

# **A COMPREHENSIVE DESCRIPTION OF THREE NATIONAL COMMUNITY HEALTH WORKER PROGRAMS AND THEIR CONTRIBUTIONS TO MATERNAL AND CHILD HEALTH AND PRIMARY HEALTH CARE**

## **CASE STUDIES FROM LATIN AMERICA (BRAZIL), AFRICA (ETHIOPIA) AND ASIA (NEPAL)**

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**31 December 2016**

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## Executive Summary

This report reviews the available evidence concerning the operational characteristics and effectiveness of three national community health worker (CHW) programs from Latin America (Brazil), Africa (Ethiopia) and Asia (Nepal). These programs have achieved national reach, and their countries have become global leaders in improving the health of their mothers and children as well as in expanding access to primary health care.

The report focuses on the Community Health Agents (CHAs) of Brazil, the Health Extension Workers (HEWs) of Ethiopia, and the Female Community Health Workers (FCHVs) of Nepal. Additionally, information is provided about the Health Development Army Volunteers (HDAVs) of Ethiopia as well as the Village Health Workers (VHWs) and the Maternal and Child Health Workers (MCHVs) of Nepal. There is approximately 1 CHA per 600 people in Brazil, 1 HEW per 2,500 people in Ethiopia, and 1 FCHV per 500-1,000 people in Nepal. The large number of HDAVs in Ethiopia (1 for every 23 people) helps to extend the outreach of HEWs since the two CHW cadres collaborate.

In all three countries, there is strong evidence that CHWs are an important contributor to the national progress made in improving maternal and child health. Although all three national CHW programs have their own unique characteristics, they share some important commonalities. (1) There are adequate numbers of CHWs to reach every household on a regular basis. (2) Communities participate in the selection of candidates to become CHWs. (3) CHWs have strong linkages with the closest PHC facility. (4) Governmental salary support is provided for the more highly trained CHWs. (5) CHWs have strong supervision. (6) CHWs have effective support for needed supplies and commodities. (7) CHWs have strong support from the government and from the communities themselves.

This is the first in-depth comprehensive review of the operational characteristic of the national CHW programs of Brazil, Ethiopia and Nepal and their effectiveness. As such, this review provides a useful point of reference for other countries that are seeking to strengthen their own national CHW programs. Taken together, these three national CHW programs offer compelling evidence that primary health programs with strong outreach services provided by CHWs down to the household level are an effective approach for improving the health of mothers and their children. National CHW programs, when well-planned and well-implemented, as the programs described here are, can accelerate national progress in improving maternal and child health and can provide an essential foundation for helping countries to eventually achieve Health for All through primary health care as envisioned by the world community at the International Conference on Primary Health Care in 1978.

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## Acknowledgements

Loriade Akin-Olugbade, Aliza Lailari and Yeri Son carried out the initial literature review for this report and also contributed to earlier drafts.

We are grateful to the following people who served as key informants for this report:

- For Brazil: Vera Joanne Bornstein, Camila Giugliani, Matthew Harris, Aline Torres, and Magareth Zanchette;
- For Ethiopia: Zufau Abera, Kenneth Baes, Filimona Bisrat, Tedbabe Defefie, Ndola Prata, and Chala Tesfaye;
- For Nepal: Steve Hodgins, Shiva Raj Mishra, and Ram Shrestha.

These are people with broad knowledge of the country's national CHW program as it actually functions on-the-ground and are in direct or indirect contact with the community health workers themselves. We thank them also for reviewing earlier versions of this document. Appendix 1 provides further information about them.

We are also grateful to the Bill and Melinda Gates Foundation for its financial support and to Enric Jané, Senior Program Officer at the foundation, for his guidance and encouragement as well as his comments on the final draft of this report.

## Glossary

AHW	Auxiliary Health Worker
ANM	Auxiliary Nurse-Midwife
CB-IMCI	Community-based Integrated Management of Childhood Illness
CB-NCP	Community-based Neonatal Care Program
CHA	Community Health Agent
CHAI	Community Health Agent Initiative
CHW	Community Health Worker
CHX	Chlorhexidine
CPR	Contraceptive prevalence rate
DDC	District Development Committee
DoHS	Department of Health Services
FCHV	Female Community Health Volunteer
FHT	Family Health Team
FHS	Family Health Strategy
FMOH	Federal Ministry of Health
HDA	Health Development Army
HDAVs	Health Development Army Volunteers
HEP	Health Extension Program
HEW	Health Extension Worker
HSDP	Health Sector Development Program
iCCM	Integrated Community Case Management (of childhood illness)
IIP	Iron Intensification Program
IMCI	Integrated Management of Childhood Illness
MCH	Maternal and child health
MCHW	Maternal and Child Health Worker
MDG	Millennium Development Goal
MINI	Morang Innovative Neonatal Intervention
MOH	Ministry of health
NFHP	Nepal Family Health Program
NHTC	National Health Training Center
NVAP	National Vitamin A Program
PHC	Primary health care
SNNP	Southern Nations, Nationalities, and Peoples' Region
SUS	<i>Sistema Unico de Saúde</i>
U5MR	Under-5 mortality rate

UHEP	Urban Health Extension Professional
VDC	Village Development Committee
VDCZ	Village Development Committee Zone
VHW	Village Health Worker
WHO	World Health Organization



## Introduction

There is a global resurgence of interest in the contributions that community health worker (CHW) programs can make to improve the health of populations, to increase access to basic health services, and to strengthen health systems.<sup>1-4</sup> The Declaration of Alma-Ata in 1978, signed on to by all the attendees from 134 countries at the International Conference on Primary Health Care at Alma-Ata (then in USSR), sponsored by the World Health Organization and UNICEF, was the first widespread and official endorsement of CHWs as legitimate members of health teams and outreach workers.<sup>5</sup> Following the 1978 conference, many developing countries developed national CHW programs. However, due to complicating factors (including the global recession, the structural adjustment policies of donors, the debt crisis many low-income countries faced, and the loss of momentum for comprehensive primary health care (PHC) and focus on vertical selective programming by international technical experts and donors), CHW programs were insufficiently financed, and they lacked careful planning, adequate supervision, appropriate logistical support, and strong political backing.<sup>6-8</sup> Thus, the CHW movement lost momentum in the 1980s because of lack of evidence of effectiveness and multiple examples of national programs that languished and even collapsed.<sup>9</sup>

However, over the past two decades, there has been growing evidence that under optimal circumstances CHWs can make major contributions to improving the health of mothers and children.<sup>3</sup> Surprisingly, there is virtually no evidence that investments in strengthening facility-based health services make any measurable contribution to the health of geographically defined populations.<sup>a</sup> However, most of the evidence regarding CHW effectiveness has come from short-term, small-scale studies carried out in highly controlled field settings that are hard to replicate at scale over the long-term.

Fortunately, there are a growing number of countries with strong national CHW programs and a growing body of evidence that demonstrates the effectiveness of these programs in improving the health of their national populations. In fact, there has emerged widespread consensus that CHWs have made major contributions to these national successes.<sup>10</sup>

One of the current challenges is to better understand how effective CHW programs actually function on the ground. A large gap often becomes apparent between what is supposed to

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<sup>a</sup> Even among evaluations of performance-based financing schemes in which facilities are rewarded for outstanding outcomes, there is virtually no evidence of improvements in health as defined by increased coverage of evidence-based interventions, improved nutritional status, or reduced serious morbidity/mortality in geographically defined populations.

occur and what in fact takes place in reality when one takes a closer look at health services in low-income settings, including CHW services.

The goal of this review is to summarize the available evidence regarding what is actually happening on the ground in three effective national CHW programs: Brazil's Community Health Agent (CHA) Program, Ethiopia's Health Extension Worker (HEW) and Health Development Army Volunteer (HDAV) Program, and Nepal's Program of Village Health Workers (VHWs), Maternal and Child Health Workers (MCHWs), and Female Community Health Volunteers (FCHVs). These programs were selected because they are all widely regarded as being successful in implementation and as making important contributions to improving the health of the national population. They are from separate major regions of the world.

One of the countries (Brazil) has moved from low-income to middle-income status over the past several decades and provides an example of how a CHW program can contribute in the longer term to national health improvement and to the building of a foundation for a strong PHC program. Another country (Ethiopia) demonstrates how a strong national CHW program can be scaled up quickly – in only a decade. The third country (Nepal) provides an example of what can be achieved with a minimally trained and largely illiterate cadre of CHWs.

Throughout this document, we will be comparing and contrasting these three programs with the aim of providing a perspective that will be useful to those who may be considering how to develop, expand, or strengthen national CHW programs elsewhere.

## Methods

We carried out a search using PubMed and Google Search of related terms for CHWs combined with each of the three countries in our review (Brazil, Ethiopia and Nepal). All documents – both peer-reviewed and otherwise – that described any aspect of one of these three national CHW programs were reviewed. Information describing how the program actually functions and what CHWs do on a day-to-day basis was abstracted and included in our report.

The CHW search terms used were the following:

"community health workers" or "lay health workers" or "volunteer health workers" or "community health promoters" or "village health workers" or "village health volunteers" or "lady health workers" or "community health aides" or "health assistant workers" or "home based carers" or "home community based carers" or "community health agents" or "health surveillance assistants" or "traditional birth attendants"

The terms for CHWs in the respective countries were used: Community Health Agents for Brazil; Health Extension Workers and Health Development Army for Ethiopia; and Village Health Workers, Maternal and Child Health Workers, and Female Community Health Volunteers for Nepal.

In addition, we interviewed key informants who have significant on-the-ground experience with these CHW programs. Prior to the interview the key informants completed a structured questionnaire addressing their perceptions of the CHW program in their respective country.

For our purposes here, we refer to CHWs as community-level health workers who can be categorized into two sub-groups: (1) paid, generally full-time workers with pre-service training of up to one year who work at a peripheral health post and/or in the community outside of a health facility and (2) minimally trained volunteers who have a role that involves primarily community mobilization and health promotion, but they may also provide some limited health care delivery services as well.

This study was declared as exempt from human subjects review by the Johns Hopkins School of Public Health Institutional Review Board.

### **Brazil: The Family Health Strategy and Community Health Agents**

In Brazil, community health workers are known as *agentes comunitário de saúde* in Portuguese, or English as community health agents (CHAs). CHAs were introduced in Brazilian municipalities in the 1990s as part of the Community Health Agent Initiative (CHAI) following the success of a pilot CHW program in one of the poorest areas of Brazil in the 1980s, the northeast state of Ceará.<sup>11,12</sup> Today, CHAs are an integral part of the *Programa Saúde Família* (Family Health Program, more recently renamed the Family Health Strategy, or FHS), a national public health program developed to connect communities across Brazil with primary care and public health services.<sup>13,14</sup>

The CHAs' services are provided free-of-charge. All three levels of government (federal, state and municipal) pay for them using revenue from taxes.<sup>15,16</sup> The federal government establishes national health goals and policies, and it disseminates findings from health data that CHAs collect.<sup>17</sup> The organization, implementation, and management of the program are the responsibility of the states and municipalities.<sup>17,18</sup> Municipal health councils are in charge of the day-to-day management of the program at the local level.<sup>19</sup> These are composed of users (50% of the council members), lower-level staff (health workers, who comprise 25% of the council members) and higher-level staff (health managers and service providers, who comprise 25% of council members).

The FHS uses a team-based approach to PHC. As such, CHAs are part of Family Health Teams (FHTs) that include physicians and nurses.<sup>11</sup> There are approximately 4-6 CHAs per FHT and some teams include other health professionals such as dentists and nurse assistants.<sup>13,14,20</sup>

**Figure 1. A Community Health Agent visits an elderly client in his home**



CHAs wear identifying clothing: a light-blue jacket with the letters “SUS” (for *Sistema Unico de Saúde*, the name of the government health system in Portuguese) written on the back (Figure 1).<sup>21</sup>

The impetus for the development of the CHA and the broader PHC program in Brazil began in 1985 when Brazil emerged from two decades of military

rule and a new constitution was adopted in 1988 that recognized health and equitable access to health services as human rights and, as such, are the responsibility of the state.<sup>22</sup> The FHS began as a relatively small pilot program under the direction of local municipalities in Ceará state in northeastern Brazil, one of the country’s most impoverished areas.

## Evidence of effectiveness

Here we identify evidence regarding the effectiveness of the CHA Program, although since it is so closely intertwined with the work of Family Teams it is difficult (if not impossible) to separate out the CHA program’s separate effects. We categorize evidence of effectiveness into three parts: national outputs, coverage of services, and health impact.

### Outputs

There are an estimated 27,000 FHTs for 5,560 municipalities, and each FHT is responsible for 1,000 – 2,000 families.<sup>23</sup> Approximately half (99-112 million) of Brazil’s total population of 200 million people receive services from 257,265 CHAs.<sup>21,24</sup>

### Quality of care

We did not identify any studies of the quality of care provided by CHAs.

### Coverage of services

Coverage of basic and essential services in Brazil for children and mothers is extremely high (Table 1). The health promotion activities of CHAs have no doubt made an important contribution to these impressive achievements, along with the ready access to PHC services. The lack of disparities in these health indicators is also notable. The only indicators that have a significant equity gradient (i.e., a difference in coverage between the richest 20% and poorest 20% being greater than 30%) in antenatal care coverage and care seeking for pneumonia.<sup>25</sup>

**Table 1. National coverage of basic and essential services in Brazil<sup>25</sup>**

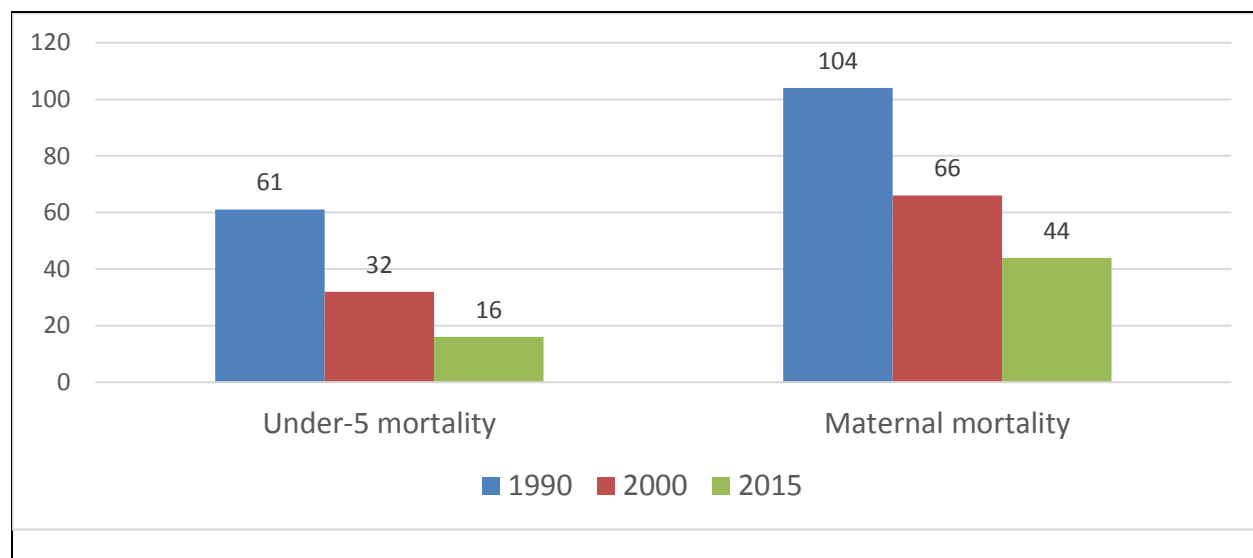
Indicator	Coverage level
Immunization against measles, Hib (3 doses), DPT (3 doses) and pneumococcal vaccine (3 doses)	93-97%
Percentage of children who are moderately or severely underweight/stunted	2% underweight 7% stunted
Percentage of infants <6m who are exclusively breastfed	39%
Percentage of children with symptoms of pneumonia taken to an appropriate provider	50%
Percentage of children with diarrhea receiving oral rehydration therapy/ increased fluids with increased feeding	44% (1996 data)
Percentage of women obtaining at least 4 antenatal care visits	89%
Percentage of births attended by skilled health personnel	98%
Percentage of women whose demand for family planning is satisfied (i.e., do not desire a child in the next 2 years and using a modern contraceptive method)	93%

Brazil has one of the most equitable coverages of maternal and child health services among low- and middle-income countries as assessed by comparing the level of coverage of services among the lowest income quintile with that among the highest quintiles.<sup>25</sup> In addition, wealth inequalities for maternal and child health interventions have diminished over the past three decades.<sup>26</sup>

### Changes in health status

Brazil has experienced dramatic improvements in a broad range of national health indicators over the past 3 decades. This includes marked increases in access to maternal and child health interventions and marked reductions in maternal, infant, and child mortality as well as marked reductions in childhood stunting. Between 1990 and 2006, Brazil had one of the most rapid declines in mortality in children younger than 5 years of age (henceforth referred to as under-5 mortality) among all low-income countries.<sup>27</sup> There have also been reductions in the health disparities within the country. Millennium Development Goal (MDG) 1 (50% reduction in the percentage of underweight children between 1990 and 2015) and the MDG 4 (two-thirds reduction in under-5 mortality between 1990 and 2015) were met.<sup>28-30</sup> MDG 5, which called for a three-quarters reduction in the maternal mortality was not met, but the maternal mortality ratio did decline by 58% (Figure 2).

**Figure 2. Changes in the under-5 mortality rate (per 1,000 live births) and the maternal mortality ratio (per 100,000 live births) in Brazil, 1990-2015<sup>30,31</sup>**



A variety of factors such as socioeconomic development and conditional cash transfers have facilitated this progress, but the FHS and various health interventions have been critical components in the improved health indicators.<sup>28</sup> Victora and colleagues used vital statistics, United Nations model life tables, and census data to compare infant mortality in areas with different levels of FHS coverage. They found that while infant mortality was highest within poor communities irrespective of level of the Family Health Strategy, when FHS coverage was higher, the mortality differences between poor and rich communities were less.<sup>28</sup> Since the CHAs are so integrally connected with the Family Health Team and the PHC system (as implemented by the Family Health Strategy), there have been no attempts to measure the health impact of CHAs separately.

There have been other assessments of the overall PHC system on health in Brazil. Macinko and colleagues used public data from each state to determine the impact of the program on infant mortality from the pre-intervention period (1990 to 1994) to the period from 1999 to 2002, when FHS expansion had occurred.<sup>20</sup> During this time period, the infant mortality rate (IMR) decreased from 49.7 per 1,000 live births to 28.9 and FHS national coverage increased by 36.1%. The authors found a significant and temporal relationship between coverage by FHS and decreased IMR. A 10% increase in FHS coverage was associated with a 4.6% decrease in the IMR, holding all other variables constant. A different analysis found that the program was associated with a 13% to 22% reduction in the IMR, depending on the level of FHS coverage.<sup>32</sup> Additional analyses of municipal-level data found that exposure to the FHS

program was associated with a reduction in mortality, with the greatest impact on under-5 mortality. The programmatic impact was largest in the poorest municipalities as well as in the more rural regions in the country with worse baseline health indicators.<sup>17,32</sup> In municipalities that had expanded FHS services, infant mortality rates declined about 25% more than in municipalities that had not implemented the FHS program.<sup>33</sup>

Family Health Teams (FHTs) and their associated CHAs have led improvements in the detection of neglected tropical diseases and vital statistics reporting as well as the in the reduction of disparities in oral health in Brazil.<sup>15</sup> The specific contributions made by CHAs to the health status of the Brazilian population is difficult to determine. However, one recent review reported that CHAs were effective across a broad range of interventions but were particularly effective in the areas of child nutrition, promotion of breastfeeding and delayed introduction of bottle feeding.<sup>34</sup>

### **Costs and cost-effectiveness**

In 2000 the national Community Health Agent program cost an estimated US\$31-50 per person per year.<sup>17</sup> However, there are wide variations across the country. In Ceará, for example, one of Brazil's poorest states, only US\$1.30 per person per year was spent on the CHA program.<sup>11</sup>

Municipalities receive approximately US\$15 per capita from the federal budget to cover the expenses of the FHS. Overall, 8% of the government's health budget goes to fund the FHS.<sup>22</sup> The typical cost per capita of the FHS program was US\$44 in 2010. The FHS has been described as "probably the most impressive example worldwide of a rapidly scaled up, cost-effective comprehensive primary health care system."<sup>35</sup>

### **Selection**

Individuals who are considering becoming a CHA must: (1) be an adult, (2) be literate, (3) have completed at least a primary level of education, (4) have demonstrated leadership and a spirit of solidarity with the community, (5) and be a resident of the community where the will work.<sup>1,35-38</sup> Although candidates are not required to be women, almost all are. This is an entry level position, so most do not have previous work experience or a history of earning a salary.<sup>39</sup> The community is involved in the selection of CHAs, and prospective CHAs must be endorsed by them in order to be selected for training.<sup>40</sup>

Municipal governments oversee the process of selection of CHAs,<sup>17</sup> notably the administration of oral and written exams that candidates must pass to be eligible for the CHA position.<sup>41,42</sup> Only the oral interview is used for selection in rural areas where the level of literacy of populations is low.<sup>42</sup> Value is placed on the prospective CHAs' "indigenous knowledge" of the

people in the community where they will work and their familiarity with the setting and its norms and traditions.<sup>40</sup> The community is involved in the selection of CHAs and prospective CHAs must be endorsed by them in order to be selected for training.<sup>40</sup>

## **Training**

Following selection, CHAs take a residential course for eight weeks followed by supervised fieldwork for four weeks.<sup>11</sup> In 1994 in Ceará, CHAs were trained by physicians, dentists, social workers, nurses and physical therapists.<sup>42</sup> More recent reports indicate that public sector nurses and physicians train CHAs<sup>11,40,43</sup> at national training institutions<sup>38</sup> and at local FHT training centers.<sup>18</sup> The training curriculum includes general information about healthcare, disease prevention, and specific diseases.<sup>40</sup> CHAs are taught basic health concepts, sanitary living, public health prevention, and promotion strategies.<sup>40</sup> They are not trained to diagnose and treat illnesses but rather to provide health promotion and act as community advocates and health system navigators. After the initial training period, CHAs attend monthly and quarterly training sessions at the MOH's Training Centers in Family Health.<sup>11,40</sup> CHAs have expressed a desire for more training on social issues such as family violence, sexual abuse, birth preparedness, and newborn care.<sup>44</sup> Since training of CHAs is a local responsibility, there is variation in the content and quality of training throughout the country.<sup>45</sup>

## **Role description**

CHAs spend most of their visiting households, but they are integrally connected to the Family Health Team (FHT) with which they work. The FHT meets together frequently (at least weekly) to coordinate its work and discuss problems, including challenges that CHAs identify out in the community.

CHAs in the state of Ceará 15 years ago were carrying backpacks containing ORS packets, soap, iodine, bandages, thermometer, scissors, a comb, thermometer, measuring tape (for assessing nutritional status by mid-upper-arm circumference), and family health record cards.<sup>11</sup> Today, CHAs provide a range of services that differs considerably from what was previously carried out. In most cases at present, CHAs carry with them only a register of households and residents along with immunization cards.

## **Tasks and services carried out**

The purpose of the CHA position is to improve access to PHC, promote public health education in underserved communities, and ensure that populations always have access to a trained member of the health system in case of health need.<sup>20,38</sup> Consequently, every CHA is expected to visit monthly each of the families for which they are responsible.<sup>35</sup> Those households with people who have medical problems get priority, so not every home is always visited monthly.



As a general rule, CHAs generally stop by the Health Unit they are assigned to first thing in the morning and at the end of the day.

CHWs give special attention to children, pregnant women, the elderly, and patients with diabetes and hypertension.<sup>46</sup> Two decades ago in Ceará, CHAs spent 90% of their time during household visits on the following six activities: prenatal health promotion, encouragement of exclusive breastfeeding and monthly weighing of children younger than 2 years of age, nutritional counseling, referrals for child vaccinations, provision of oral rehydration salts (ORS) for children who have diarrhea, and treatment of minor wounds.<sup>11</sup>

CHAs answer health-related questions and clarify misconceptions,<sup>37</sup> check the vaccination cards of the children living in the homes they visit,<sup>21,47</sup> screen patients for specific diseases and conditions, and refer patients when needed.<sup>15,35</sup> CHAs also provide lifestyle recommendations and guidance on diets for diabetic and hypertensive patients,<sup>36</sup> participate in the provision of integrated management of childhood illness (IMCI) for sick children,<sup>14</sup> and share technical knowledge.<sup>40</sup>

CHAs may lead health education sessions for groups of persons in their target area related to breastfeeding, adolescent sexual health, diabetes, and the prevention of hypertension.<sup>14</sup> In the Sao Carlos Community of shantytowns in Rio de Janeiro, CHAs distribute condoms to men and women.<sup>12</sup> The degree to which CHAs are involved in family planning activities in other municipalities and states is not well-documented. CHAs serve as “instruments for public health action and community empowerment”.<sup>14</sup>

The CHA’s role is fluid and dynamic and varies by context.<sup>47</sup> The CHA’s main role is to provide person-focused care over the life course and maintain a continuum of care for everyone.<sup>38</sup> CHAs make appointments with physicians on behalf of clients.<sup>44,47</sup> CHAs remind clients of scheduled appointments and follow up if an individual misses an appointment.<sup>15</sup> CHAs may even accompany patients to the Health Unit.<sup>48</sup>

CHAs in a rural area in Minas Gerais reported that they are the first source to go to for health-related questions.<sup>36</sup> They also reported that they are involved in social mobilization and other broader social actions to promote health; they are the first to observe human rights abuses, family violence, abuse of children, and other forms of discrimination.<sup>44</sup>

CHAs use informal dialogue and non-technical jargon to build a close relationship with their clients and support them as they struggle with these and other social issues.<sup>44</sup> CHAs even provide assistance with civic duties such as voter registration.<sup>49,50</sup>

CHAs become quite proficient in linking clients to needed social services, and they often become advocates for their clients in their interactions with the health system or with other government programs. Some CHAs become quite proficient in certain specialized areas such as weight loss, diabetes care, or even Tai Chi, and provide these services at the Health Unit not only for their own clients but for clients from other catchment areas.

In some cases, CHAs spend part of their time at the clinic serving as a receptionist who receives clients and gets them set up for the services they need, reducing their time available for community work. But above all, they are experts in their knowledge of the community they serve as “eyes and ears of the doctor,” as one key informant put it. They are the connecting link between the community and the health system.

### **Hours worked, workload and productivity**

On average, CHAs work 8 hours a day,<sup>36,51</sup> 40 hours a week.<sup>18</sup> However, since they live in the community they serve, they are available outside of regular work hours, and people call on them for help at all hours.<sup>38,47</sup> As stated previously, CHAs carry out approximately 6-8 home visits per day, with more daily visits possible in urban than in rural areas.

### **Location of work**

CHAs split their time between the Health Unit and the community where they live and work.<sup>21</sup> One early report from 1988 stated that CHAs spent half of the day doing home visits, the other half of the day caring for patients at the Health Unit, providing first aid, and making referrals.<sup>52</sup>

### **Population assigned**

Each FHT consists of a physician, at least one nurse, and 7-15 CHAs. Some teams also include a dentist, an assistant dentist, a dental hygienist, and a social worker. Nationally, there are 33,000 Family Health Teams and 236,000 CHAs, which yields an overall average of 7.2 CHAs per team. The physicians and nurses are based primarily at the Health Unit (sometimes called a health post, clinic or health center). Health Units usually have 3-4 FHTs based there. Physicians and nurses frequently go with a CHA to visit patients who are unable to come to the Health Unit. Each FHT is responsible for approximately 1,000-2,000 families, having more or less 3,500-4,500 people.<sup>17</sup>

Each CHA is responsible for approximately 750 persons (about 150 families, but the number may vary from 75 to 200). Each CHA has her own defined geographic area, and she resides in that area.<sup>15,16,21,35,47,49</sup> In Ceará in 1994, CHAs were assigned an average of 110 families each

and were expected to make 5-8 household visits per day.<sup>42</sup> In 2000, Svitone and colleagues<sup>11</sup> found that CHAs visited 10-15 houses a day in urban areas and 4-10 houses a day in rural areas.

One study<sup>46</sup> from Vitoria, a city in the state of Espirito Santo, reported that there were 11 CHAs for 1,200 families although there should have been 13. The area to be covered had been divided into 13 micro-areas, with one CHW responsible for micro-area. Due to the absence of two CHWs, two of the micro-areas were uncovered at the time of the study.

### **Incentives, compensation and motivation**

CHAs are full-time public sector employees, and compensation for their services is at the discretion of the states and municipalities where they work. CHAs receive a salary equivalent to the minimum wage monthly, usually in the ranges of US\$200 and US\$228 per month.<sup>36,38,40,42</sup> Some CHAs earn as much as US\$320 per month.<sup>21</sup> This level of compensation is low, more or less an entry-level wage in the Brazilian labor market, and is considerably less than that received by the other more highly trained FHT members.<sup>36</sup> Key informants report that CHAs are generally happy with their work but they are getting frustrated with the bureaucratic aspects (mostly paper work) that they are required to perform.

### **Turnover/drop-out rate**

Published data are not available regarding turnover and drop-out rates for CHAs. But traditionally the position has been highly sought after.<sup>11</sup> However, as the availability of jobs has grown with economic growth in Brazil, especially in urban areas, CHA jobs are gradually becoming less attractive than previously. According to key informants, the average length of employment is 4-5 years, though there is considerable variation, with many working only a few years and many others working 15 years or more.

### **Career advancement opportunities**

There is no direct progression from a CHA position into a higher-level position, although CHAs are able to apply to unrelated programs for higher levels of training. The CHA position is an entry-level position within the Brazilian job market. In some areas of Brazil, CHAs can attend a technical institute for additional training and obtain a certificate that would enable them to receive a slightly higher salary as a CHA. Others obtain specialty training of some sort and continue in their position as a CHA. Many others obtain further training and go on to higher-level positions as become nurses or even doctors; others go into community development work and become community leaders.

### **Supervision**

Nurses who are employed by the government public sector are required by law to supervise CHAs.<sup>11,43</sup> Current legislation does not forbid other health providers from supervising CHAs.<sup>43</sup>

Each supervisory nurse may be responsible for up to 30 CHAs. These supervisory nurses divide their time between work at the Health Unit and supervisory duties.<sup>11</sup>

Nurse-supervisors interact individually with each CHA at least once a month to her caseload and collect service data.<sup>11</sup> They assess their performance and provide a score for each CHA's work.<sup>43</sup> The supervisor also facilitates cooperation among members of the FHT.<sup>43</sup> In many locales, however, they are in daily contact with the CHAs they supervise. Supervisors place an emphasis on providing support to their CHAs, investigating the quality of their training as well as the quality of the care that CHAs provide to their clients. Supervisors also make their own independent home visits to ensure that CHAs are visiting the families for which they are responsible.

### **Relationship with the community/role of the community**

For the most part, studies reveal that CHAs enjoy a positive, rewarding relationship with their clients. According to one report,<sup>51</sup> CHAs find satisfaction and fulfillment by engaging in the social reality of the people with whom they work and assisting them. CHAs strive to establish a friendly rapport and to develop a committed relationship with their clients who, of course, are also their neighbors.<sup>40</sup> Since they live and work in the same socio-cultural environment as the people they serve, emotional ties and strong bonds develop over time in terms of solidarity, commitment, responsibility, and trust.<sup>53</sup> Key informants report that CHAs are highly respected and valued by community members. CHAs are seen by community members as an essential link with the health system. From the perspective of community members, CHAs are in a position of power and prestige within the health system, but they are also expected to respond to the needs and demands of the community.<sup>54</sup>

### **Linkages with the health system**

Brazil's CHW program has one of the strongest, if not the strongest, linkage to the national health system of any CHW program in the world.<sup>38</sup> The CHA program is not only fully integrated with the FHTs and Health Units, but also with the municipal health councils, which are responsible for allocating financial resources from the federal and state levels. The strong support the CHA program receives from citizens, local health service providers, and government officials ensures the stability of the CHA program. This also helps to ensure full integration of the CHA program with the national health system governance, financial and service delivery functions.

CHAs act as a link between the community and the formal healthcare system (and the FHT at the Health Unit).<sup>41</sup> They attend weekly hour-long meetings with other members of the FHT, and they also (sometimes daily) report findings from community visits and serve as a community

representative and patient advocate within the FHT.<sup>21,55</sup> Some view CHAs as spokespeople for the community.<sup>37</sup>

### **Logistical support**

Since CHAs are frequently visiting the health clinic which they are attached and since they are not distributing commodities or medicines, logistical support is not an issue.

### **Monitoring and data use**

CHAs are the frontline and foundation of the government health system. CHAs provide surveillance in the micro-area for which they are responsible, looking for health issues and reporting them to the FHT at the health clinic.<sup>46</sup> CHAs collect data for disease surveillance, providing an important population-based source of information to supplement facility-based data.<sup>22</sup> At each home visit, CHAs collect data for disease surveillance registers.<sup>15,22,35</sup> The data is entered into a database and updated monthly.<sup>14</sup> The database is available at local municipal health offices and is maintained by staff at the federal level for monitoring infant and child health indicators such as the infant mortality rate.<sup>11,15,17,42</sup> Presently, CHAs are serving as an important link with the Brazilian Army in efforts to control the emerging Zika virus epidemic.

## **Conclusions and challenges**

Brazil has made remarkable progress in improving child and maternal health and in developing a strong PHC system that reaches out to every household, making it possible to achieve near-universal coverage of basic services. The CHAs are the eyes and ears of the health system, providing a strong linkage between the community and the health system.

However, no matter how effective any health system is, there is no shortage of challenges and issues to be faced. This is true for Brazil. CHAs face numerous challenges and issues that affect their job performance. On one hand, they sometimes have issues related to getting to their catchment areas.<sup>55</sup> They sometimes lack basic resources such as first aid kits and may, for example, use their personal phones to make client referrals because the government does not provide them with a phone.<sup>40,42</sup> In Rio de Janeiro's shantytowns, CHAs are not taught how to develop educational materials or how to teach health information despite the fact that health education is a critical component of their job description.<sup>12</sup> In addition, some CHAs have difficult relationships with their colleagues (both with other CHAs and with higher-level staff). They face resistance from other health professionals, especially nurses who express concerns regarding their own liability for CHA work and the overlap of their roles with the roles of CHAs.<sup>38</sup> The hierarchical structure of the FHT and the Family Health Program limits the decision-making power of CHAs,<sup>53</sup> and some CHAs feel insecure about speaking in the presence of other FHT members who are more educated and experienced.<sup>55</sup> CHAs get drawn into broader

personal and social issues their clients face along with the broader social determinants of their health problems,<sup>56</sup> while the health professionals on the FHTs have a much more circumspect medical orientation, sometimes leaving CHAs in difficult situations that they cannot resolve themselves.<sup>57</sup>

Some CHAs cite poor or unsatisfactory relationships with co-workers as a main source of burnout.<sup>51</sup> One study revealed that CHAs sometimes work in unhealthy, unsafe places but feel powerless because they lack the means to change their situation.<sup>46</sup> However, key informants report that communities often provide special protection for CHAs when they are working in unsafe and insecure areas because they are valued by the community. As Brazil's population becomes more affluent and larger numbers are living in high-rise apartments, accessibility of CHAs to the homes of clients is becoming more difficult.

Another challenge faced by CHAs is that some feel that they lack credibility and authority in terms their ability to do their work effectively, especially when they have to be accompanied by nurses for household visits.<sup>40</sup> Some CHAs have difficulty implementing the changes and activities that their supervisors recommend.<sup>43</sup> Others note that if the government health program does not or cannot meet the population's health needs or expectations, CHAs are the first to be blamed by the population.<sup>58</sup> It is therefore unsurprising that CHAs report experiencing emotional distress due to the fact that their personal and professional lives exist in the same social milieu.<sup>58</sup> Perhaps more importantly, we should note that the expansion of the CHAs program coincides with a growing shortage of physicians and growing concerns about the level of government expenditure on health care, equity, and the quality of care provided.<sup>16</sup> In 2000, Svitone and colleagues wrote about concerns in terms of job security and the lack of career mobility for CHAs.<sup>11</sup>

Broader challenges at present within the Brazilian health system include a high turnover of the PHC workforce, lack of investment in linkages and integration between PHC and higher levels of care, and management challenges. The competing interests of the health system subsectors also require a reconsideration of the most appropriate roles of the public and private sectors.<sup>59</sup> Patients are provided very different levels of care depending on whether their care is funded by the government or by private health insurance, and there are concerns related to low quality of care provided for patients whose care is funded by the government.

Nonetheless, the strengths of the Brazilian PHC system are such that it is increasingly seen as a model for low-income countries to emulate. South Africa is now in the process of adapting the Brazilian model and scaling it up, and Ethiopia is adapting it for its urban population.

## **Ethiopia: Health Extension Workers and Health Development Army Volunteers**

CHWs have a long history in Ethiopia, dating back to around the time of the 1978 Alma Ata Conference on Primary Health Care. One early program in Tigray, during the time of the civil war there in the 1970s and 1980s, trained 3,000 CHWs. These workers were selected by their communities to receive training in maternal, child, and environmental health and in malaria diagnosis and treatment. The Tigray program was suspended in 1991 at the end of the war, but various CHW programs continued throughout the country.<sup>60</sup> In 1997 the Ethiopian Federal MOH (FMOH) launched the National Health Sector Development Program (HSDP), which shifted the health system focus from predominantly curative to include more preventive and promotive care, and it prioritized the needs of the rural inhabitants (who make up 83% of the Ethiopian population).<sup>61</sup> However, the results of the first 5 years of the HSDP revealed meager progress in expanding coverage of basic services for the rural population because the existing services were located at facilities.<sup>62</sup>

In 2003, in response to these unmet needs, the Government of Ethiopia launched two programs: (1) the Accelerated Expansion of Primary Health Care Coverage and (2) the Health Extension Program (HEP).<sup>63</sup> Multiple stakeholders, including the Federal Ministries of Health, Education, Labor, Finance, and Capacity Building were all involved. These programs were designed to expand health service coverage, particularly in rural areas, using locally available human resources. Two cadres of locally available human resources were developed: Health Extension Workers (HEWs), who complete one year of training and are paid as full-time regular government employees, and volunteers who were initially called Community Health Promoters (CHPs) but are now called Health Development Army Volunteers (HDAVs). National guidelines call for 1 PHC center and 5 health posts for 25,000 people, with each health post having 2 HEWs serving 5,000 people and 20 HDAVs in the catchment area of the health post (Figure 3).<sup>19,64</sup>

The HEWs provide curative care in the health post and are supposed to spend one-half of their time in the community carrying out promotional work in coordination with HDAVs, for whom they provide training and support. There are approximately 10 HDAVs for every HEW. However, as their name implies, the HDAVs' focus is not only on health but on other aspects of women's development as part of a broader national social and political agenda.

There are two variations of the HEW program that are now under development in Ethiopia – one for pastoralist (migratory) populations and one for urban populations. There is little written about these new initiatives. The pastoralist HEW has less formal education since these populations generally do not have candidates with the minimum educational requirements for

the national HEW program. The urban HEW is a higher trained professional who will link patients in need to services to a health center, very much modelled on the Brazilian system.

**Figure 3. A health post and two Health Extension Workers with their family health folders**



The Health Development Army, a massive program aimed at recruiting one woman from every five households, was initiated by the government in 2011 to supplement the work of HEWs and to more fully engage women and communities in health improvement by establishing “model households” which practice healthy behaviors.<sup>65</sup> One of the important reasons for the rapid and successful scale up of the HEP and the HEW Program was the close oversight provided by the prime minister’s office. A “model villages” program is being introduced, the goal of which is for 80% of the households in a village to be composed of model households. The national goal is for 80% of Ethiopia’s villages to achieve “model village” status.<sup>66</sup>

In the discussion that follows, we will focus initially on HEWs, and then provide some summary comments about HDAVs at the end.

### **Evidence of effectiveness**

The HEP has adopted an innovative approach to providing communities with readily accessible PHC services. Here we summarize the evidence of effectiveness in terms of outputs, quality of care, population coverage of services, changes in health status, and cost-effectiveness.

#### **Outputs**

Over little more than a decade (2003-2013), Ethiopia recruited, trained and deployed 38,000 HEWs (approximately 1 per 2,500 population) and 4 million HDAVs (approximately 1 per 25 population). In 2004, 64% of the national population had access to health services, increasing to 92% in 2011.<sup>67</sup> Another study reported that Ethiopia was able to increase PHC coverage from 77% in 2005 to 90% in 2010.<sup>64</sup>



HEWs have been recruited and trained to work in urban areas as well. There they are referred to as Urban Health Extension Professionals (UHEPs) and are nurses who receive additional training. A representative household survey in one town (Bishoftu, in Oromia Regional State) reported that 73% of the surveyed households had had a least one service from a UHEP during the previous 6 months and households had had on average 4 home visits from an UHEP during that period.<sup>68</sup>

HEWs each see approximately 20 clients a week, including 4 children and 3 new family planning clients.<sup>69-71</sup> Over a three-year period during which training for Integrated Community Case Management (iCCM) was provided to HEWs (from 2011 to 2013), 1.3 million sick children were treated for malaria, suspected pneumonia, diarrhea and severe acute malnutrition.<sup>69</sup>

### **Quality of care**

The best information about the quality of care provided by HEWs comes from the studies of iCCM implementation in a program supported by UNICEF. In the Jimma and West Hararghe Zones of Oromia Region with a population of 2.5 million people, HEWs staffing 490 health posts received a 6-day training to strengthen their capacity to assess, classify and treat childhood pneumonia, diarrhea, malaria, malnutrition, and measles. The iCCM program also included, in addition to the training, a program to strengthen supportive supervision, provision of essential commodities, and enhanced monitoring and evaluation.<sup>72</sup> Follow-up assessment<sup>73</sup> revealed that nearly all HEWs had received the iCCM training; supervision was strong, and essential commodities were available. HEWs provided correct case management for 64% of children. However, only 34% of children with severe illness were correctly managed. HEWs who attended performance review and clinical mentoring meetings had 8.3 times the odds of correctly managing sick children compared to HEWs who did not attend; follow-up training also increased the odds of correct management by 2.1.<sup>74</sup>

### **Coverage of services**

Although the national coverages of essential child and maternal health services are still not as high as they need to be, the country has made strong progress during the previous decade in expanding coverage following the introduction of the HEP and the deployment of HEWs (Table 2). Immunization levels have doubled. Levels of undernutrition have declined markedly, and the level of exclusive breastfeeding during the first 6 months of life has increased. The percentages of children with symptoms of pneumonia and diarrhea who were treated appropriately have increased by 50%. Antenatal utilization has almost tripled, and the percentage of births attended by skilled health personnel has increased 10-fold (from 6% to 62%). The contraceptive prevalence rate (CPR) has increased 2.5 times, and the unmet need for family planning has declined by one-third. Ethiopia is one of the few countries where the CPR has doubled twice within a decade, from 6% to 14% between 2000 and 2005 and to 27% in 2011.<sup>71</sup>

HEWs have promoted the entire range of healthy household behaviors and appropriate health care utilization related to child and maternal health. One report<sup>75</sup> assessed the intensity of outreach services provided by HEWs in 101 representative rural districts of Ethiopia and found, using multiple regression analyses to control for potential confounding variables, increasing intensity of HEW outreach services between 2008 and 2010 led to significant increases in antenatal care utilization, birth preparedness, postnatal care utilization, and immediate breastfeeding after birth, but no changes were noted in skilled deliveries or newborn health care indicators.

**Table 2. National coverage of basic and essential services in Ethiopia<sup>76,77</sup>**

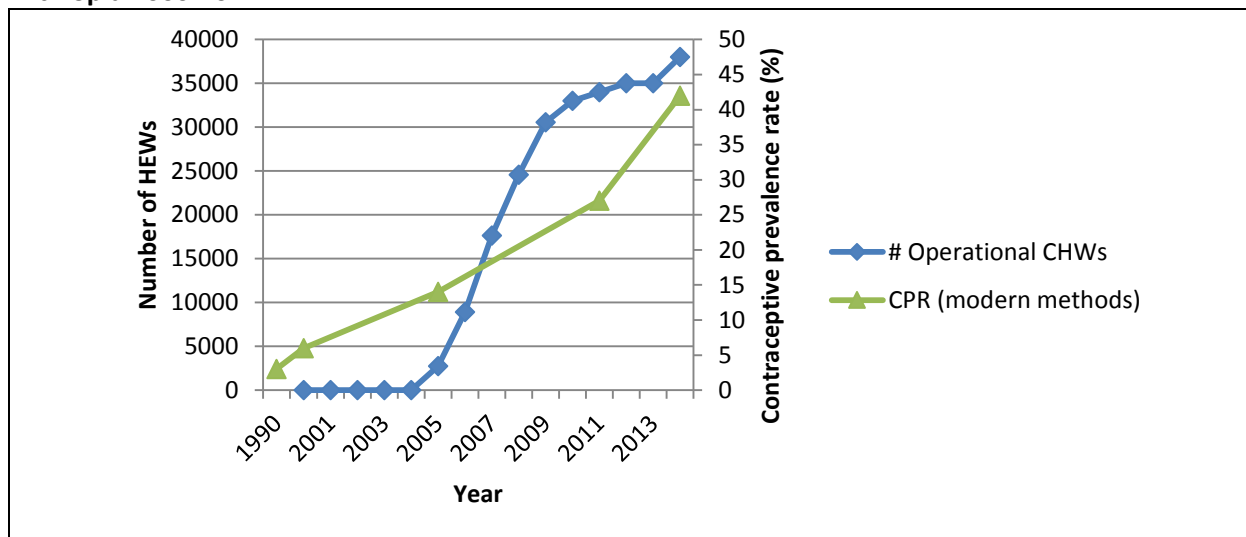
Indicator	Previous coverage levels (2005)	Current coverage level (2016)
Immunization [in 2016, complete: BCG, DPT (3 doses), pneumococcal vaccine (3 doses), Hib (3 doses) and measles; in 2005, complete: BCG, DPT (3 doses), and measles]	Complete: 20% DPT3: 32% Measles: 35%	Complete: 39%; DPT3: 53%; Measles: 54%
Percentage of children who are moderately or severely underweight/stunted	38% underweight 47% stunted	24% underweight 38% stunted
Percentage of infants <6m who are exclusively breastfed	49%	58%
Percentage of children with symptoms of pneumonia taken to an appropriate provider	19%	30%
Percentage of children with diarrhea receiving fluid from oral rehydration packets	20%	30%
Percentage of women obtaining at least 4 antenatal care visits	12%	32%
Percentage of births attended by skilled health personnel	6%	62%
Contraceptive prevalence rate (currently married women, modern methods)	14%	35%
Unmet need for family planning (percentage of women who do not desire a child in the next 2 years and who are NOT using a modern contraceptive method)	34%	22%

\*DPT: diphtheria, pertussis and tetanus

Isolating the specific contributions made by HEWs to improving the coverage statistics shown in Table 2 is not possible in most cases. But since HEWs directly provide family planning services, it is possible to identify their contribution to the increase in the use of contraceptive. In 2005, 17.5% of users of contraception indicated that they received contraception from a community-based worker or at a health post.<sup>76</sup> In 2014, after a tripling of the CPR, 37% of current users indicated that they received their family planning method from a health post/HEW.<sup>78</sup> One 2009 survey of three districts in Tigray region found that 55% of women who were using a family planning method indicated that they had obtained it at a health post from the HEW.<sup>79</sup>

Figure 4 shows a strong correlation between the roll out of HEWs in Ethiopia and the expansion of the contraceptive rate. Of course, correlation is not causation, but the supporting evidence documenting the important contribution HEWs make in providing family planning services supports the case for a significant causal influence.

**Figure 4. Trends in contraceptive prevalence in relation to Health Extension Worker expansion, Ethiopia 2000-2014**



One study<sup>80</sup> of utilization of HEWs for treatment of sick children in the Jimma and West Hararghe zones (districts) of Oromia Region revealed that only 9.3% of caregivers of a child sick with diarrhea, fever, and/or pneumonia in the previous 2 weeks had taken their child to an HEW. The most frequent reasons offered by caregivers for not seeking care from an HEW were:

- Illness not perceived to be serious enough to require treatment
- Health post not open
- Drugs thought to not be available at the health post
- HEW perceived to provide a low quality of care
- Preference for an informal provider
- Barriers of distance and lack of transport to reach the HEW

A mixed-methods study<sup>81</sup> in Shebedino District in Sidama Zone of the eastern Southern Nations, Nationalities, and Peoples' Region (SNNPR) regarding factors influencing the low utilization of curative child health services produced similar findings. This study reported the following barriers to the use of evidence-based treatment by HEWs at health posts:

- Use of home remedies, leading to delays in care-seeking from HEWs
- Decision-maker absent from the household
- Fear of stigma
- Expectation of non-availability of service or medicine
- Geographic or financial barriers
- Perception of (or actual) poor quality of care
- Alternative sources of care that are accessible, available, affordable, and reliable.

Focus group interviews with 60 mothers in Shebedino District of SNNP Region<sup>82</sup> identified 10 barriers to care seeking for sick infants younger than two months of age:

- Lack of knowledge about availability of services
- Fear of evil eye
- Social stigma
- Perceived financial barriers
- Perceived infant fragility
- An elder's advice not to seek care from an HEW
- Distance
- Husband's refusal
- Fear of injection
- Belief in recovery without medicine

A 2011 household survey of women with a child younger than 5 years of age in Jimma and West Hararghe Zones revealed that the coverage of interventions to prevent childhood illness was relatively low, with most of the children receiving half or fewer of the recommended eight interventions.<sup>83</sup> A 2009 household survey of women with under-5 children<sup>79</sup> was undertaken in three districts of Tigray region to assess utilization of maternal health services. 72% of the respondents had received a home visit from an HEW in the previous 12 months and the HEW had talked with her about family planning. 44% had received a home visit during their pregnancy, but only 22% had obtained antenatal care at a health post and only 1% had obtained a postnatal visit at a health post. 7% reported that the HEW had delivered her baby. 95% of the births had occurred at home, most commonly delivered by a relative, friend or traditional birth attendant. Among current family planning users (38% of the respondents), over half (55%) had obtained their family method at the health post from an HEW.

In a 2012 cross-sectional household survey of mothers from six districts in West Gojjam Zone of the Amhara National Regional State, 93% of the respondents reported that HEWs had given them information about family planning, and 66% were currently using a contraceptive. 88% of the users were using an injectable contraceptive, and 68% of the users obtained their method from a health post staffed by an HEW.<sup>84</sup>

A 2012 household survey of households in the Amhara, SNNP and Tigray Regions compared baseline care-seeking outcomes from the 2011 Ethiopian Demographic and Health Survey with those for iCCM areas in 2012. This revealed that appropriate care seeking for acute respiratory infection, diarrhea, or fever increased two-fold, from 19% at baseline to 38% at follow-up.<sup>85</sup> Two household coverage surveys<sup>86</sup> carried out in 2011 and 2013 in iCCM target regions in Amhara, Oromia, SNNP and Tigray regions demonstrated that the coverage of 10 of 15

maternal and child health indicators had increased, most notably antenatal iron and folic acid (from 39% to 72%), exclusive breastfeeding of infants 0-5 months of age (from 58% to 79%), and children 6-23 months of age who started complementary feeding at 6 months of age (from 61% to 75%).

Most recently, in 2016 an evaluation of the coverage of child survival services provided by HEWs in 31 districts in the Oromia region revealed that only 2-12% of sick children (i.e., those with symptoms of pneumonia, fever or diarrhea) sought care from an HEW at either the time of the baseline or endline surveys.<sup>87</sup> At the end of the study, only 6% of children with suspected pneumonia in the intervention arm received antibiotics promptly (within 24 hours of the onset of symptoms) in the intervention area.

A qualitative study<sup>88</sup> of the perspectives and experiences of caregivers in the Jimma and West Hararghe zones of Oromia region found that lack of availability of HEWs at the health post was one of the most common barriers to utilization of HEW service for childhood illness. Another was difficulties in geographic access (distance, lack of transport, and poor village pathways and road conditions, particularly during the rainy season). Over half of the study respondents lived more than a 45-minute walk from the health post. Other notable barriers were a perceived lack of sensitivity of HEWs and concerns about the quality of medicines given at the health post.

Finally, one study<sup>79</sup> compared the utilization of maternal health services in the Tigray region of Ethiopia between 2005 and 2009 based on household surveys and concluded that the Health Extension Program had made important contributions to expanding the coverage of family planning services, antenatal care and HIV testing, though there were no increases in health facility delivery, postnatal check-ups or use of iodized salt.

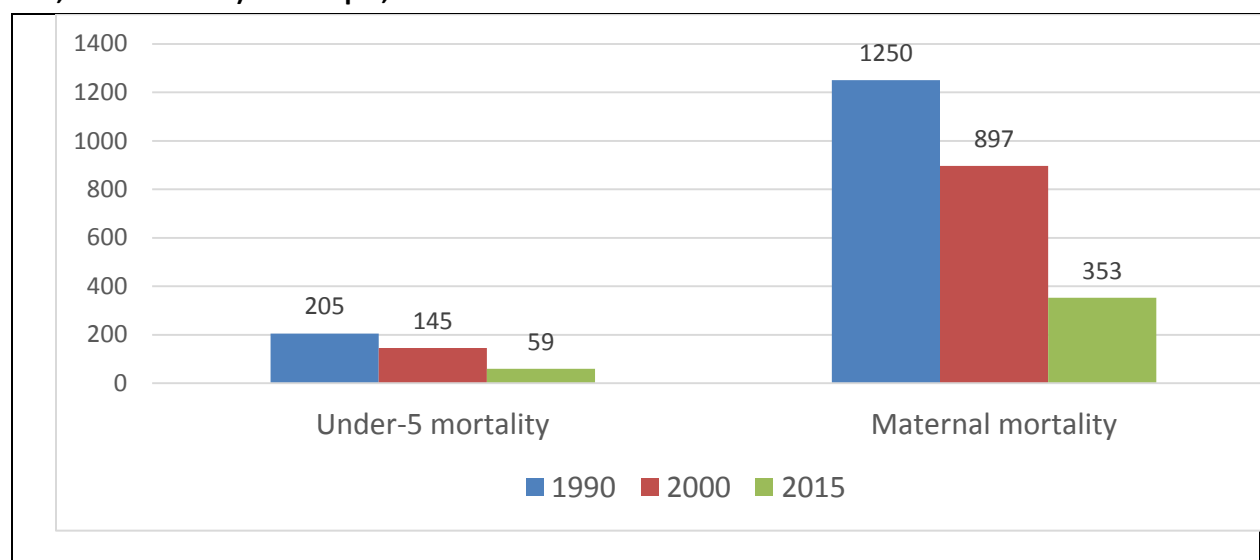
### **Changes in health status**

In spite of the still low (but nonetheless improving) coverage of child survival services, there is widespread consensus that the significant progress in Ethiopia in child and maternal mortality as shown in Figure 5, can be attributed to the development of PHC programs and systems that have strong community-based services provided by CHWs.<sup>89</sup> This is partly because coverage levels were even much lower prior to the initiation of the Health Extension Program more than a decade ago. Among African countries, Ethiopia is the second largest (after Nigeria), with a population now approaching 100 million people – much larger than the few other African countries making strong progress in improving the health of their mothers and children (Eritrea, Liberia, Madagascar, Malawi, Mozambique, Niger, Rwanda, Tanzania, and Uganda).<sup>30</sup> Ethiopia met MDG 4<sup>30</sup> (for children) and also MDG 6 (for HIV, malaria and tuberculosis).<sup>90</sup> Significant progress has been achieved for reducing levels of childhood malnutrition, another MDG.<sup>90</sup> MDG 5 (for mothers) was almost reached, with a decline in maternal mortality of 72% (against the goal of 75%).<sup>31</sup>

Unfortunately, the iCCM component of the HEW program has not so far produced any evidence of mortality impact. iCCM was implemented in 16 randomly selected *woredas* (districts) of the Oromia region, and over a 2-year period there was no greater mortality decline in children 2-59 months of age than in 15 randomly selected control *woredas*.<sup>87</sup>

The degree to which Ethiopia's overall progress can be attributed directly the Ethiopia's CHWs – its Health Extension Workers and Health Development Army Volunteers – is a matter for conjecture, but there appears little doubt that the contribution was an important one. However, the direct contribution of HEWs to the expansion of contraceptive usage seems to be quite clear since they are the only family planning provider for a large portion of the population.

**Figure 5. Changes in the under-5 mortality rate (per 1,000 live births) and maternal mortality ratio (per 100,000 live births) in Ethiopia, 1990-2015<sup>30,31</sup>**



Because of its demonstrated health achievements and the difficulties that many other African countries are encountering in accelerating progress in improving the health of their populations, Ethiopia has been receiving visits from ministers of health and other health officials from countries throughout Africa and beyond who want to learn firsthand how Ethiopia achieved these remarkable results. During the past two years alone, ministerial-level health officials from 20 African countries have come to Ethiopia for this purpose.

### **Costs and cost-effectiveness**

The HEW program has an annual program cost of US\$387 million, and HEW salaries account for 10% of program costs.<sup>10</sup> One study<sup>91</sup> estimated the cost-effectiveness of the Ethiopian HEW program in the Sebedino *woreda* of Sidama Zone of the eastern Southern Nations, Nationalities, and Peoples' Region (SNNPR), with a population of 278,000 people, by measuring

the increase in coverage of maternal and child health services and estimating the number of lives saved using the Lives Saved Tool (LiST). The authors attributed increases in the population coverage of key maternal and child health interventions to the HEW program, and used the LiST model to estimate the number of lives saved and years of life gained. The analysis included start-up costs and recurrent costs obtained from local data (expense files, payroll records, key informant interviews, and supply catalogues for medicines and supplies). An overhead rate of 15% was applied. Costs of medicines and vaccines were also included. The incremental cost of the program (expressed in international dollars) was US\$1.76 per capita.

On the basis of their analysis, the incremental cost per life-year gained (expressed in international dollars) in the Sebedino *woreda* was US\$999. Cost-effectiveness was based on whether the cost per life-year gained was less than the national gross domestic product per capita (US\$1,500). Thus, the program was judged to be cost-effective.

## Selection

The basic requirements to become a HEW are (1) have a 10th grade education, (2) be 18-30 years old and female, and (3) preferably reside in the community where the candidate will be working.<sup>64,92</sup> In order to address challenges in recruiting qualified individuals in pastoralist and semi-pastoralist areas, the rules were revised to allow men and those with a 6th to 8th grade education to serve.<sup>92</sup> In a study of 131 HEWs carried out in 69 rural *kebeles* (ward – the smallest administrative unit in Ethiopia) in the Southern Nations Nationalities and People's Region (SNNPR) and Oromia Region, HEWs were on average 23-26 years old and had been working as an HEW for 5-6 years.<sup>70</sup>

One recurring theme in the literature is a discussion on whether HEWs are being recruited from the same *kebeles* that they are from. This is one of the preferred qualifications for HEW candidates, in order to promote community acceptance and HEW retention.<sup>92</sup> In one study that took place in rural areas of Jimma and West Hararge Zones of Oromia Region (including 190 health posts) 86-91% of HEWs lived in the same *kebele* in which they worked. However, only 6-12% of the HEWs reported that they had been living in the same *kebele* before beginning their HEW training.<sup>73</sup> Another study<sup>70</sup> of 131 HEWs working in 69 rural *kebeles* in the SNNPR and Oromia Regions found that only 35% of HEWs lived in the *kebele* in which they worked, and these HEWs reported an average of 50 minutes of travel time to reach their work.

HEWs are supposed to be selected through the involvement of local health committees and the community is involved with many aspects of the Health Extension Program.<sup>19</sup> The degree to which these guidelines are followed is not well-documented.

## Training

Training for HEWs lasts 12 months and includes both didactic and clinical modules, as well as in-service training.<sup>19</sup> The training makes use of existing Ministry of Education facilities<sup>19</sup> and is conducted with assistance from the *Woreda* (District) Health Office.<sup>92</sup> Trainees are required to pass a national exam. If they fail, they have to retake it until they pass in order to begin their work.

HEWs are also supposed to receive additional refresher trainings after this initial training. The 2014 study<sup>70</sup> of 131 HEWs in 69 rural *kebeles* in the SNNPR and Oromia Regions found that in the previous 3 years over 80% of HEWs had completed integrated refresher training in the management of possible severe bacterial infection (PSBI), integrated community case management (iCCM), as well as maternal, newborn, and child health, while a smaller percentage had received re-training on other topics.<sup>70</sup> A recently completed study<sup>93</sup> of 44 HEWs from across Ethiopia reported that at least 40% had received refresher training during the previous 12 months in the following areas: immunizations (68%); tuberculosis (64%); Integrated Community Case Management of Newborn and Childhood Illness (50%); HIV/AIDS and sexually transmitted diseases (46%); maternal, newborn and child health (43%); or community-based health information systems (41%). 80% of the country's 32,000 HEWs were trained to deliver iCCM between 2010 and 2013.<sup>69</sup>

The number of HEWs in training has recently been increased to 5,000 per year, and the number of HEWs is expected to reach 50,000 by 2020. At present, HEWs make up 47% of the total health workforce in Ethiopia. A new curriculum has been developed that will give more emphasis to curative care and non-communicable diseases (including mental health). Every 1-2 years, HEWs receive 15 days of refresher training. Newly added refresher trainings include sepsis management in the newborn, insertion of subcutaneous contraceptive implants, and directly observed treatment of tuberculosis. In response to requests from both HEWs and the community for more curative training, opportunities are now being developed to provide HEWs with 1 year of additional training to enable them to become a Level 4 rather than a Level 3 HEW with a higher salary.

An evaluation carried out between 2007 and 2010 reported that 78% of HEWs felt that the types of duties and responsibilities they are expected to perform require more training than they had received.<sup>94</sup>

## Role description

The HEW job description is broad and includes many different components, including: (1) disease prevention and control, (2) hygiene and environmental sanitation, (3) family health services, and (4) health education and communication.<sup>92</sup> HEWs divide their time between the health post, where they see patients with complaints and provide family planning services, and



in the community, where they carry out health promotion activities, visit clients in their home, and support Health Development Army Volunteers (HDAVs).

### **Tasks and services carried out**

The job description of HEWs in Ethiopia covers a broad range of activities, including health promotion, disease prevention, as well as treatment of uncomplicated and non-severe cases of malaria, pneumonia, diarrhea, malnutrition and measles. Their work includes clinical case management of many types of acute illness and provision of injectable contraception.<sup>19</sup> Other additional tasks that are being added include distribution of misoprostol for mothers to take at home after delivery to reduce the risk of post-partum hemorrhage,<sup>95</sup> home-based neonatal care, and collection of sputum specimens from patients with symptoms of tuberculosis.<sup>96</sup> Compared to CHWs in many other national programs, the role of HEWs is very broad, including not only medical care for pregnant women (antenatal care, delivery, and postnatal care) and for children but also community mobilization; improvement of water, sanitation and hygiene; and health promotion.<sup>19</sup>

As HEWs are now considered to be a critical asset for effective delivery of health services, HEWs have been given an increasing number of responsibilities and tasks. This may compromise their ability to effectively carry them all out effectively.<sup>19</sup> One challenge in the continuity of care is that the national target of building 3,300 health centers that provide emergency obstetric care has not been met: at the time of one recent analysis reported in 2013, 81% of the projected number (2,660) had been completed.<sup>67</sup> Even with the operation of all of these, a large proportion of the population will be several hours or more away from such a facility. Key informants indicate that the unmet needs for health services at the community level are still substantial. Even though HEWs are trained in a very wide array of skills, there is a need for more health care providers.

HEWs spend the majority of their working time conducting health promotion, and much of their time is in contact with patients, families, or community members. One study, which was a time-motion study based on self-reports to a daily diary completed by 131 HEWs,<sup>70</sup> found that HEWs spent 43% of their time on health promotion, 16% on curative care, 9% on work-related travel, and 32% on other activities. In total, 70% of productive time was spent in contact with patients, families, or community members. A more recent time-motion study<sup>93</sup> observing 44 HEWs from across Ethiopia over a 21-day period reported that two-thirds of the time was spent on the following activities: (1) waiting for patients at a health facility, (2) traveling between work activities, and (3) building relationships with the community (Table 4). In some settings, HEWs have to walk 3-4 hours to reach outlying sub-villages in their catchment areas, diminishing time available to provide services.<sup>64</sup>

Table 3 also gives a breakdown on what kinds of health education or services that HEWs provided for that 12.8% of that time. Almost half (44.7%) was devoted to family health services and one-third to family and environmental sanitation.

**Table 3. Distribution of time spent by 44 HEWs across Ethiopia based on 21 days of observation**

<b>General activity</b>	<b>Percentage of time devoted to activity</b>
Waiting for clients in the health post (or health center in urban areas)	24.9
Travel between work activities	15.5
Building relationships in the community	13.3
Recordkeeping, reporting, managing family folders	13.2
Providing health education or services	12.8
Participating in meetings and giving trainings	9.3
Other: this includes receiving supervision (3.2%), receiving training (1.6%), managing commodities and supplies (1.3%), community mapping and mobilization (0.8%), and other activities (4.0%)	10.9
Total	100.0
<b>Breakdown of time spend on health education or services (12.8% of total time spent)</b>	
Family health services	44.7
Family and environmental sanitation	30.3
Disease prevention and control	12.4
Non-communicable diseases	0.6
Mental health	0.0
Other	11.9
Total	100.0

Source: <sup>93</sup>

### **Hours worked, workload and productivity**

Since the government hires HEWs as formal employees, they are typically expected to work a 40-hour week. The time-motion study administered through daily self-reports to a diary completed by 131 HEWs,<sup>70</sup> found that HEWs spend an average of 7 hours and 49 minutes at work each day. HEWs logged an average of 4 hours and 58 minutes per day for various activities except breaks, 29 minutes for breaks, and there was no specific accounting for the remaining 2 hours and 22 minutes per day spent at work. Moreover, 44% of this time was focused on a specific recipient and 26% of this time was focused on broad activities that benefit the whole community. About half of HEWs reported working on at least one weekend day during the previous 4 weeks, and on average they worked 2 days over the previous 4 weekends.<sup>70</sup> About half of HEWs reported involvement in at least one seasonal campaign of some type or other (immunization, environmental health, sanitation, agriculture, or watershed management).<sup>70</sup> The time-motion study of 44 HEWs working across Ethiopia<sup>93</sup> revealed that HEWs worked on average 15.5 days in a three-week (21-day period) and 6.0 hours per day (excluding breaks and meals).

Key informants report that the workload of HEWs is heavy, and they are unable to complete all they are supposed to do in a regular work day. HEWs themselves report that their workload is excessive (when including unpaid overtime), and they struggle to find time to complete their household responsibilities.

HEWs reported an average of 75 clients attending each health post per week.<sup>70</sup> Research findings and reports from key informants suggest that the HEWs may be stretched too thin, and there is now under consideration an increase in the number of HEWs per population.<sup>67</sup> At present, Ethiopia has fewer than 3 doctors, nurses and midwives per 10,000 people in comparison to the World Health Organization (WHO) minimum standard of 23 doctors, nurses and midwives per 10,000 population.<sup>97</sup>

A 2010 study of 400 HEWs and 10,000 of their clients found that each health post had an average of 153 new clients per year with 157 ongoing family planning clients.<sup>71</sup> The three main services that clients recalled having been offered by HEWs were family planning (reported by 63% of respondents), immunizations (41% of respondents) and health education (reported by 38%). The four leading reasons cited by respondents for visiting a health post were for family planning (36%), health advice or counseling (21%), immunization (18%) or treatment of malaria (16%).

In the Jimma<sup>98</sup> and West Hararghe zones of Oromia region where iCCM had been introduced, an average of 16.0 sick children had been seen in the previous month in 2012.<sup>69</sup> There, HEWs reported that had worked on average 6.1 hours the previous day and had spent an average of 4 hours providing or offering clinical services in the health post, about 30 minutes offering clinical services in the community, and nearly 1 hour engaged in community mobilization/education activities.<sup>73</sup> Another assessment of iCCM registration books of 622 randomly selected health posts revealed that nearly two-thirds (64%) of health posts treated fewer than 5 sick children per month.<sup>99</sup>

### **Location of work**

HEWs divide their time between health posts and community-based work. There is some discrepancy in the desired split between the two, and this has also changed over time. There has been a revision in the guidelines to allow HEWs more time at the health post. At one point the goal was to spend 75-80% of time in the community<sup>19,69</sup> but now the goal is to divide time evenly between the community and the health post.<sup>100</sup> The time-motion study of 131 HEWs found that 51% of the HEWs' time was spend at the health post, 37% in the community, and 11% spent elsewhere.<sup>70</sup> A different recently completed time-motion study<sup>93</sup> of 44 HEWs from across Ethiopia observed over a 21-day period reported that one quarter (23%) of the HEWs' time was spent at the health post, one quarter (24%) in households, one quarter at other

locations (e.g., schools or community meetings), and for 13% of the time there was no location recorded.

### **Population assigned**

Two HEWs are assigned to a population of approximately 5,000 people. A government health post is present for the two HEWs to work from. One HEW is normally working at the health post one day and in the community the following day, alternating with her partner.

### **Incentives, compensation and motivation**

HEWs are government employees and salaried civil servants, with a compensation at US\$84 per month as of 2014.<sup>19</sup> This has increased slightly to keep up with increases in the cost of living. The monthly salary is paid regularly. Funding for the program comes mostly from central government revenues, but also from a variety of other sources, including regional sources and bilateral and multilateral donors.<sup>19</sup> Services provided at health posts and in the community are free. Key informants indicate that HEWs are not satisfied with their pay for several reasons: (1) the pay is not enough to meet basic needs; (2) the pay is not enough when compared to their workloads; and (3) when their workload is compared to that of other health workers, their pay is not equitable. Similar sentiments are expressed by HEWs themselves.<sup>101</sup>

### **Turnover/drop-out rate**

There are no reliable national statistics on the level of turnover of HEWs. However, some evidence suggests that there may be high turnover as a result of problems with recruitment, low salaries, and disappointments that the opportunities for career advancement have not met expectations.<sup>92</sup> According to key informants, some HEWs leave to go to obtain more schooling, to become a nurse, or to go overseas to work (usually in the Middle East). There are opportunities for HEWs to advance in their skills and get slightly higher pay for their work, but this can prove challenging for HEWs. Key informants report that the government had planned for around 2.5% attrition nationally, but the actual level of attrition is around 5-7%. The average length of employment is 8-9 years and most have been working since they were trained (the training of HEWs began in 2003). In-depth interviews with 44 HEWs from across Ethiopia<sup>93</sup> reveal a high level of frustration because of limited professional career growth opportunities, inadequate in-service refresher training, and lack of funding for salary increases and health service improvements. One evaluation carried out between 2007 and 2010 reported that 79% of HEWs were not satisfied with their monthly salaries and 75% felt that they were overworked.<sup>94</sup> Salaries have since been increased. Nonetheless, even though HEWs complain about these issues, overall they are satisfied with their work. For example, one HEW profiled several years ago in *The Lancet* was quoted as saying:

I really enjoy serving the community. And you can see the results here. The community respects us, and we know that we are helping them stay healthy.<sup>102</sup>

## Career advancement opportunities

Opportunities to advance do exist, including the option to become an HEW supervisor or a nurse after additional training.<sup>19</sup> Opportunities to pass exams to move up to a higher paid position as an HEW do exist. However, key informants report that career advancement opportunities are limited. Most advancements so far have been from Level 3 to Level 4, meaning a continuation in the same role as an HEW but with a somewhat higher salary. Many HEWs feel that career advancement opportunities are inadequate. The no-transfer policy often creates hardships for some HEWs. They are not able to relocate to work in a different location. This creates hardships, for example, for women who have been working as an HEW who later marry a husband who lives in a different location. She is not able to transfer to where her family is located.<sup>98</sup> A recent report concluded that “It is essential that the women who make up the HEW workforce are not denied their rights to fair and equal working conditions and are not seen as a low-cost way to make up the personnel shortfall in the health system.”<sup>98</sup>

## Supervision

HEWs report to and are supervised by a team based at PHC centers that includes: a Health Officer, a Public Health Nurse, an Environmental/Hygiene Specialist, and a Health Education Specialist.<sup>19,100</sup> One member of the team is assigned to supervise a specific health post. Of course, these people have many other responsibilities, and they have a total of approximately 10 HEWs under their supervision. The supervisor is supposed to visit the health post weekly and also make one household visit every week. This is common but not universal. In addition, the PHC team meets monthly with the HEWs when they come to the PHC Center for monthly meetings. The performance evaluation of PHC staff includes an assessment of their supervision of HEWs. However, according to one report, only 56% of the PHC Centers reported holding monthly meetings.<sup>103</sup>

According to one study,<sup>70</sup> over 90% of HEWs had received supervision from the PHC center in the previous three months and had been supervised 5 times (on average) by them, and additionally many had been supervised by someone based at the *Woreda* (District) Health Office. In another study on Integrated Community Case Management of Childhood Illness (iCCM) from the rural areas of the Jimma and West Hararghe Zones of Oromia Region, researchers found that nearly all HEWs (98%) received training and supervision in the areas covered by the iCCM training.<sup>73</sup> Almost all (87%) of those in the iCCM intervention area had received health post supervision in the previous 3 months compared to 43% in the comparison area (where iCCM training had not been given).

According to the national iCCM database report for 2013, 75% of HEWs trained in iCCM were supervised at least once over a two-year period between February 2011 and April 2013.<sup>69</sup> Another assessment of health post registers in 113 *woredas* (districts) across six regions of

Ethiopia revealed that over an 18-month period between 2011 and 2013 all health posts received at least one supportive supervision visit, 41% received two, and 15% received more than two.<sup>104</sup>

Key informants indicate that supervision requires a lot of time, including time for travel to the field with the HEW as well as time for meetings with the HEWs at the PHC center. According to one key informant, improvements in supervision have stemmed from monthly one-day exposure visits where staff at PHC centers spend a day at a health post to give the supervisory staff a better sense of what HEWs face in their roles.

### **Relationship with the community/role of the community**

HEWs are supposed to be selected through the involvement of local health committees and the community is involved with many aspects of the Health Extension Program,<sup>19</sup> so there are many opportunities for the community to interact with the HEW and provide feedback. Early on in the beginning of the HEW program, communities viewed HEWs as unqualified to assist with maternal and child health care since many were younger and had no children of their own.<sup>19</sup> However, key informants indicate that this view has changed over time and there is now a strong appreciation of the work carried out by HEWs.

Recent evaluations of the Health Extension Program (HEP) by the Center for National Health Development in Ethiopia and Columbia University found that 60% of more than 10,000 community members questioned rated all HEP services as satisfactory or very satisfactory, with family planning getting the highest score.<sup>105</sup> Key informants report that the relationship between HEWs and community is very good overall, with a strong appreciation in the community of the work of the HEWs and substantial trust in the quality of services the HEWs provide. Moreover, no notable concerns about safety issues encountered by HEWs were noted in the reviewed literature or in conversations with those who have worked with the HEW program.

In-depth interviews with 44 HEWs from across Ethiopia indicate that HEWs take great pride in serving their community and in seeing positive changes occur in the community as a result of their work.<sup>93</sup>

### **Linkages with the health system**

As full-time members of the formal health workforce with a stable government salary, HEWs are overall well-integrated into the health system and its governance, financing, and training functions.<sup>19,38</sup> In fact, Ethiopia, along with Brazil, have the most strongly integrated CHW programs in the world according to one recent systematic review of the literature on this topic.<sup>38</sup> The HEWs are fully integrated into the national civil service structures, and HEWs are

the first point of contact for community members who need to access higher levels in the health system.<sup>64</sup>

Nonetheless, in-depth interviews with 44 HEWs and other key informants from across Ethiopia revealed that a common theme was the weak linkages among health posts, health centers, *woreda* (district) health offices, and hospitals. There is little information sharing between the various elements of the health system.

### **Logistical support**

Logistical support for HEWs – to provide them with needed supplies and medicines – is a critical element for effective functioning. In one study,<sup>70</sup> health posts were found to be adequately stocked with essential medicine and equipment. However, another report<sup>106</sup> assessed stock outs at health posts of HEWs and found that only 27-36% of health posts had all the five essential medicines needed for integrated community case management of childhood illness (iCCM): cotrimoxazole (for pneumonia), Artemisinin combination therapy (for malaria), oral rehydration packets and zinc (for diarrhea), and ready-to-use therapeutic food for severe acute malnutrition. Another study<sup>73</sup> carried out in 2012 in Jimma and West Hararghe zones of Oromia region where iCCM had been scaled up found that 69% of health posts had all iCCM commodities in stock on the day of assessment, while only 46% had all essential supplies and job aids for iCCM. An earlier national evaluation carried out between 2007 and 2010 found that only 20% of health posts were equipped with 80% of the minimum of medical equipment, and only 24% had the necessary equipment for immunization.<sup>94</sup>

One qualitative study<sup>107</sup> of HEWs in the Sidama zone of the South Nation Nationalities and Peoples Region reported that HEWs' relationships with the with the health system (as well as with the community) were constrained by inadequate support systems; lack of trust, communication and dialogue; and differing expectations. Standardized and regular training, support, supervision, monitoring and accountability, and referral were all seen as important for improving HEW performance and building trust between HEWs and the health system (as well as between the HEWs and the community).

### **Monitoring and data use**

HEWs use a unique system of record-keeping that enables them to keep track of their catchment area, who is in their catchment area, and who needs services. A family health folder is kept at the health post for each family, and the folder is given a number that corresponds to the household number that has been created for that household at the time of the community census that the HEW undertook in collaboration with the community. The HEW pulls out family folders for those families that need a special service (e.g., an immunization or a family planning follow up) and she makes a note to visit these households at the time of her next visit to the

community. HEWs are beginning to register vital events. Plans are now underway to digitize all 18 million paper-based family health records over the next 5 years.<sup>108</sup>

### **Health Development Army Volunteers (HDAVs)**

Ethiopia has a long history of different types of volunteer CHW programs. In 2011 the government consolidated all of these into the HDA.<sup>109</sup> At the time of its formation, the HDA consolidated several previously existing volunteer community health worker cadres, including those focused on reproductive health/family planning activities. The Health Development Army (HDA) supports HEWs by assisting with household visits and community outreach, thus allowing HEWs to spend more time at the health post. HDAVs are mostly women at least 15 years of age and preferably literate.<sup>19</sup> There are reports now of traditional healers becoming HDAVs. The dynamics of HDAVs receiving “orders from above” while at the same time empowering themselves as well as their female neighbors from below are indeed complex.<sup>101</sup>

The following remarks are based on reports from key informants. The HDAVs are typically well organized and promote immunizations, participation in campaigns (such as polio campaigns in high-risk areas), antenatal care, family planning, and birth at the PHC center. HDAVs are expected to promote healthy behaviors among their neighbors.<sup>101</sup> They work a few hours each week, and are unpaid volunteers. They receive some non-financial benefits or in-kind gifts from community members. The position is seen as a respected community leadership role, and HDAVs are also well-respected by their husbands and families. In some areas, HDAVs also perform activities that enable them to earn a small profit.

There are now an estimated 4 million HDAVs, or approximately one for every 4-5 families (one per 23 people). The rate of attrition appears to be low. There is no standardized training or single training manual for HDAVs. The training varies from area to area. Key informants report that it is not common for HDAVs to go on to become HEWs since they rarely have the educational qualifications required for HEW training.

In-depth interviews with 44 HEWs from across Ethiopia<sup>93</sup> revealed that the HEWs consider the HDAVs to be essential for community mobilization and awareness. HDAVs are becoming increasingly valued members of the PHC team since many people live far away from HEWs (as much as a 3-4 hour walk). HDAVs are critical for informing which patients need to be visited. HEWs are beginning to delegate some of their tasks to HDAVs.

### **Conclusions and challenges**

The HEW Program and the associated HDAV Program are now the cornerstones of Ethiopia’s PHC system. The success that Ethiopia has achieved in building this system and the associated gains in national health statistics have made Ethiopia a leader in PHC in Africa. This has led to the recent establishment of the International Institute for Primary Health Care in Ethiopia,



which will provide short-term training for high-level officials (ministers and parliamentarians) and mid-level staff (program managers) on Ethiopia's achievements as well as on PHC from a global perspective.

The rapid scale up (over a 10-year period) in a vast country of 92 million people of a national program of CHWs that provides access to PHC services that previously was not available is a major achievement. The evidence that HEWs had made a major contribution to Ethiopia's achievements in family planning is persuasive.<sup>71</sup> Unfortunately, coverage levels of many key child survival services remains quite low, so concerted efforts are needed to decrease the barriers to the treatment of sick children with signs of pneumonia, diarrhea, and fever. And, neonatal mortality remains high (28 deaths per 1,000 live births<sup>25</sup>), so the introduction of home-based neonatal care into this system, which is now only beginning, is very much needed.

The evidence is strong that HEWs are well-trained, well-supervised, and are reasonably well-supported with the supplies and medicines they need. In-depth interviews with 44 HEWs and other stakeholders from across Ethiopia drawn from high-performing as well as low-performing *woredas* (districts) revealed that in the higher-performing *woredas* six themes emerged, as shown in Table 4.<sup>93</sup>

**Table 4. Recurring themes among higher-performing *woredas* (districts)<sup>93</sup>**

Staff reported examples of success within their <i>woreda</i> (e.g., latrine construction, improved skilled birth attendance rates, and community engagement)
Strong collaboration existed among HDAVs, <i>kebele</i> (ward) councils, HEWs, and health centers
Data were actively used for problem solving
Performance was monitored routinely and results used to improve performance
HEWs were well-respected in the communities
Inter-sectoral efforts were used to promote health

A separate qualitative study comparing 7 higher-performing *woredas* with 7 lower-performing ones<sup>110</sup> observed that the use of local data to solve problems, respectful and supportive relationships with the community, and strong support from zonal and regional health bureaus were associated with higher performance of HEWs and the Health Extension Program.

In order to achieve higher levels of coverage of key child survival services, it appears that there will be a need to expand the number of HEWs at each health post, to increase their contact with households where pregnant women and young children are present, and to build a stronger role for HDAVs in promoting awareness about warning signs of childhood illness and enabling them to manage some cases of childhood illness.

In terms of the HEW Program specifically, there appear to be three major issues to address: (1) workload, (2) pay, and (3) career development opportunities. These three issues are closely interrelated.

As previously mentioned, Ethiopia has only one-tenth of the WHO minimum standard of doctors, nurses and midwives per capita nationally.<sup>97</sup> So, the unmet need for PHC is substantial, and the population has traditionally relied on traditional providers for health care. The introduction of HEWs is beginning to address the unmet need for modern health care, but not surprisingly there is substantial anecdotal evidence that HEWs are overworked and unable to respond to the need for health care in their communities. In order to address this issue and expand the coverage of evidence-based interventions for newborns and children, an expansion in the number of HEWs will be needed. There appears to be widespread dissatisfaction with pay, and this seems to be generated by the workload (particularly in relation to the workload of other MOH staff). Finally, career development is an important issue for many HEWs. The HEW program was structured initially to provide career development opportunities, and this was widely communicated. However, to date, this has not yet occurred except for the possibility of a relatively small number of HEWs to move to a higher salary scale for performing the same work after several years of service and adequate performance on an examination. This issue will have to be addressed more forcefully in order to keep ambitious HEWs within the health system.

### **Nepal: Female Community Health Volunteers, Village Health Workers and Maternal and Child Health Workers**

Nepal established the Female Community Health Volunteer (FCHV) program in 1988 to increase the coverage of basic health services in rural areas.<sup>111</sup> In the beginning, the cadre was implemented in 27 districts throughout the central and mid-western regions, but by the early 1990s, the program had largely become moribund, primarily because of lack of political support and funding at the central level.<sup>112,113</sup> However, prompted by new evidence regarding the importance of vitamin A deficiency in Nepal, the benefits of vitamin A supplementation programs for reducing child mortality, and newly available funding for vitamin A supplementation, the government established the National Vitamin A Program (NVAP) using FCHVs to biannually distribute vitamin A capsules. Due to its effective management of FCHVs, the NVAP soon became a success because of the high national coverage achieved, bringing national and international attention to the key role played by the FCHVs. The NVAP thus revitalized the FCHV cadre and elevated the cadre's status in the community. By 1993 the FCHV-provided vitamin A supplementation program grew to cover all 75 districts. The FCHV program currently boasts a cadre of 52,000 FCHVs (Figure 6).<sup>114</sup>

**Figure 6. Female Community Health Volunteers at work**



In Nepal, national health services are delivered through a network of government facilities, PHC centers, health posts, and sub-health posts. In terms of geopolitical divisions, the country is divided into 75 districts, and each district is further divided into Village Development Committee Zones (VDCZs). VDCZs are then broken down into wards, with one VDCZ consisting of nine wards<sup>112</sup> Each ward is served one FCHV. The average population served by a FCHV is 1,580 individuals.<sup>115</sup> FCHVs are present in 96% of the nation's rural wards. They work primarily in rural regions. FCHVs educate mothers and community members on basic health issues and encourage the use of health services for family planning and maternal, neonatal and child health needs.<sup>112,114,116</sup> Our discussion will primarily focus on FCHVs but, later, the other CHWs in the Nepalese PHC system will also be introduced and discussed.

### **Evidence of effectiveness**

FCHVs are widely recognized for their delivery of key interventions to households in isolated, dispersed communities and helping to achieve high levels of intervention coverage that otherwise would not be possible. Here we review some of the evidence regarding output and population coverage of services as well as changes in health status.

### **Outputs**

On average, FCHVs hold 11 (ranging from 12-20 depending on the district) mothers' group meetings every year. The median number of attendees is 15, with a variation from 5-12, depending on the district.<sup>117</sup> Overall, the majority (61%) of FCHVs feel supported by their local mothers' groups.<sup>117</sup>

A nationally representative survey of 4,302 FCHVs carried out in 2014 revealed that 64% of FCHVs reported that immunizations were provided in the ward where they worked. Almost all (91%) of FCHVs in these wards reported that they supported these immunization activities.<sup>118</sup>

This same nationally representative survey of 4,302 FCHVs carried out in 2014 revealed that virtually all (99%) reported that they had participated in the most recent round of vitamin A distribution.<sup>118</sup> This same survey indicated that half (52%) had provided oral rehydration solution (ORS) during the previous 3 months, and 44% had given zinc along with ORS to treat diarrhea during the same period. Among FCHVs who treated at least one child for diarrhea during the previous three months, the average number of cases treated was 8.3, and all of these also received zinc.

More than a decade ago, in an effort to strengthen Nepal's community-based treatment of childhood pneumonia, a technical working group consisting of MOH staff and in-country experts from several organizations (the United Nations, UNICEF, WHO, the United States Agency for International Development, and John Snow, Inc.) decided to test the capacity of FCHVs to manage childhood pneumonia at the community level using oral antibiotics.<sup>119</sup> A pilot study was conducted in which FCHVs in four districts were trained to identify danger signs of pneumonia and refer severe cases to health facilities. Pictorial training manuals and booklets were used for those who had low literacy levels. Initially it was found that providing training in community-based management of pneumonia led to a doubling in the total number of cases treated in the intervention districts compared to districts in which FCHVs had not received this training. Moreover, over half of the childhood pneumonia cases were treated by the FCHVs.<sup>119</sup> The program was therefore up-scaled and by 2007, it covered 42 districts with 69% of the nation's population of under-5 children. The program was expanded to include diarrhea and malaria as a community-based Integrated Management of Childhood Illness (CB-IMCI) services package, also called Integrated Community Case Management, or iCCM.<sup>119</sup>

The same nationally representative survey of 4,302 FCHVs carried out in 2014 revealed that 44% reported having examined a child for cough and cold during the previous three months and 24% had provided cotrimoxazole for cases of "possible pneumonia."<sup>118</sup> Among those who treated at least one case during the previous three months, the average number of cases treated was 8.8, almost half of whom (4.9) were given cotrimoxazole.

Nationwide, FCHVs have been able to give 90% of children aged 6-59 months vitamin A supplements twice each year. Coverage for deworming tablets is likewise high, with 84% of 6-59-month-old children receiving this medication.<sup>120</sup> Furthermore, one study in 20 districts found that each FCHV had treated on average during the previous six months 18 children with symptoms of pneumonia.<sup>117</sup>

In the 2014 survey of FCHVs, 93% reported that they had provided counseling to pregnant women during the previous 3 months and that they had seen on average 4 pregnant women over that period.<sup>118</sup> Another study reported that in one year, FCHVs counseled an average of fourteen pregnant women each.<sup>121</sup> Almost all FCHVs who counselled pregnant women reported

that they had recommended these pregnant women to obtain antenatal care (95%), obtain tetanus immunization (74%), take iron tablets (87%), and eat nutritious food (89%). One half of the FCHVs who had counseled pregnant women said they had advised these women to deliver in a health facility. Additionally, one-half of FCHVs reported that they distributed iron tablets to the pregnant women they counseled. In the districts of Nepal where the chlorhexidine (CHX) program had been implemented (for administration to the cut umbilical cord after birth to prevent infection), 29% of FCHVs said they had distributed CHX in the previous 3 months.

In the 2014 national survey, 97% of FCHVs reported that they had provided some family planning services in the previous 3 months, most often through counseling of pregnant or postpartum women. Two-thirds of the FCHVs reported that they gave counseling to other women as well.<sup>118</sup> 68% had distributed condoms during the previous 3 months and 67% had distributed birth control pills. One-third (31%) had referred women for sterilization and 45% had referred men for sterilization.

Distribution of misoprostol is a newly added component to the services of FCHVs. Misoprostol is a pill which produces uterine contractions and reduces the risk of postpartum hemorrhage when taken at home by the mother following a delivery. A pilot test was first conducted in one district to test the effectiveness of using FCHVs to distribute three 200 µg tablets to women residing in rural areas late in pregnancy.<sup>122</sup> Study results showed that after 18 months, 73% of recently delivered women had recently had given birth had received misoprostol (versus a coverage of only 12% at baseline). From those who were given misoprostol but did not take it, 75% delivered at a health facility and thus, were likely to have received oxytocin post-partum instead of misoprostol.<sup>122</sup> Two-thirds of those who took misoprostol at home took it in full accordance with guidelines provided by the FCHV.

This study found that the FCHVs were effective in achieving high population coverage of postpartum uterotonic medication in disadvantaged communities that are at higher risk of obstetrical complications.<sup>123</sup> Moreover, FCHVs (both literate and illiterate) were able to dispense misoprostol to women who cannot be reached by facility-based skilled providers. Such promising results prompted the government to upscale the misoprostol program to increase uterotonic coverage in areas where utilization of health centers for delivery is uncommon.<sup>115</sup> Misoprostol was also added to the National Essential Drug List in 2009. By July 2010, a national expansion of misoprostol was approved.<sup>115</sup> As of 2014, community-based misoprostol distribution had been expanded to 32 districts.<sup>116</sup> However, the nationally representative survey of 4,302 FCHVs carried out in 2014 revealed that in districts where misoprostol was distributed by FCHVs, only 10% of FCHVs reported having distributed the commodity during the previous three months.<sup>118</sup>

### **Quality of care**

We are not aware of any quality of care studies that have been carried out of CHW in Nepal.

### **Coverage of services**

As shown in Table 5, Nepal has a surprisingly high level of coverage of basic maternal and child health (MCH) services given the challenging mountainous terrain and long-term political instability that has permeated the country. Even though coverage levels were fairly high in 2006, they have continued to improve according to the most recently available data, particularly in terms of antenatal care and skilled birth attendance. It is not possible to specify the exact contribution of FCHVs to these relatively high levels of coverage, but there is no doubt that their contribution has been significant. The achievement of 50% coverage of children with symptoms of pneumonia who were taken to an appropriate provider is relatively high compared to many other countries. In Ethiopia, for example, comparable level is only 30% (Table 2).

Evidence from one district in Nepal<sup>124</sup> indicates that when FCHVs completed a 6-day training on community-based newborn care, outcomes were more favorable in the poorest households, demonstrating the pro-equity nature of FCHV interventions. The poorest households had the greatest increases in coverage in health facility delivery, knowledge of at least three newborn dangers signs, breastfeeding within 1 hour of birth, at least one antenatal visit with a skilled provider, at least four antenatal visits from any provider, and birth preparedness.<sup>124</sup>

In spite of the relatively high levels of coverage, contact with FCHVs for treatment of childhood illness is still limited. According to one study<sup>125</sup> from the mid-western region of Nepal, among 446 caretakers whose child had taken ill, two-thirds (67%) had never obtained care from an FCHV for their child, and the main reasons given were that the FCHVs lacked medicines and they were not perceived to be sufficiently competent to treat sick children.

**Table 5. Changes in national coverage of basic and essential services in Nepal over the past decade** <sup>25,126</sup>

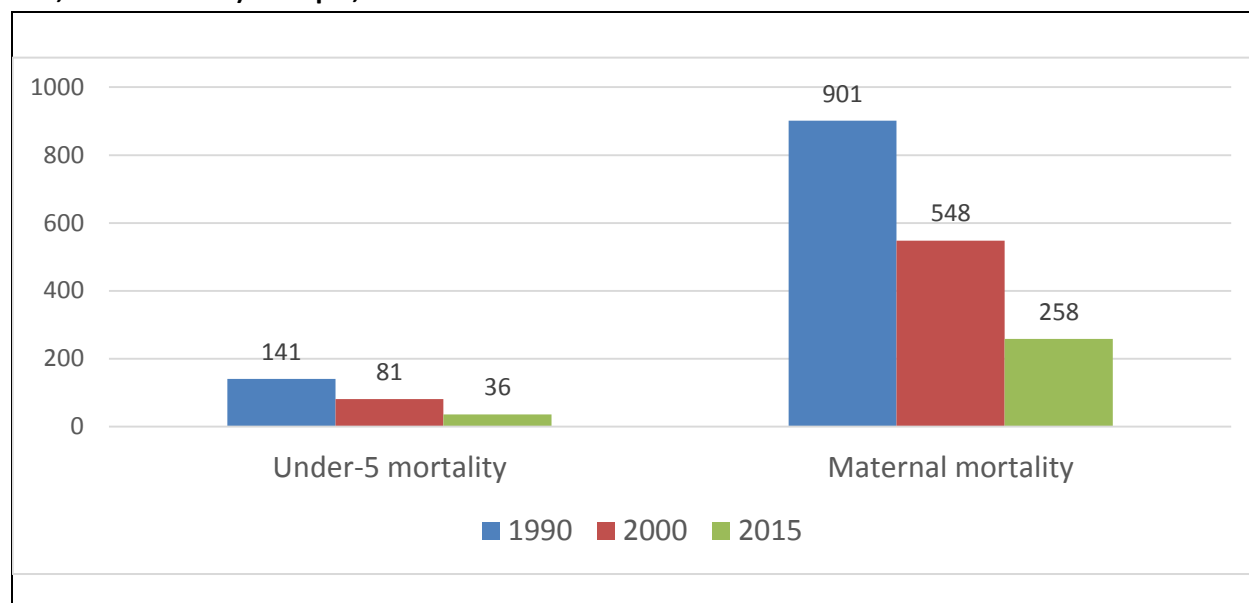
Indicator	Previous coverage levels	Current coverage level
Immunization against measles, Hib (3 doses), DPT* (3 doses) and pneumococcal vaccine (3 doses)	DPT3 89% and measles 85% (2006)	88-92% (2014)
Percentage of children who are moderately or severely underweight/stunted	39% underweight 49% stunted (2006)	30% underweight 37% stunted (2014)
Percentage of infants <6m who are exclusively breastfed	53% (2006)	57% (2011)
Percentage of children with symptoms of pneumonia taken to an appropriate provider	43% (2006)	50% (2011)
Percentage of children with diarrhea receiving oral rehydration therapy/increased fluids with increased feeding	41% (2006)	46% (2011)
Percentage of women obtaining at least 4 antenatal care visits	29% (2006)	50% (2011)
Percentage of births attended by skilled health personnel	25% (2006)	56% (2014)
Contraceptive prevalence rate (currently married women, modern methods)	44% (2006)	43% 2011
Unmet need for family planning (percentage of women who do not desire a child in the next 2 years and who are NOT using a modern contraceptive method)	25% (2006)	36% (2014)

\*DPT: diphtheria, pertussis and tetanus

### Changes in health status

As shown in Figure 7, Nepal has made dramatic progress in reducing its under-5 and maternal mortality. The national fertility rate as reported in the 2011 Demographic and Health Survey is only 2.6.<sup>120</sup> Nepal achieved MDG 4 (for child health)<sup>30</sup> and, like Ethiopia, just barely missed achieving MDG 5 (for maternal health).<sup>31</sup> Again, the precise contribution of FCHVs to this decline is impossible to specify with precision, but given their widespread and documented achievements in expanding the coverage of MCH services, it is hard to deny that they have made an important contribution to this success.

**Figure 7. Changes in the under-5 mortality rate (per 1,000 live births) and maternal mortality ratio (per 100,000 live births) in Nepal, 1990-2015<sup>30,31</sup>**



### Costs and cost-effectiveness

Our review did not identify any reports of costs or cost-effectiveness of the CHW program in Nepal. However, given the minimal financial incentives that FCHVs receive along with the modest salaries of VHWs and MCHWs, together with the marked improvements in coverage of key interventions along with strong progress in reducing child and maternal mortality, the national CHW program should be highly cost-effective. This is an important area for further study.

### Selection

To become a FCHV, women must be a local resident and 25 to 45 years old.<sup>127</sup> Literate candidates are preferred, but if no such woman can be found, illiterate women are also accepted as long as they are willing to attend literacy classes. Preference is also given to those who are married and who have no more than two children, have completed primary education, are involved in social work-type activities in their community, lack involvement in any political party, and are from Dalit, Janjati, or other marginalized groups.<sup>116</sup> A sub-national study spanning twenty districts surveying 1,949 FCHVs found that 48% of the sample cadre had never gone to school, and approximately one out of every two FCHVs (47%) were illiterate.<sup>117</sup> The median age for FCHVs is 40 years, and the average FCHV has worked for twelve years.<sup>117</sup> Moreover, though women from disadvantaged backgrounds are supposed to be preferentially chosen, studies have found that those from the upper castes are actually overrepresented in proportion to their population representation.<sup>114,117,127</sup> Some local community members even perceived FCHVs from lower castes to be intentionally excluded from the selection process.<sup>127</sup>



Ideally, mothers' groups, composed of all the mothers from the FCHV's community, and VDCs work together to select FCHVs.<sup>127</sup> However, a nationally representative study found many FCHVs to be chosen by health workers, political leaders, or local elites.<sup>114</sup> In fact, mothers' groups were found to have been formed after the selection was made.<sup>114</sup> Moreover, in one study, community members observed favoritism to occur in the selection process.<sup>127</sup> They perceived that some were chosen based on informal networks, as many newly appointed FCHVs were related to local leaders and health workers. Nevertheless, a more comprehensive 2008 study<sup>117</sup> found that those served by FCHVs were in fact from poorer and lower-caste groups of the community.

## Training

All new FCHVs undergo basic training, which consists of two 9-day training sessions spaced two months apart. These are provided at the nearest health facility, usually a sub-health post. The training covers family planning, Community-based Integrated Management of Childhood Illnesses (CB-IMCI), nutrition, safe motherhood, and immunizations. Those who work in districts carrying out the Community-Based Neonatal Care Program (CB-NCP) receive an additional 7 days of training.<sup>116</sup> Refresher training occurs for 2 days every 6 months and every 5 years a 5-day refresher training is provided.<sup>114,127</sup> The Family Health Division of the Department of Health Services creates the health curriculum for all the training sessions, but the Nepal National Health Training Center (NHTC) is responsible for the general oversight of the training. The NHTC does not directly train the FCHVs, but rather trains the trainers at the regional level, who then go on to train district-level personnel.<sup>112</sup> In turn, those at the district level train health post personnel (i.e., Health Assistants, Assistant Nurse Midwives, and Auxiliary Health Workers) who then train the FCHVs.<sup>127</sup>

In the 2014 nationally representative survey, 96% of FCHVs reported that they had received the basic training.<sup>118</sup> According to another report, most FCHVs (82%) have completed both the basic as well as subsequent refresher trainings, although there is substantial variation among districts.<sup>117</sup>

A number of issues have been identified in the FCHV trainings. These include the fact that the basic training sessions are geared to be more knowledge-oriented than skills-oriented, undermining the practicality of the concepts learned.<sup>127</sup> Compounding the situation is the fact that FCHVs are regularly given new responsibilities without adequate trainings and, consequently, many FCHVs feel inadequately trained to perform these services.<sup>128</sup> Refresher trainings were also found to not occur regularly in all wards. And, in areas where they were more frequent, some FCHVs found them to be repetitive with rote teaching.<sup>127</sup> Similarly, some FCHVs perceived the quality of their training to be poor and believed that the facilitators' only interest was in reporting their attendance.<sup>128</sup> Illiterate FCHVs further felt constrained to learn

due to their inability to read. Nevertheless, even with its weak points, many FCHVs reported that overall they liked the refresher training because they liked learning new material and found it to be necessary in order to be able to teach people in community.<sup>127</sup>

Alongside the training sessions, the Nepal Family Health Program (NFHP) also sponsors a radio program entitled *Sewa Nai Dharma Ho* (Service is Reward). The broadcast was created specifically for FCHVs to update their knowledge on family health issues.<sup>114</sup> It also provides instruction on effective interpersonal communication to further aid the FCHVs in their home visits. The NFHP distributes supplementary learning materials to the FCHVs that correspond to the radio sessions as well.<sup>114</sup> Though almost all FCHVs (85%) cite their local health facility and training sessions to be the main source of information on health issues, 89% cite radio programs as an important source of information regarding health and/or family planning.<sup>114</sup>

## Role description

Even though FCHVs receive only 18 days of basic training and work as volunteers, they perform a surprisingly large number of different services to reduce child and maternal mortality.

### Tasks and services carried out

The FCHV facilitates one local monthly mothers' group meeting every month and leads discussions related to maternal and child health. FCHVs provide community-based counseling on safe motherhood, family planning, and child health. In addition to health promotion, FCHVs also manage cases of childhood pneumonia and neonatal sepsis.

Routine home visitation to pregnant women is being piloted in selected areas of Nepal, with evidence that these visits are effective in improving health newborn care practices such as thermal care, early and exclusive breastfeeding and hygienic cord care.<sup>129</sup> The identification and treatment of neonatal sepsis is provided by what is called the Morang Innovative Neonatal Intervention (MINI), which has been implemented in all 75 VDCs. If a newborn is classified as having Local Bacterial Infection (LBI), FCHVs treat this local infection with topical antibiotics. If the newborn is classified as having Possible Severe Bacterial Infection (PSBI), infants are given oral cotrimoxazole and are referred. Then the newborn is sent to a Village Health Worker or Maternal and Child Health Worker (the next level up in the health system) for an injection of antibiotics (gentamicin).

FCHVs distribute zinc and oral rehydration salts (ORS) for treatment of diarrhea in children; vitamin A capsules to those aged 6-59 months and mothers during the first 45 days postpartum; albendazole to children aged 1-<5 years and to pregnant women; condoms and oral contraceptive pills; and iron tablets to pregnant and postpartum mothers residing in districts participating in the Iron Intensification Program (IIP).<sup>116</sup> They also provide chlorhexidine (CHX)

to women who are eight-months pregnant to use for umbilical cord care after their baby is born.

In certain districts, misoprostol pills are also given at eight months of pregnancy to be taken after a home birth to reduce the risk of postpartum hemorrhage.<sup>116</sup> FCHVs counsel the mother on when to consume the misoprostol pills, their possible side effects, and the importance of informing the FCHV when the delivery occurs so that the FCHV can visit the mother.<sup>123</sup> A postnatal home visit is usually done within the first two to three days of birth. During that postnatal visit, the FCHV looks for danger signs (and if present refers the mother or her newborn to the local sub-health post), counsels on essential newborn care, dispenses iron and vitamin A tablets, documents the consumption of misoprostol tablets, and registers the birth in the civil registration system.<sup>123,130</sup>

During their meetings with pregnant women, FCHVs use a pictorial flipchart containing key maternal and neonatal health messages to counsel both the woman and any older household members present.<sup>131</sup> The three main messages delivered in these counseling sessions are to seek antenatal care, take iron tablets, and eat nutritious foods.<sup>117</sup>

Based on recent evidence that the application of the antiseptic chlorhexidine (CHX) reduces neonatal mortality when applied to the umbilical cord after home birth in certain settings, Nepal's Department of Health Services (DoHS) piloted a community-based distribution of 4% CHX for cord stump care in newborns in three districts. FCHVs provide 3 grams of 4% CHX gel in a tube to mothers while in their eighth month of pregnancy, and then they apply this to the umbilical cord following a home birth.<sup>115</sup> The FCHV also counsels the pregnant woman to (1) wash her hands with soap and water before applying the gel with her finger, (2) keep the cord stump untouched by any cloth for some time before the CHX application, (3) only apply the gel and nothing else, (4) keep the cord stump clean and dry.<sup>132</sup> Health facilities are likewise given CHX tubes for deliveries that occur there. The tubes are locally manufactured and go by the name of Kawach. Pictorial instructions are contained inside the box holding the tube.<sup>115</sup> The current bulk procurement price for single-use CHX tubes is 18Rs (US\$.023) per newborn.<sup>115</sup>

A formative study of CHX acceptability and a larger-scale pilot test were conducted, yielding promising results.<sup>133</sup> The pilot study, conducted in three districts, showed that, within only a year after beginning the program, seven in ten newborns in Banke District, six in ten in Jumla District, and about half in Bajhang District received the Kawach tubes.<sup>132</sup> Furthermore, a high proportion of mothers complied appropriately with the program protocol to apply a full tube at a single time within 2 hours of cutting the cord (68% in Banke, 77% in Jumla, and 70% in Bajhang). The Ministry of Health and Population (MoHP) thus decided to implement CHX nationwide in 2011.<sup>133</sup> As of 2014, the program had been introduced in 42 of the 75 districts, with a majority of the distribution done through FCHVs, Village Health Workers, and Maternal

and Child Health Workers.<sup>116</sup> The government plans to increase the program coverage to 63 of the country's 75 districts total by the end of 2015.<sup>116</sup>

Pilot projects to assess the capabilities of FCHVs to work with childhood injury prevention and hypertension control are underway.<sup>134,135</sup>

### **Hours worked, workload and productivity**

FCHVs usually work 6-10 hours in a given week, and they average 7.2 hours per week (about 1 hour per day on average). Notably, it was found that the great majority (75%) of FCHVs desire to put more time into their work.<sup>117,118</sup> Given the voluntary nature of their position, FCHVs are able to decide how many hours they want to work each week. Except for responding to acute illness and childbirths, FCHVs provide services in their spare time on their own schedule.<sup>121</sup>

### **Location of work**

FCHVs see clients at either the FCHV's or the client's house.<sup>131</sup> They generally walk or use public transportation to reach their clients, but some in the flatland regions use a bicycle for easier access.<sup>116</sup> Among respondents to the nationally representative survey, 57% reported that the primary location for providing services was the client's residence, while 29% reported that the primary location was in their own homes.<sup>118</sup> Almost all (95%) of FCHVs participating in this same survey indicated that they live in the ward where they work.

### **Population assigned**

Officially, there is one FCHV assigned to each ward, which consists of about 1,580 people. However, with 52,000 FCHVs in a country of 27 million, the ratio is likely to be one FCHV for less than 1,000 people.<sup>114,115</sup>

### **Incentives, compensation and motivation**

The FCHV is a voluntary position, but FCHVs receive some financial compensation for certain services. The most important incentive in monetary terms (from their perspective) is the dress allowance of 4,000 Rs (US\$37) annually, and virtually all FCHVs (96%) reported receiving this during the previous year.<sup>118</sup> They receive 200 Rs (US\$1.84) per day when attending training at health facilities and likewise are given the same amount when participating in national campaigns such as vitamin A distribution and immunizations.<sup>116</sup> The government has just doubled this amount to US\$3.68.<sup>118</sup>

The FCHV Program provides FCHVs with identification cards, uniforms and, in select locations, a bicycle. FCHVs receive free health care locally and access to small loans. According to one report,<sup>117</sup> the great majority (76%) of FCHVs had received their identification card. At the time of retirement (when FCHVs reach 60 years of age), the program provides a monetary gift of 10,000 Nepalese Rupees (approximately US\$100). However, studies have shown a large

discrepancy between the overall incentives the FCHVs are entitled to and what they actually receive.<sup>117,128</sup>

In 2002, the national government created local endowment funds as a long-term incentive for FCHVs and implemented this in 47 out of 75 districts. Managed by the local VDCs, these funds are placed in a local bank account and the interest accrued can be collected and used to support FCHVs.<sup>136</sup> The principal cannot be invaded. FCHV endowment funds are now established and managed by almost all VDCs and District Development Committees.

FCHVs can borrow money from this endowment fund for income-generating activities. In addition to national government contributions to this fund, some NGOs, VDCs and DDCs contribute as well.<sup>118</sup> In the 2014 national survey of FCHVs, virtually all (97%) reported having an FCHV fund in their VDC, and 60% reported having drawn on this fund (normally as a loan).<sup>118</sup>

The FCHV funds are generally in the range of 50,000-100,000 Rs (US\$461-921). Loans are generally in the range of 4,000-6,000 Rs (US\$37-55). But these funds are insufficient to cover even the most basic of FCHV costs such as dress allowances and refreshments for mothers' group meetings.<sup>137</sup> In fact, one study found that only 4% of FCHVs actually received income from an endowment fund (as opposed to a loan) to support their work.<sup>114</sup>

Surprisingly, FCHVs themselves believe that if they were provided with regular salaries, their local community would respect them less and negatively impact community utilization of their services.<sup>121,138</sup> In a qualitative study exploring perceptions of volunteerism in one district, FCHVs mentioned how community members often mistakenly believed that FCHVs receive regular payment for their services. This widespread public misconception was found to be a barrier to their work, threatening their social status.<sup>139</sup> A number of studies have found social recognition and value placed on voluntary work for the community are major factors motivating FCHVs to work.<sup>117,139,140</sup> Volunteering in response to a spiritual obligation has also been cited as a key motivator.<sup>121</sup>

The government also produces FCHV stamps and postcards to recognize the cadre's valuable contribution to the country.<sup>123</sup> To further recognize the FCHVs' contribution, the country designated December 5<sup>th</sup> to be National FCHV Day. A survey found that 75% of FCHVs had celebrated the event with their community.<sup>114</sup>

The recent 2014 national study of the FCHV program concluded that "FCHVs report they are happy as FCHVs, that communities appreciate their work, that their families and supervisors are supportive and that they are treated fairly and respectfully by the health workers at their health facility."<sup>118</sup>

### **Turnover/drop-out rate**

Of particular importance is the fact that the annual turnover rate for FCHVs is only 4%.<sup>117,118</sup> One half (53%) of FCHVs have served more than 10 years and only 20% have served for less than 5 years.<sup>118</sup>

### **Career advancement opportunities**

FCHVs with at least a Grade 8 education have the opportunity to become a Maternal and Child Health Worker (MCHW), a position described further below. Approximately one-quarter of the 3,129 MCHWs at present are former FCHVs. This is only a small proportion of the overall cadre of 52,000 FCHVs, but it does provide at least some hope and motivation, no doubt.

### **Supervision**

The FCHV is directly supervised by either a Village Health Workers (VHW) or a Maternal and Child Health Worker (MCHW). These are described further below. Though the VHW or MCHW is expected to visit the FCHV in her village at least once a month, most instead hold monthly meetings at the health facility with the FCHVs that they supervise.<sup>114,118</sup> Nevertheless, supervisors appear to maintain regular contact with their FCHVs.<sup>53, 55</sup> Almost all (96%) of recently surveyed FCHVs reported that they had met with their supervisor during the month preceding the survey.<sup>118</sup> These data are from a nationally representative sample of 4,302 respondents surveyed in 2014.

### **Relationship with the community/role of the community**

In general, studies have found FCHVs to enjoy a good relationship with their community. Almost all local residents trust and respect them, especially for home visits to care for mothers and newborns.<sup>141</sup> One study asked community members about their perceptions of their FCHV.<sup>142</sup> Generally they are seen as knowledgeable, disciplined, and providing a positive contribution to the community. However, one study from the mid-western region of Nepal<sup>125</sup> reported less favorable results. Child caregivers in three VDCs in three different districts perceived FCHVs as not having a desired level of competence. Some study participants also reported the presence of unfriendly attitudes of FCHVs that made them less inclined to utilize FCHV services.

In 2014, as part of a national survey of 4,302 FCHVs, a wide range of qualitative data were collected from stakeholders (community members, government officials at various levels, and peripheral health staff) through key informant semi-structured interviews and focus group discussions.<sup>118</sup> FCHVs are uniformly seen as a “key link between communities and health facilities and play an important role in promoting maternal and child health services.”

One of the important findings from this study is that FCHVs commonly accompany mothers for health services. The report concludes as follows:

As FCHVs establish close relationships with families, trust increases; so any programs that FCHVs facilitate are well-received by the community. Similarly, ... FCHVs have an important role in changing beliefs about health, resulting in increased utilization of health services.<sup>118</sup>

The qualitative part of this national study also found that FCHVs assist in arranging transport when emergencies arise and take on a broader leadership role in the village.<sup>118</sup>

### **Linkages with the health system**

Regarding the relationships of FCHVs with other health workers, not much information could be found in literature. FCHVs generally appear to enjoy good relationships with other cadres.<sup>143</sup> However, one study (conducted in the third-poorest district in the country) did find that more highly trained facility-based health care providers often lacked professional respect for the FCHVs in their district (70% of whom were illiterate) and some were even unwilling to work with FCHVs even though the FCHVs were strongly supported by the local communities.<sup>140</sup>

### **Logistical support**

The 2014 national survey of FCHVs found that one-half of FCHVs were lacking zinc (for treatment of diarrhea) and cotrimoxazole (for treatment of pneumonia). Almost half were lacking ORS packets, one-third were lacking birth control pills, and 41% were lacking condoms.<sup>118</sup> Thus, the logistical support system still appears to have weaknesses that seriously compromise the effectiveness of FCHVs.

### **Monitoring and data use**

To keep track of their clients, FCHVs maintain a pictorial register called the Health Management Information System (HMIS) 27, with 27 indicating the MOHP's form number.<sup>144</sup> In particular, the FCHVs record the different services they provide to a pregnant woman in their catchment area during her pregnancy as well as the services they provide to the newborn.<sup>145</sup> The HMIS 27 is submitted monthly to the FCHV's supervisor.<sup>145</sup> FCHVs also submit an annual report to their supervisor and to the local mothers' groups she works with.<sup>116</sup> A pilot program to implement a monitoring and evaluation system for FCHV patient encounters has been described.<sup>140</sup> Other components of the pilot monitoring and evaluation program include strengthened local leadership for the FCHV program, weekly supervisory meetings, and weekly trainings of FCHVs at the village level.

### **Other Community-based Health Agents: Village Health Workers (VHWs) and Maternal and Child Health Workers (MCHWs)**

Along with the FCHVs, there exist two much smaller other cadres who provide health services at peripheral facilities and in the community who are salaried: Village Health Workers (VHWs) and Maternal and Child Health Workers (MCHWs). VHWs are paid health workers who provide immunization services, family planning, and basic treatment services at peripheral health

facilities: PHC centers, health posts, and sub-health posts.<sup>116</sup> They also conduct outreach programs and work together with FCHVs, who encourage community members to attend such programs. Their work hours are from 10am to 5pm.<sup>143</sup>

VHWs are predominantly men and are required to have at least a Grade 10 education. They complete three months of training on family planning and maternal/neonatal and child health services.<sup>116</sup> Those who work in districts with CB-NCP undergo an additional five days of training. VHWs also receive refresher trainings as required.<sup>116</sup>

MCHWs provide the same services as VHWs but also provide antenatal, skilled deliveries and postnatal care at the health facility, and they do provide services outside of regular work hours.<sup>146</sup> MCHWs only work out of sub-health posts.<sup>116,146</sup> Both the MCHWs and VHWs receive a higher level of training than do the FCHVs. Each health post usually has at least one MCHW and one VHW.<sup>147</sup>

To become a MCHW, the candidate must come from the community, be female, married, and have at least a Grade 8 education. Similar to the VHWs, MCHWs complete three months of training on family planning and maternal/neonatal and child health services and a five-day additional training session if residing in districts that implement the CB-NCP.<sup>116</sup> Refresher trainings are conducted as required.

Qualified FCHVs can apply to become a MCHW and preference is given to them in the selection process.<sup>143</sup> Approximately 25% of all MCHWs were former FCHVs.<sup>148</sup>

Currently, there are 4,013 VHWs and 3,129 MCHWs in Nepal, compared to 52,000 FCHVs.<sup>116</sup> However, the number of VHWs and MCHWs is gradually decreasing, as the government is planning to upgrade VHWs and MCHWs to auxiliary health workers (AHWs) or auxiliary nurse midwives (ANMs), respectively, in an effort to professionalize its health workforce.<sup>116</sup> In 2011, there were 17,424 ANMs and 4,923 AHWs.<sup>149</sup> AHWs and ANMs receive more training and therefore are able to provide more skilled services than MCHWs and VHWs. The government does not consider AHWs and ANMs to be community health workers.<sup>116</sup>

## Conclusions and challenges

Nepal has made significant achievements in expanding access to PHC and in reducing its under-5 mortality rate, maternal mortality ratio, and total fertility rate given its mountainous terrain, dispersed and isolated communities, and long history of political instability. The important contributions made by the FCHVs, working only 7 hours a week, is remarkable, as is the long-term service of many of these women. It is widely acknowledged that the FCHVs in Nepal played a crucial role in achieving these goals.<sup>136</sup> Looking ahead, there are a variety of issues that, if addressed, can increase the effectiveness and reach of the FCHV cadre. These include



replacing the aging workforce; improving the supply of equipment and drugs; and expanding training, support and incentives to adjust for the growing number of responsibilities delegated to FCHVs.<sup>150,151</sup>

## Discussion

The national CHW programs in Brazil, Ethiopia and Nepal are among the strongest such programs in the world. They are widely viewed as making strong contributions to expanding access to basic health services, linking communities and health systems, and improving the level of health of the population, particularly for children and their mothers. And these three countries are global leaders in reducing child and maternal mortality. Although these three case studies demonstrate a notable diversity of operational approaches, they are also united by some important common themes. Table 6 directly compares some of the important operational characteristics of these three programs. The current review contributes to the existing literature on large-scale national CHW programs since there are few reports that focus on these programs in an integrated fashion.<sup>4</sup>

### Features shared by all three national programs

Some of the important commonalities are: (1) adequate numbers of CHWs to reach every household on a regular basis, (2) community engagement for selection of candidates to become CHWs, (3) strong linkages with the closest PHC facility, (4) strong supervision, (5) governmental salary support for the more highly trained CHWs, (6) effective support for needed supplies and commodities, (7) and strong support from the government and the communities themselves.

In all of the three CHW programs described, CHWs visit every household periodically. The Community Health Agents in Brazil visit each household monthly. HEWs in Ethiopia are expected to be carrying out home visits on alternate days that they are not in their health post, and the Health Development Army Volunteers (HDAVs) are closely connected to their neighbors' households since there is one HDAV for every 5-10 households. Although the Nepal VHVs and MCHWs are mostly based at a peripheral health post, the FCHV spends most of her time visiting homes and does not have a facility where she attends to individual clients.

All three national CHW programs require the CHW to be a resident of the catchment area that she will be serving, and all three programs engage the community in the selection of candidates for training. In Ethiopia, sometimes the requirement of residency has to be relaxed if there are no suitable candidates from the catchment area. Issues of political favoritism are sometimes issues in the community's preferences for selection of candidates, but nonetheless the process for community engagement is present.

Table 6. Summary of key elements of the national community health worker programs of Brazil, Ethiopia and Nepal								
Country	CHW name	Number currently active in country	Population per CHW	Length of training	Type of incentives/salary	Roles/ responsibilities	Supervision	Linkage to formal health system
Brazil	Community Health Agent (CHA)	236,000 (mostly women)	236,000 CHAs for 200 million people	CHWs receive 8 weeks of formal didactic training and 4 weeks of field training	Full-time salaried workers earning between US\$100-228 per month	Provide comprehensive care through promotive, preventive, recuperative, and rehabilitative services. Do not provide any diagnostic or curative services.	Supervised by nurses and physicians from the local clinics	Operate as members of the family health care teams that are managed by municipalities
			Working in 33,000 family health care teams that each provide services to 1,500-3,000 people	CHAs receive monthly and quarterly ongoing training		Register the households in the areas where they work  Empower their communities/link them to the formal health system  Promote breastfeeding; provide prenatal, neonatal and child care; provide immunizations; participate in management of infectious diseases  Frequently engage in health-related social problems such as gender-based violence, drug abuse, alcoholism, and so forth		
Ethiopia – cadre 1	Health Extension Worker (HEW)	38,000 (all women)	2 HEWs for 3,000-5,000 people  1 HEW for approximately 2,500 people	12 months of pre-service training	Formal employees and are paid a government salary (approximately US\$85 per month)	Promote health  Prevent disease  Treat uncomplicated, non-severe illnesses	Woreda (district) supervisory team: health officer, public health nurse, an environmental/hygiene expert, health education expert  A staff member of the primary health center visits the HEWs at their health post	HEWs are a formally recognized cadre that has strong political support, including from the MOH and prime minister  HEWs attend monthly meetings at the “parent” PHC Center

Table 6. Summary of key elements of the national community health worker programs of Brazil, Ethiopia and Nepal								
Country	CHW name	Number currently active in country	Population per CHW	Length of training	Type of incentives/ salary	Roles/ responsibilities	Supervision	Linkage to formal health system
Ethiopia – cadre 2	Health Development Army Volunteer (HDAV)	4 million (all women)	1 for approximately every 5 families	Informally trained by HEWs	Receive non-financial incentives such as formal recognition, ongoing mentorship, certificates, and recognition at community celebrations	Promote utilization of health post services and facility-based deliveries; assist with national health campaigns	Informal supervision by HEWs  Also linked to hierarchical Women's Development Army, a national political and governmental movement	Referral of patients in need of health care services  Support the work of HEWs  Support national health campaigns by mobilizing the community
Nepal -- cadre 1	Village Health Worker (VHW)	4,013 (mostly men)	1 per health post  1 per 5-10,000 population	3 months	Formally employed and paid by the government	Offer family-oriented services such as immunizations and management of newborn infections	Supervised by the facility manager	Based out of local health facilities that serve populations of 5,000-10,000 people
Nepal – cadre 2	Maternal and Child Health Worker (MCHW)	3,129 (all women)	1 per health post  1 per 5-10,000 population	3 months	Formally employed and paid by the government	Offer reproductive services for women	Supervised by the facility manager	Based out of local health facilities that serve populations of 5,000-10,000 people
Nepal – cadre 3	Female Community Health Volunteer (FCHV)	52,000 (all women)	At least 9 to serve 5,000-10,000 people  1 per 500-1,000 population	18 days	Non-financial incentives such as a clothing allowance and community recognition	Provide basic services and health education	Supervised by VHWs and MCHWs	Linked to local health facilities that serve populations of 5,000-10,000 people

In all three national CHW programs, there is a strong linkage of the CHW to a health facility. In Brazil, CHAs are in the health center almost every day at the beginning of the day, and they meet with other members of the PHC team on a regular basis. In Ethiopia, the HEWs attend monthly meetings at the PHC center they are connected to (even though this may require a walk of several hours), and supervisors from the district and supervisors from the PHC center are also regularly visiting the HEW at her place of work. In addition, the HEWs appear to be in frequent contact with the HDAVs for which they are responsible, but there is no direct linkage between a HDAV and health facility. The Nepal VHWs and MCHWs are supervised by the facility manager at the health post where they work, and the FCHVs are supervised by either a VHW or MCHW with whom they are in frequent contact.

Although the CHAs in Brazil do not utilize commodities, the HEWs in Ethiopia and the FCHVs in Nepal are reasonably well-stocked with the medicines and commodities they need. However, in both cases the logistical systems could be further improved. Nonetheless, the logistical support for these two programs appears to be far superior to that for many national CHW programs.

Stable government salary support is provided to the more highly trained CHWs in all three national programs. This includes the CHAs in Brazil (with 3 months of formal training), the HEWs in Ethiopia (with 1 year of formal training), and the VHWs and MCHWs of Nepal (with 3 months of formal training). The HDAVs of Ethiopia (who are informally trained by HEWs), and the FCHVs of Nepal (with 18 days of formal training) are unsalaried, though the FCHVs do receive some modest financial incentives intermittently.

All three national CHW programs have enjoyed strong political support at both the national governmental and local levels. In Brazil, PHC has strong political support, and CHAs are seen as an integral part of the PHC team. In Ethiopia, HEWs and HDAVs have received strong support from the national political leadership, and their role is now strongly appreciated by the local communities. In Nepal, qualitative studies have demonstrated strong support for the FCHV Program from the national to the community level, though political support for FCHVs at the highest levels in the ministry of health appears to be waning at present, unfortunately.

### **Features shared by two of the three national programs**

Two of the three national programs share important characteristics that are not shared by the third. We will highlight these here.

Two out of the three programs we reviewed have more than one cadre of CHWs. The Ethiopia CHW program has a dual cadre system (HEWs and HDAVs) while the Nepal program has a dual cadre system in which the higher-level cadre has two types of CHWs – one (the MCHW) that is focused on reproductive health services (mainly family planning, ANC and delivery care) while the other (the VHW) is focused on immunizations and curative care. The top of the dual cadre

dyad in Ethiopia (HEWs) are the main outreach service provider at the community level in terms of treatment of common illnesses and provision of family planning while in Nepal the bottom of the dual cadre dyad is the main outreach service provider.

Two out of the three programs (Brazil and Nepal) evolved slowly over a period of three decades, while the third (Ethiopia) was scaled up rapidly over a decade. The Brazilian CHA system started in one underserved area of the country (Ceará) and slowly spread as a result of popular support and continued evidence of effectiveness to reach national coverage of the lower-income population of Brazil. In Nepal, the program focused initially on vitamin A distribution, gradually scaling that up to achieve national coverage. Since then, new interventions have been slowly and gradually added, often on a pilot basis in a part of the country and then followed by national scale up.

In two national programs, CHWs have facilities in which they work part of the time to provide patient care. In Ethiopia, the HEWs spend approximately one-half of their time seeing patients in a health post. In Nepal, the MCHWs and VHWs also work out of a peripheral health facility and spend most of their time attending to patients there. The CHAs of Brazil are in close contact with the health center they are attached to and are often there on a daily basis to check in and attend meetings, but all of their day-to-day work with their clients takes place in homes.

### **Important differences among the programs**

In spite of their commonalities, each program, like all national CHW programs, is the product of a unique blend of the country's own historical, cultural and social influences along with its own health system and geographical characteristics. These three programs we have analyzed in this report have major differences, particularly in terms of (1) selection criteria, (2) length of training, (3) roles performed, and (4) size of the catchment area for each CHW.

With respect to selection criteria, HDAVs in Ethiopia and FCHVs in Nepal do not have to be literate. CHAs in Brazil are required to have a primary education. HEWs in Ethiopia should have a 10<sup>th</sup> grade education but this requirement is occasionally relaxed in isolated rural areas where the overall level of education is low. VHWs and MCHWs in Nepal require a Grade 10 and Grade 8 level of education, respectively.

In terms of training provided, two extremes of training are contained in the dual cadre CHW program in Ethiopia: HEWs there have one year of formal training while HDAVs have only a few hours of informal training. CHAs in Brazil as well as the VHWs and MCHWs in Nepal all receive 3 months of training while the FCHVs in Nepal receive only 18 days of formal training. While the CHAs in Brazil, the HEWs in Ethiopia, and the VHWs and MCHWs are formal government employees, the HDAVs in Ethiopia and the FCHVs in Nepal are volunteers who receive only formal community recognition and (in the case of FCHVs) some minimal financial incentives.

The roles performed vary substantially among the three programs. In Brazil, the work of CHAs is strictly for health promotion, detection of cases in need of referral, and facilitation of referral. In Ethiopia, HEWs are engaged in integrated community case management (iCCM) of serious childhood illness and provision of family planning services (injectable contraceptives and insertion of implantable contraceptives). In Nepal, FCHVs are engaged in iCCM as well as home-based neonatal care. In addition, FCHVs established their reputation internationally by achieving near-universal coverage of vitamin A distribution to children.

In terms of the size of the CHW catchment area, there is substantial variation. And of course, the population density and the length of travel times (usually by foot) required for CHWs to reach households varies by context, not only among the three countries but within them as well. In terms of full-time salaried CHWs, the CHAs of Brazil are responsible for a population of only about 600 people while HEWs are responsible for 2,500 people and the MCHWs and VHVs of Nepal have catchment areas of 5,000-10,000 people. In terms of the volunteer CHWs, the HDAVs of Ethiopia have a catchment area of only 23 people or so while the FCHVs of Nepal serve 500-1,000 people. The rural populations of Ethiopia and Nepal are quite dispersed, probably more so than in Brazil, so this makes the larger catchment areas there even more challenging.

### **Limitations of the available evidence and methodological challenges**

High-quality monitoring data from field operations of national CHW programs are not easy to come by. They require large-scale data collection methods. Internal monitoring data are often considered to be unreliable or biased and are not readily available to independent researchers. Independent assessments are expensive, and funds for independent researchers to assess program assessment have been limited. Much of the research cited in our review has been of conducted in selected geographic areas of national CHW programs, so whether the findings from these studies are representative of the national program is not known. Fortunately, Nepal has had several nationally representative studies of its FCHV workforce, but this has not been the case in Ethiopia or Brazil. One recent review of issues facing the Health Extension Program in Ethiopia identified the need for rigorous evaluation research prior to widespread implementation of program reforms.<sup>152</sup>

Additionally, there is a lack of carefully collected, independent observations of what is actually happening on the ground, along with a lack of studies that collect information directly from CHWs regarding their views of the work they do. One researcher made the following passionate call for action:

The substantial role and high value attributed to CHWs should call for vigorous research to learn about their labors and lives, including their daily social realities, priorities and concerns. Yet the reality is that such efforts are very limited, and we know little. Too

often, what we read about CHWs in NGO, government and donor reports, and what we now see and hear about them on YouTube presents little more than caricatures of humble and heroic health technicians who wield technologies including bikes, smartphones, forms, medicines, and diagnostics; who transmit information for monitoring and evaluation; and who save lives....<sup>153</sup>

Recent research based on 6 country case studies (include Ethiopia) has highlighted the sense of frustration among CHWs regarding their lack of control over their work and their sense of being underappreciated and undervalued in their work.<sup>154</sup> Funding has not been readily available to support this type of research, but it has the potential for improving relationships among CHWs, communities and health systems.<sup>155</sup>

It is difficult to determine the specific contribution of a national CHW program to national health improvements since these national health statistics are influenced by many socioeconomic and health system factors. Nonetheless, there is broad agreement that these three national CHW programs have been important contributors to expanding access to PHC services and to national improvements in health status. For some specific interventions, the contribution of CHWs is clearer, as for the expansion of family planning services provided by HEWs in Ethiopia or the expansion and high levels of coverage of vitamin A supplementation in Nepal. For some interventions, there is strong circumstantial evidence that CHWs have made important contributions as judged by their national reach, the kinds of services they provide, and the national progress in health status achieved as measured by indicators. One of the many examples that might be cited is the virtual elimination of childhood undernutrition in Brazil. The reach of regular home visits by CHAs in Brazil is nearly universal for the lower-income segment of the population, and promotion of good nutrition among mothers and children is one of the CHAs' core activities.

When the all the evidence is considered, the case that CHW programs in these three countries have been instrumental in making the national health gains possible is persuasive. Brazil, Ethiopia and Nepal are all global leaders among low- and middle-income countries in strengthening their PHC systems and in improving the health of their populations.

## Conclusions

Brazil, Ethiopia and Nepal have all developed national CHW programs that have been credited with making basic health services more accessible to their populations, improving household-related health behaviors, and to encouraging appropriate use of facility-based services. The programs have linked communities with health systems in ways that have improved population health. Even though each program could be strengthened, they nonetheless serve as models for what might be achieved by other national programs.

By developing outreach services with CHWs that reach every household, ensuring ready access to basic services either provided by the CHW in the home or at a nearby facility, facilitating referral to a higher-level facility when required, and providing continuity of care, CHWs have made themselves the foundation of these three countries' PHC systems. Team-based approaches that include CHWs are essential features of these systems as well, although each country program has its own unique characteristics. Consequently, these three CHW programs are widely viewed as integral to the strong progress that each of these countries has made to improve the health of their populations.

These three case studies clearly demonstrate that teamwork is essential for effectiveness. CHWs depend on strong linkages with the health system for training and continuing education, supervision, referrals, and logistical support. They also require strong linkages with the community and some level of ownership of the CHW program in the community. These three national CHW programs have achieved an effective balance of integration with the community and integration with the health system.

This review of the national CHW programs of Brazil, Ethiopia and Nepal provides an in-depth comprehensive up-to-date description of how these programs function, what their outputs are, what population coverage levels of key interventions have been achieved, and what the associated national changes in health status have been observed. As such, these case studies provide a useful point of reference for other countries that are seeking to strengthen their own national CHW programs. However, no one national CHW program can be exactly replicated in another country since each country's own unique context will naturally exert a strong influence on many elements of the program.

Brazil, Ethiopia and Nepal provide compelling evidence that primary health programs with strong outreach services provided by community-level workers who provide services down to the household level represent the most effective approach for health systems to improve the health of their populations. Thus, health for all can be achieved through PHC when the types of services described here in these three national CHW programs are available to all.



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## Appendix: Key Informants

### Brazil

Bornstein, Vera Joanne

Rio de Janeiro, Brazil

Giugliani, Camila

Porto Alegre, Brazil

Harris, Matthew

London, England

Torres, Aline

Porto Alegre, Brazil

Zanchetta, Magareth

Toronto, Canada

### Ethiopia

Abera, Zufau

Addis Ababa, Ethiopia

Baes, Kenneth

Oregon, Portland

Bisrat, Filimona

Addis Ababa, Ethiopia

Degefie, Tedbabe

Addis Ababa, Ethiopia

Prata, Ndola

Berkeley, CA

Tesfaye, Chala

Addis Ababa, Ethiopia

### Nepal

Hodgins, Steve

Washington, DC

Shiva Raj Mishra

Kathmandu, Nepal

Shrestha, Ram

Washington, DC