 1985).

In other places, however, CHW programs have only a single type of worker in the village affiliated with a clinic whose workers do not provide services in the surrounding communities. We will refer to this as a *single cadre model*. Some single cadre modules employ para-professionals based in small rural health posts, while others depend on non-professional volunteers to provide education, contraceptives and other health products. The terms dual cadre and single cadre are not commonly used in the CHW literature. Thus we will define and create a taxonomy of these program types. In addition, a diverse nomenclature is used when referring to common CHW program elements. We have developed definitions for some of the basic concepts used in this review.

Single cadre program refers to a program that uses only one type of worker in the community, usually a CHW (e.g. a briefly trained volunteer who provides health education and makes referrals to health centers for services). Other single cadre models may use only mid-level workers (e.g. Lady Health Workers in Pakistan). Figure 1 depicts the organization of a typical single cadre program. It is followed by a taxonomy indicating two basic single cadre models.

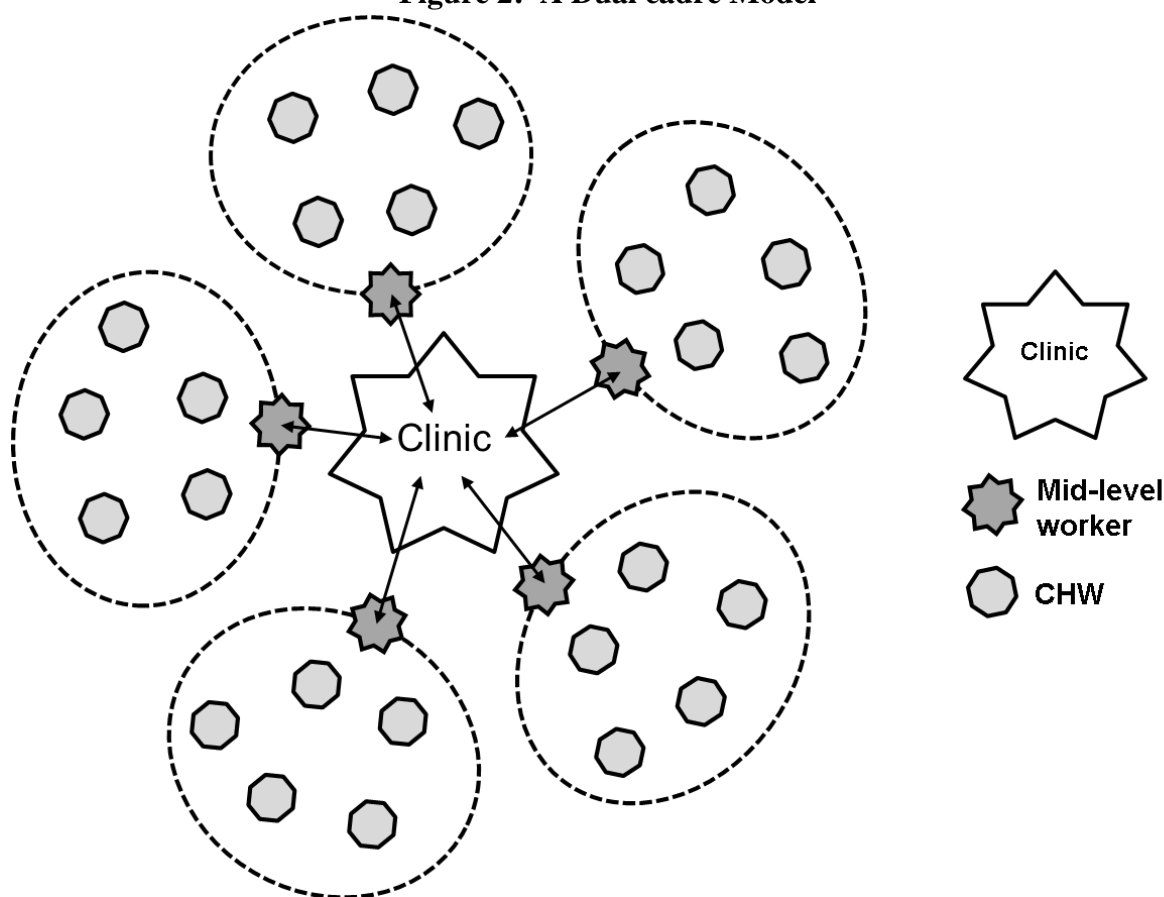
Figure 1: A Single Cadre Model



Single cadre			
		Promotion/Mobilization Referral	Service Delivery
Model 1	Supervisor	X	
	CHW		X
Model 2	Supervisor	X	
	CHW	X	

Dual cadre program refers to a program that uses two types of workers in the community, usually a mid-level professional or paraprofessional working with volunteer CHWs. The dual cadre program represents an attempt to bring more health services and information to the community than can be provided by one level of worker. The mid-level worker usually supervises several CHWs. Figure 2 (below) is a graphic representation of a dual cadre program. It is followed by a taxonomy of two basic dual cadre models.

Figure 2: A Dual cadre Model



Dual- Cadre			
		Promotion/Mobilization Referral	Service Delivery
Model 3	Mid-level	X	X
	CHW	X	
Model 4	Mid-level	X	X
	CHW	X	X

Community is a small geographic unit that is served by a CHW. Communities may include discrete rural villages or neighborhoods of urban or peri-urban areas. This review is mainly concerned with rural communities.

Community health workers in this paper are defined as the lowest level of health worker. Usually they are local inhabitants who have received limited training to provide information, mobilization, referral, and often some basic health services to the communities in which they live. They are expected to remain in their home village or neighborhood and usually work part-time. They may be volunteers or receive some type of compensation for their time and effort. They are generally not, however, regular employees of ministries of health or non-governmental organizations (NGOs). Community health workers are also referred to as non-professional or non-medical workers, lay health workers, or community-based distributors, among many other terms.

Mid-level health workers are generally of ministries or NGOs. They generally cover more than a single community, have some professional training and provide more services than the lower level worker. In dual cadre programs the mid-level provider is usually assisted by and supervises CHWs.

Role expansion refers to the addition of activities to the role of a health worker, especially a community health worker. Role expansion *usually* does not involve shifting a task from a higher level to a lower level worker. For example, contraceptive distribution might be added to the family planning education duties of a village health worker while mid-level workers and clinics continue to supply the same contraceptives to clients.

Task sharing may refer to either a higher level or a lower level worker providing the same service (e.g. both the lower and higher level workers provide condoms), or providing different components of the same service (e.g. a lower level worker provides education about family planning and referral to a higher level worker who actually provides contraceptives). Task sharing is implicit in all programs with more than one worker dedicated to the same health area.

Task shifting involves the redistribution of tasks among health workforce teams. Specific tasks are moved from highly qualified health workers to health workers with less training and fewer qualifications. Although the term is often confused with task sharing and role expansion, true task shifting *usually* occurs in clinics. For example, a volunteer provides education and counseling to clients, a task formerly performed by a nurse. The nurse is then freed to perform more clinical and administrative tasks.

V. Conceptual Framework

In the following sections we will develop a conceptual framework for analyzing CHW programs. CHW program performance can be expressed as a simple function $P = f(C, U)$ where:

P = Performance

C = Variables controllable by program managers, in specific program context

U = Variables not under the control of program managers, in specific program context

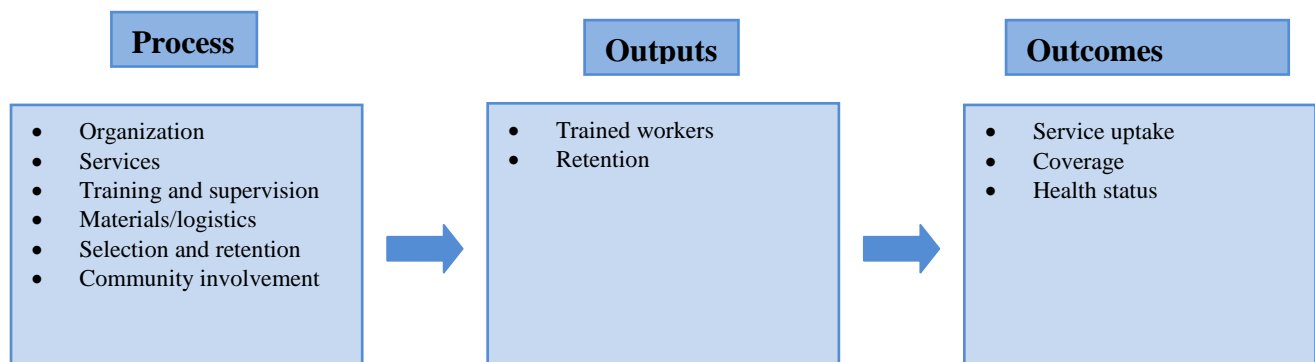
Although we recognize the importance of policy factors such as program leadership and financing as well as non-controllable factors such as religion and geography, the focus of our project is on technical assistance and operations research. Therefore we will systematically examine factors under the control of managers, and will discuss some methodological issues related to the measurement of CHW program costs.

In all, we will highlight six factors frequently identified in the CHW literature as important to program success. The factors include:

1. Program organization
2. Family planning and other services provided by workers in CHW programs
3. Training and supervision of workers
4. Availability of supplies and materials
5. Selection motivation and retention of workers
6. Community involvement

The relationship between the above factors and program outputs and outcomes is shown in the simple logic frame in Figure 3 below.

Figure 3
Logic Frame for CHW Program Analysis



The logic frame assumes that six critical processes are responsible for keeping community workers in the field. In turn the presence and quality of community workers produces outcomes, like service uptake, that impact health status.

V. Organization of CHW programs

Program structure: In a dual cadre program the mid-level worker usually covers a population of 4,000 to 5,000 (Prasad & Muraleedharan, 2008), while lower level workers are usually based in a single village, and are supervised by the higher level worker. In single cadre programs, the worker (especially a mid-level worker) may cover a village or larger area akin to those covered by mid-level workers in dual cadre programs. Ultimately, the size of the population covered depends on the density of the population, availability of transportation and the actual frequency of visiting villages and households to effectively deliver information and/or services.

CHW programs tend to share the following assumptions about community workers:

- There is underutilized capacity among less specialized health workers
- It is desirable and possible to change the roles of lower level workers to include tasks performed by higher level workers
- The number of lower- and mid-level workers can be increased and they can provide services more cost-effectively than facility based professional workers based in fixed facilities.

Controlling operations and resources are managerial tasks that are based on hierarchical organization, distribution of tasks among hierarchies, and information systems. Community programs are linked to clinics and hospitals to which they make referrals and from which they receive supplies and supervision.

Figures 4 through 6 show the organizational structure of two dual cadre programs, the CHPS program in Ghana (Figure 4) and the rural CHW program in India (Figure 5).

Figure 4
Ghana Health System Organizational Structure: CHPS Program
(Nyonator, Awoonor-Williams, Phillips, Jones, & Miller, 2005)

State	<ul style="list-style-type: none"> •Ministry of Health •Ghana Health Service
Regional	<ul style="list-style-type: none"> •Hospitals
District	<ul style="list-style-type: none"> •District Health Management Teams (DHMT) •District Hospitals
Sub-district	<ul style="list-style-type: none"> •Sub-district Health Management Teams (SDHMT) •Health centers, or Polyclinics, in Sub-district
Community	<ul style="list-style-type: none"> •Community Health Committees •CHPS Zones with community support systems •CHO, nurse, midwives, and CHVs
Village	<ul style="list-style-type: none"> •Health volunteers (CHVs)

Service delivery is the major role of health workers in the village, community and sub-district levels in Ghana. The functions of the district level are predominantly technical support, planning and supervision for the sub-district, community and village levels. The regional level exercises oversight for districts, sub-districts, and community and village levels. The state or ministry of health level sets policies and makes sure that those policies are implemented. It is also responsible for channeling resources to the appropriate levels and conducting monitoring and evaluation.

Figure 5
India Health System Organizational Structure: ASHA Program
 (National Rural Health Mission, Accessed Feb 2011)

State	<ul style="list-style-type: none"> •State Monitoring Group at State Level SPMV •State Health Resource Center: Project Manager, Statistical Assistant, Office Attendant
District	<ul style="list-style-type: none"> •District Health Mission •DPMU •ICDS Officer
Block PHC	<ul style="list-style-type: none"> •Block Medical Officer, Block Organizer, Block Facilitator, block education officer •ICDS officials
PHC	<ul style="list-style-type: none"> •Medical Officer •Accredited Social Health Activist (ASHA) Facilities

Sub-center	•Auxiliary Nurse Midwives (ANM)
Village	•SHG, Anganwadi Worker (AWW), Auxiliary Nurse Midwives (ANM), Gram Panchayat

The organizational structure of the Indian CHW program is not as straightforward as the Ghana program. The ASHA is attached to Primary Healthcare Centers (PHC) because ASHAs are paid diverse incentives to refer clients to the centers for various health services. Training and re-supply of materials also occurs at this level. The ANM who supervises the ASHA at the village and sub-center level is attached to both the sub-center and the PHC level, as is the ASHA. Program policy is set at the State level; monitoring and evaluation is performed at the District and block levels. PHC provides technical support, management and supervision to the lower levels.

In Ethiopia, there are fewer organizational levels, but the structure of the dual cadre program is similar to those in Ghana and India.

Figure 6
Ethiopia Health System Organizational Structure: Health Extension Program
(Federal MOH Ethiopia, 2007)

Federal Level	•Federal Ministry of Health
Regional	•Regional Health Bureaus/Regional administration
Zonal Depts of Health	•Zonal Health Bureaus •Health professionals
Woreda administration	•Woreda Health office/ Kebele Health Committee and Kebele Cabinet •Health posts/health centers/facilities •HEWs work out of rural health posts and work with village level CHWs, TBAs (CBRHAs)

The Health Extension Worker (HEW) program in Ethiopia is organized in four layers starting with the district and proceeding up through zones, and regions to the national level. Community health workers are based at the district level and health professionals at the zonal level. The HEW supervises a variety of lower level workers including birth attendants, CHWs, and, in some districts CBD workers inherited from an NGO program.

Monitoring and evaluation: In theory, monitoring and evaluation systems are important for program decision making and supervision. In practice, these systems suffer from poor quality

information and tardy and incomplete reporting. Problems range from requiring too much information from the field to requiring too little, and workers are often not trained in filling out forms and records. Even where the system does function, administrators often do not make use of the data. These problems have been noted for a long time (Shaefer & Raynolds, 1985), and there have been persistent efforts to correct them, however the problems continue to exist (Acquah, Frelick, & Matikanya, 2006).

VI. Services Provided

The selection of family planning (FP) services and other health services provided in rural community programs should be based on efficacy (the intervention's potential for significantly affecting health), community demand for the intervention, cost, and ability of the health worker to deliver the intervention safely. The services provided in community-based programs, both in single and dual cadre models, range from family planning services, such as oral contraceptives, injectables, fertility awareness methods and selected long acting contraceptive methods, to other health services, such as reproductive and primary health care, antenatal and postnatal care, safe delivery, immunization, nutrition, distribution of oral rehydration salts, and treatment of minor illnesses.

Family planning services: Adding new methods to a family planning program is associated with increased adoption and use of contraception (Ross & Frankenberg, 1993), but the safety of CHW provision of products and services is a perennial area of concern among program managers. In response to these concerns, many studies on the safety and effectiveness of contraceptive provision by lower-level workers have been conducted. Evidence shows that CHWs can safely provide a wide range of contraceptives when assisted by simple algorithms or checklists including injectable and oral contraceptives (Stanback, Mbonye, & Bekiita, 2007) (WHO, 2009a) (Rosenfield & Limcharoen, 1972), as well as emergency contraception.

In 2009, WHO, USAID and several international family planning organizations held a technical consultation, which concluded that “community-based health workers can safely and effectively administer injectable contraceptives” (WHO, 2009a). Community health workers administer DMPA injections in Bangladesh, Bolivia, Guatemala, Haiti, Mexico, Nepal, and Peru (WHO, 2009a). In Africa, pilot projects have tested DMPA provision by CHWs in Uganda (Stanback, Mbonye, & LeMelle, 2005), Malawi (Hamblin & Msefula, 2009), and Madagascar (Hoke, et al., 2010). Administration of DMPA by mid-level workers is already common in Africa, including Ethiopia, Ghana, and Kenya. In 2010, Family Health International convened a regional workshop in Uganda where participants from seven African countries passed a resolution urging governments to allow CHW distribution of DMPA (Malkin, 2010).

Despite the endorsement of WHO and other organizations, program managers in developing countries are concerned that CHW distribution of DMPA may increase the possibility that clients will not receive injections on schedule, resulting in lessened protection and more side effects; that needle stick injuries would be common among providers, increasing the possibility of HIV infection, and that injection site morbidity would be greater among the clients of CHWs than clinic providers (Uganda, FHI, & USAID, 2007).

In response to these concerns, an FHI study in Uganda compared the proportion of CHW clients receiving a second injection of DMPA with the proportion of clinic clients receiving a second injection. About 88 percent of CHW clients received a second injection compared to about 85 percent of clinic clients. Moreover, 94 percent of both CHW and clinic clients received their injections on time. Injection safety was very high. No needle sticks were reported during the study, and only a handful of injection site morbidities were reported by clients, with no significant differences between CHW and clinic clients (Stanback, Mbonye, & Bekiita, 2007).

Emergency contraceptive pills (EC) are an over-the-counter hormonal product that is used to prevent pregnancy after unprotected intercourse or method failure. EC is available in pharmacies in all the countries in our study, and as a clinical method in Ethiopia, Ghana, and Kenya. Family planning programs in Pakistan and India permit CHW distribution (EC is an oral contraceptive variant, and any worker who provides pills can also provide EC). Acceptors of EC, especially those who have been educated and given advance provision, use the method when needed. Studies have found no increased unprotected sex among EC users, and no negative effects on regular contraceptive use (Raine, Harper, Leon, & Darney, 2000) (Ellertson, Ambardekar, Hedley, Coyaji, Trussell, & Blanchard, 2001) (Keesbury, Liambila, & Obare, 2009). In fact, studies of EC in Bangladesh and India suggest that women who begin contracepting by using emergency contraception go on to use regular family planning methods (Sebastian, Khan, Kumar, Shekhar, & Gupta, 2005).

The Standard Days Method (SDM) of contraception is a fertility awareness method that has many features that make it attractive to rural programs (Institute for Reproductive Health, 2006). The method is approximately as effective as pills and has no contraindications. SDM uses a string of beads indicating fertile and non-fertile days of the month. The beads and accompanying education need only be provided once, and continuing use is not affected by stock outs or side effects. An alternative natural family planning method is the Lactational Amenorrhea Method (LAM), which can also be provided by mid-level and low-level community health workers who have consistent contact with clients in the postpartum period.

Trained mid-level workers should be able to provide clients with selected long acting contraceptive options. The single-rod implant provides clients with a contraceptive option that is effective for three years and is already being used in many community programs. The impact of

mid-level workers on the availability of long acting contraceptives can be enhanced by IUD insertion training but, with the possible exceptions of India and Ghana, this method is generally available only in hospitals and large health centers that are inaccessible to most of the rural population (Nyarko, et al., 2008). The method provides protection for ten years or more, and the safety of para-professional IUD insertion is one of the strongest findings in the operations research literature (Foreit J. R., 1991).

Other health services: Other reproductive and primary health care (PHC) services are provided in both single and dual cadre programs. The most common services include ante- and postnatal care, safe delivery, immunization, nutrition (growth monitoring and micronutrient distribution), bednets and anti-malarials, acute respiratory infection (ARI) treatment, distribution of oral rehydration salts (ORS), and treatment of minor illness. In rural programs some services—especially childbirth and immunization—are often reserved for mid-level workers. Referrals, health education and “community mobilization” are virtually universal components of CHW programs.

CHWs have been shown to provide services correctly and safely when supported by job aids in other health areas including assessment of neonatal illness in rural communities (Darmstadt, et al., 2009), prevention and treatment of malaria (Delacollette, Van der Stuyft, & Molima, 1996) (Lehmann & Sanders, 2007), and administration of misopristol (Mobeen, et al., 2010).

Health education often includes topics such as hand washing and breastfeeding as well as information about the health services available in the community. The meaning of community mobilization varies by program. It can mean organizing community meetings when higher level workers come to the village to speak on a health topic or making home visits to prepare the village for the arrival of an immunization campaign. Other mobilization activities include forming women’s health committees and meetings with village leaders to obtain support for and participation in health activities.

There is often pressure on CHW programs to deliver more services. Communities demand more curative services while administrators in integrated programs try to add preventive services. Adding new services may hamper the delivery of older services, or the new services may be ignored by overburdened workers. The number of services provided should take into consideration the amount of training required, the frequency of the problem addressed by the service, logistics constraints and the amount of record keeping and supervision needed. Table 1 (below) shows the family planning and other health services that are provided in CHW programs in Ethiopia, Ghana, India, and Kenya, by level of worker.

Table 1
Family Planning, Reproductive and Other Health Services in Community Programs

Country	Mid – Level Worker		Low – Level Worker	
	FP Services	Other Services	FP Services	Other Services
Ethiopia	Condoms, pills, DMPA, single-rod implants	ANC, post-natal care, delivery, vaccination, bed-nets, malaria drugs, ARI, HIV education and referral	Information and referral	Health education and referral, community mobilization
Ghana	Condoms, pills, DMPA, single-rod implants, LAM, and NFP, sterilization referrals	ANC and post-natal care, deliveries (if trained), vaccination, malaria prevention and treatment, ARI, minor curative, community mobilization	Condoms, pills	Record keeping, ARI, Malaria treatment (and bed nets distribution), community mobilization
India	Condoms, pills, IUD (if trained), sterilization referral	ANC, post-natal care, delivery, vaccination, community mobilization	Condoms, pills, emergency contraception, sterilization referral	Distribution of ORS, Iron supplements, chloroquine, community mobilization
Kenya	Condoms, pills, DMPA, single-rod implants (if trained)	ANC, post-natal care, delivery, Malaria, HIV care and treatment, malaria and minor illness treatment, community mobilization	Single Cadre Program No consistent involvement of CAs with lower level workers	
Pakistan	Condoms, pills, DMPA, referrals for other methods	Referrals, health education, minor illness treatment, community mobilization	Single Cadre Program No consistent involvement of CAs with lower level workers	

VII. Training and Supervision

The two most important factors for increasing Lady Health Worker (LHW) service delivery are adequate supervision...and LHWs' knowledge. Supervisors' access to a vehicle appears to be important even in urban areas."

-- Final Report, Population Council Lady Health Worker Program external evaluation

The jobs of community health workers in both dual cadre and single cadre programs differ from those of clinic based workers. Less supervision may be received by the community worker than by the clinic worker. Thus, the CHW is often placed in the position of taking on a complex role without benefit of support, correction of errors, or help in problem solving. The outreach role of the community health worker involves continuous public contact, for which the CHW usually receives no training (Golden, Wawer, & Mercer, 1985).

Training: The need for large numbers of mid- and lower-level health workers may impose heavy costs on health programs even though these workers receive less training than physicians and nurses. The sheer size of the training task may lead to problems, including less training than is needed for many tasks. For example, for the CHPS model to cover all of rural Ghana requires ten times the number of community health nurses currently employed by the Ghana Health Service (when assigned to rural areas, the nurses' title becomes Community Health Officer, or CHO). To provide the number of nurses needed requires expanding the number of community nursing schools from four to ten (Ghana Health Service, 2005), yet funds are short for existing training schools; classes are overcrowded; and some training programs lack the transportation funds necessary to fulfill students' field experience requirements (Acquah, Frelick, & Matikanya, 2006).

In our study countries, as shown in Table 2, mid-level workers receive one to two years of training while lower level workers receive anywhere from a few days to a few weeks of training. Additionally, both cadres may receive supervision, refresher training and/or specialized training when a new activity is added to their duties.

Table 2
Training of Community Health Workers

Country	Mid-Level Worker		Basic-Level Worker	
	Job Title	Initial Training	Job Title	Initial Training
Ethiopia	Health Extension Worker	1 year	Community Volunteer	3 days
Ghana	Community Health Officer	2 years	Community Volunteer	5 days
India	Auxiliary Nurse Midwife	18 months	Accredited Social Health Activist	23 days
Kenya	Community Midwife	2 weeks*	Community Health Worker	1 – 2 weeks**
Pakistan	Lady Health Worker	15 months	Community-Based Volunteer	7 days

*Community midwives are trained and registered midwives who are retired or out-of-work. The two week training period is mainly a refresher activity.

**Two weeks required if worker will distribute contraceptives, otherwise one week of training.

Many reports and reviews suggest that lower-level community health workers have serious training deficiencies. For example, a WHO algorithm for managing childhood illnesses was ineffective because CHWs had serious difficulties in understanding it. In India, it was found that lower-level workers had problems understanding a number of different training manuals (Prasad & Muraleedharan, 2008). In Uganda, workers in a community-based HIV/AIDS prevention program are supposed to visit households to collect data about the number of HIV cases in the village. However, they were never trained to collect the information, and had no forms on which to record it. The workers received three days or less of training on all topics and did not feel competent to counsel or provide information on any of them (Parker, 2010).

Systematic research on the effect of training variables, such as duration, content, and training methods, is needed to make training more affordable and effective, especially for the large numbers of lower-level and volunteer workers.

In many community programs, retraining, when done at all, is performed by professional trainers during periodic refresher courses. A weakness of this system is that job related knowledge declines between the time of original and refresher trainings. Operations research projects in Peru experimented with on-the-job training (OJT) by supervisors using an Individual Diagnostic and Feedback Instrument to retrain CBD distributors. A comparison between traditional group training and individual OJT found that on-the-job training was substantially less costly and resulted in significantly more knowledge retention than traditional training (Population Council, 1990).

Supervision: Although appropriate and continuous supervision is emphasized in most of the CHW literature, little is known about supervisor training, what actually goes on in a supervisory visit, or about the frequency and duration of visits. Shortages of personnel, transportation and per-diem as well as seasonally inaccessible communities are usually cited as major constraints on the supervision of CHW programs (Shaefer & Raynolds, 1985). A variety of supervisory models have been tried in addition to regularly scheduled routine visits to program staff. These include group supervision where workers are assembled in one place and are supervised as a group rather than individually, and selective supervision where low and high performing workers are supervised more frequently than workers with average performance.

Dual cadre programs where mid-level workers supervise lower-level workers may be able to supervise more effectively than single cadre programs. The catchment areas usually covered by mid-level workers often contain only a small number of lower-level workers who can be contacted if the mid-level worker visits the villages to provide services. In Bangladesh for example, a mid-level worker supervises four to five village health workers (Shah, et al., 2010). However, other CHW programs require mid-level workers to supervise large numbers of

community workers. In Ethiopia, mid-level HEWs work in pairs and each pair is responsible for supervising 50 community workers (Mekbib, 2010).

When actually carried out, supervision is frequently confined to collection of service statistics, and monitoring and control of stocks rather than focused on supportive, educational, and motivational activities (Foreit & Foreit, 1984). Also, adversarial relations are often reported between supervisor and supervisee in CHW programs. In Ethiopia, competition between HEWs (salaried health workers) and NGO community-based distributors (CBRHAs), and concerns about the existence of parallel programs, has resulted in the government suspending the CBD project (Mekbib, 2010).

Cell phones and other electronic media are starting to be used to facilitate task shifting, and the use of algorithms by mid- and lower-level health workers. A South African triage protocol helps lower level workers decide if an ART patient can safely continue his/her medication or requires a referral to a physician or nurse. In Tanzania, cell phones are used by CHWs to record household visits and enter data on each household. The program also contains a checklist of activities to be performed by the CHW during each visit. The data is sent to a central computer and can be used for planning and supervision of village level activities (D-Tree International, 2009). Similar applications can be adapted for use in CHW family planning and reproductive health programs to aid reporting, training, and supervision as well as to develop algorithms to guide CHW decision making.

VIII. Availability of Supplies, Materials and Equipment

Successful community programs often increase the use of the health system resources, increasing the demand for supplies and materials which may contribute to health system shortages.

Additionally, community programs are located on the periphery of the logistics system, making regular supply more difficult. Logistics failures affect not only contraceptives and drugs, but also the Information, Education and Communication (IE&C) components of a program by producing shortages in job aides, flip-charts, posters, among others, and also in reporting when forms and records are not delivered on time. In Uttar Pradesh (UP), India, a recent study shows that only one-fifth of workers had been provided with brochures or flip-charts to help counsel clients (Ganju, Bhatnagar, Hazra, Jain, & Khan, 2010).

Community health workers are often not adequately equipped to fully carry out their tasks. In Uganda, HIV program volunteers are expected to make home visits to HIV positive clients. Because these CHWs do not have umbrellas or gumboots, few home visits are made during the rainy season. Similarly a lack of bicycles limits the number of areas they can visit. Some programs do adequately equip workers (for example the CHPS program provides Community Health Officers with motorbikes), but many others do not. A lack of supplies and other tools needed by workers may harm the program's image in the community and discourage utilization

of services. In UP, health authorities were often unable to provide the supplies needed to vaccinate children already gathered to receive the service (Ahmad, Khan, & Hazra, 2010).

IX. Selection and Retention of Community Workers

Selection: A worker's attributes—whether s/he has enough education, is of the appropriate age and gender, or is acceptable to the community—can be a critical factor in the effectiveness and quality of CHW programs. It is widely recommended that community workers should have education appropriate to the complexity of the tasks they are expected to perform. Volunteers and other lower level workers usually have a primary education or less, while mid-level workers usually have ten or more years, in addition to one to three years of health care training. Programs emphasizing family planning, reproductive health and maternal and child health services usually select women as community workers, due to factors such as increased access to potential clients and networks, higher performance, and they are more easily recruited. Additionally, the worker must be acceptable to and live in the community s/he will serve. Community involvement in the selection process is almost universally advocated; a worker who is not acceptable to the community will be ineffective. However, little is known about the degree of community involvement in practice (Lehmann & Sanders, 2007). In India, where community workers are given cash incentives, nepotism is a problem; many ASHAs are members of powerful village families.

Worker self-selection may also be a constraint on program functioning. Programs that depend on volunteers may not be able to select the worker at all, but will have to accept virtually everyone who applies in situations where volunteers are difficult to attract. In the CHPS and Community Midwifery programs, in Ghana and Kenya respectively, the mid-level worker is self-selected, and, in CHPS, may not be from the community in which they work. In Kenya, formally trained and certified midwives out of work, retired or in private practice were invited to join the Ministry of Health's Community Program. As an incentive, the midwives receive additional training and support (e.g. contraceptives). In Ghana, CHOs attend a two-year training course in regional nursing schools. The program attracts students nationally, and although they are expected to return to their home districts, there is no obligation to do so. Difficulty in attracting Community Health Officers to isolated rural communities is one of the most important factors responsible for the slow expansion of the CHPS program (Nyonator, Awoonor-Williams, Phillips, Jones, & Miller, 2005).

Retention: Worker attrition is one of the primary factors in the effectiveness of CHW programs. High attrition rates mean less experienced workers, greater recruitment and training costs, and

the collapse of service delivery in the community until a new worker is found to replace the one who dropped out of the program. The effects of retention interventions have not been systematically evaluated, which has led to a lack of informed workforce retention strategies (Dolea, Stormont, & Braichet, 2010).

Payment of workers is perhaps the largest factor affecting attrition, with most reviews stating that paid workers are much more effective and more likely to continue working than unpaid workers (Phillips, Greene, & Jackson, 1999). It has been argued that hiring a smaller number of paid workers may be more effective and cost-effective than recruiting a larger number of volunteer distributors (Population Council, 1990). Attrition rates range from about three percent to 70 percent per year, with the lowest rates found among paid workers and the highest rates found among unpaid workers, or workers who depended on community financing for their salaries (Lehmann & Sanders, 2007). Two recent guidelines from the World Health Organization view payment as necessary for the long-term sustainability of community health worker programs (WHO & GHWA, 2008) (WHO, PEPFAR, & UNAIDS, 2007). However, at least one group of commentators believes that salaries may be counter-productive in some situations in rural India where volunteerism is highly respected (Glenton, Scheel, Pradhan, Lewin, Hodgins, & Shrestha, 2010).

Lower-level workers tend to be unpaid volunteers. In CBD programs that charge for contraceptives, the worker keeps a portion of the selling price as a reward for her efforts. However, the income from these commissions is usually minimal, and may have little or no effect on retention. As an alternative to paying small commissions on products sold, the Indian MOH is experimenting with incentive payments for ASHAs who complete reports and bring clients into health centers. Eleven activities qualify for incentive payments ranging from about \$1 USD for making three post-natal care visits to a woman, to over \$13 USD for bringing a woman to a health center for delivery (Khan, 2010).

In many African programs, volunteers are often given non-monetary incentives to join and remain in the CHW program. Incentives may include the per-diem saved from training, t-shirts, knap-sacks, certificates for course completion, or bicycles (Awoonor-Williams, 2004). Although frequently mentioned in the literature, there is little evidence concerning the success of alternative payment schemes in retaining low-level workers.

Mid-level workers are usually salaried and sometimes receive bonuses for working in remote areas (Sundararaman & Gupta, 2011). For mid-level cadres, factors other than salary per se are important in determining retention. In Ghana, CHOs are often stationed far from their families and work under difficult conditions. They are on call 24 hours per day, usually have a heavy workload and have trouble balancing the time they spend in their health post with the time spent in home visits. Few CHOs spend more than three years in the community (Acquah, Frelick, & Matikanya, 2006).

In India, in Madhya Pradesh state, retention of mid-level workers in the field is achieved by a disincentive to leave the community. Women with rural backgrounds from under-served districts are sponsored for nursing courses. They are bonded to serve in the rural areas for seven years after training or else they have to pay a penalty of 200,000 rupees, more than \$4,300 USD. The initial response to this strategy “is very encouraging” (Sundaraman & Gupta, 2011). Obligatory service in return for training is a common method used for ensuring provision of workers in rural areas, and applies to many cadres including physicians and nurses.

X. Community Involvement

It is often stated that community involvement is necessary for the success of a CHW program. Ideally, the community should be involved in every stage of the program including identification of the services to be provided, selection of prospective staff, monitoring and evaluation, and financing (Lehmann & Sanders, 2007) but, in fact, there is little in the literature that supports this contention. The usual mechanism for obtaining community support is the organization of village health committees by program staff (Lehmann & Sanders, 2007). The existence of factions within the village often results in minimal effectiveness of community health committees, and conflicts between groups may affect who receives services and the type of services utilized (Frankel & Doggett, 1992).

Material support by communities—salaries, construction of health posts, purchase of equipment and provision of living quarters—is acknowledged to be the weakest aspect of participation in community programs (Frankel & Doggett, 1992) (Nyonator, Awoonor-Williams, Phillips, Jones, & Miller, 2005). Community involvement may be essential when programs depend on volunteers, but less important in programs that are well integrated into the formal health system, pay salaries, and hold workers accountable for performance (Phillips, Greene, & Jackson, 1999).

XI. Cost-Effectiveness and Costs

Other than cautioning that it is expensive to provide services in rural areas, the CHW literature provides little information about program costs. Therefore we will discuss program costs that can be used in case studies and operations research.

Cost-effectiveness analysis compares alternative ways of producing the same output or outcome. Cost-effectiveness comparisons of CHW programs are usually not possible because more than a single type of output is produced by the typical program, thus most cost-effectiveness analyses in the literature involve single purpose CHWs (e.g. TB workers). An additional complicating factor is the value placed on the type of client served. If providing a service to a poor rural client is valued more highly to an urban client, some type of weighting must be employed.

Simple cost analysis of program components may be the only alternative for economic analysis, but nonetheless an alternative that can produce important information for program decision making. It can identify large costs that can be potentially reduced and provides information to determine the pace and extent to which the program can be scaled up, or even if the results of the program justify its costs.

XII. Implications for Case Studies and Operations Research

This literature review has identified a number of constraints that should be taken into consideration prior to starting operations research and technical assistance activities in year two of this project. These constraints will be further explored in the case studies. The following section is organized according to the essential processes discussed in this paper. The intention of the list is to call attention to decision points and factors that may be critical to introducing new program innovation or in strengthening existing procedures (Shaefer & Reynolds, 1985).

1. Organization

- What are CHW program objectives?
- Are there any administrators whose time is 100% dedicated to the CHW program?
- What is the position of the CHW within the health system (MOH employee or volunteer, departmental affiliation, full-time/part-time)?
- How are communities in the program selected?
- Coverage (what is the number of workers in program; areas covered; size of population per CHW?)
- What are the Component Costs?
- What are the plans for program change/expansion?
- What data will be collected by the CHW and what are the indicators?
- How is data quality managed, and what is the frequency of reporting?
- Who are the Users of the data collected?
- What is the Degree of Computerization?
- Is there a possibility of using service data for measuring operations research results?

2. Services provided

- What are the CHW services and tasks?
- What family planning services are provided?
- How many activities were performed and services provided in the past year? (service statistics data on number and type of activities carried out, number and type of contraceptives distributed, regional variation in number and type of activities)

- Who determines tasks to be performed by CHWs?
- What is the level of priority of each task?
- What is the frequency with which each task is performed?
- What is the mode of service delivery (home visits, group meetings, health posts)?
- What is the degree of standardization of tasks across workers and locations?

3. Training and supervision of workers

- What is the content of the training and how much emphasis should be given to each topic?
- How will the training be conducted? (Methods: lecture, field work in the community, etc.)
- Which training materials will be used?
- How long is the training?
- Where will the training be held?
- How large is each training class?
- How is training evaluated?
- What are the topics, frequency and duration of refresher trainings?
- How will training of replacements/new community workers (OJT, regularly scheduled courses) be conducted?

4. Supplies, materials and equipment

- Which supplies, equipment and materials are officially provided to CHWs?
- Who will maintain the equipment, and how often?
- How to limit the frequency of stock outs?
- How will procurement procedures be conducted? (Issue of fixed quantities at regular intervals, provision for emergency orders)

5. Selection and retention of workers

- Based on what criteria will CHWs be selected?
- Will CHWs receive payment, and in what form (salary, reward provided)?
- What is the source of remuneration? (Government, community)
- How will worker turn-over rates be managed and slowed?

6. Community involvement

- What is the method and degree of community participation in the selection of workers?
- What is the method and degree of prioritization of problems and services?

Operations Research

The taxonomy in Section 4 indicates the basic types of operations research interventions that can be tested in Phase II of this project, which will focus on dual cadre programs.

Effectiveness of existing program types: Depending on the country and program the following comparisons are possible: (1) an evaluation that compares the two types of dual cadre programs and (2) a study comparing a single cadre and a dual cadre program.

Impact of role expansion: A before-and-after or time series can be used to study the impact of role expansion of dual cadre program workers.

Outcome variables: Outcome variables include service uptakes, coverage, and health status, as shown in Figure 3 (page 10). The greatest challenge to the operations research projects will be to operationally define effectiveness in programs that conduct many different activities and provide a range of services. Do we value a birth attended by a mid-level worker more than a birth attended by a lower-level worker? A postpartum visit over the distribution of a cycle of pills? The case studies should make some attempt at answering these questions. Program managers and communities might give greater weight to the value of some services than others.

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