



RESEARCH NOTE

REVISED **The status of Ghanaian community health workers' supervision and service delivery: descriptive analyses from the 2017 Performance Monitoring and Accountability 2020 survey [version 3; peer review: 2 approved]**

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Abstract

Introduction: Community-based services are a critical component of high-quality primary healthcare. Ghana formally launched the National Community Health Worker (CHW) program in 2014, to augment the pre-existing Community-based Health Planning and Services (CHPS). To date, however, there is scant data about the program's implementation. We describe the current supervision and service delivery status of CHWs throughout the country.

Methods: Data were collected regarding CHW supervision and service delivery during the 2017 round of the Performance Monitoring and Accountability 2020 survey. Descriptive analyses were performed by facility type, supervisor type, service delivery type, and regional distribution.

Results: Over 80% of CHWs had at least monthly supervision interactions, but there was variability in the frequency of interactions. Frequency of supervision interactions did not vary by facility or

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supervisor type. The types of services delivered by CHWs varied greatly by facility type and region. Community mobilization, health education, and outreach for loss-to-follow-up were delivered by over three quarters of CHWs, while mental health counseling and postnatal care are provided by fewer than one third of CHWs. The Western region and Greater Accra had especially low rates of CHW service provision. Non-communicable disease treatment, which is not included in the national guidelines, was reportedly provided by some CHWs in nine out of ten regions.

Conclusions: Overall, this study demonstrates variability in supervision frequency and CHW activities. A high proportion of CHWs already meet the expected frequency of supervision. Meanwhile, there are substantial differences by region of CHW service provision, which requires further research, particularly on novel CHW services such as non-communicable disease treatment. While there are important limitations to these data, these findings can be instructive for Ghanaian policymakers and implementers to target improvement initiatives for community-based services.

Keywords

primary health care, community health workers, universal health coverage, Ghana, CHPS

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Any reports and responses or comments on the article can be found at the end of the article.

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REVISED Amendments from Version 2

We are grateful to the Dr. Ballard and Dr. Perry for their insightful peer-review comments. In this updated version, in response to their feedback, we have provided additional details regarding the community health worker training and salary structures; contextualized the community health officers as a type of community health worker; provided more detailed discussion about the supervision of community health workers at hospitals; discussed the implications of the 2016 guidelines in greater detail; included additional citations for some of the contextual data regarding the community health worker program in Ghana; and added to the limitations section describing survey biases in more detail. We have also included some clarifying text regarding the 2014 launch of the National 1 Million CHW program, which is distinct from other prior community health-related programs. Finally, we have corrected several prior typographical and grammatical errors.

No data, analyses, or figures have been added or changed. No changes have been made to authorship. We have no competing interests in regards to these updated changes, nor to the original content of the manuscript.

Any further responses from the reviewers can be found at the end of the article

Introduction

As the world strives to achieve Universal Health Coverage and the Sustainable Development Goals, primary healthcare is foundational to meeting these goals^{1,2}. Community healthcare systems serve critical roles within strong primary healthcare delivery²⁻⁴. The World Health Organization's recent guidelines⁵ for best practices of community health workers (CHWs) offer important guidance to policy makers and program implementers about how to develop strong community health service delivery and support low- and middle-income countries along the path towards universal health coverage. Among other key recommendations, these guidelines highlight the importance of professionally-trained CHWs with clear roles and responsibilities, supported by strong supervision systems to ensure quality service delivery⁵.

Ghana has a strong history of high-quality community-based primary healthcare delivery, including the development of the Community-based Health Planning and Services (CHPS) in 1994⁶, with significant expansion and strengthening of those services over the past 25 years. In recent years, the Ghana Health Service has developed a set of 15 steps and six milestones to guide CHPS implementation across the country^{7,8}. CHPS service delivery is based on the deployment of Community Health Officers (CHOs) throughout the country in CHPS zones. These CHOs – a type of community health worker in and of themselves⁹ -- work closely with the Community Health Volunteers (CHVs), who are responsible for home visits, community mobilizations, participation in health outreach services with the CHOs, and household health education⁸. More detailed descriptions of the roles and responsibilities of CHOs and CHVs are provided in [Table 1](#) and [Table 2](#).

In 2014, in conjunction with the global One Million Community Health Workers Campaign, the government of Ghana formally launched the National 1 Million CHW Program, with the goal of expanding high-quality community health services throughout the

country¹⁰. This program was designed to support the pre-existing community health programs that had been built to date¹⁰.

In order to address these challenges, a new cadre of health worker, was introduced in the National 1 Million CHW Program¹⁰. These CHWs are fully-employed workers, with a salary of approximately \$142 USD per month, under the auspices of the Youth Employment Agency¹⁰. According to the program design, these CHWs report directly to the CHOs, supporting them to provide first-level health care throughout the communities. Detailed descriptions of the CHW roles and responsibilities are included in [Table 3](#). The program set a goal of deploying over 31,000 CHWs throughout the country between 2014 and 2023¹⁰. By the end of 2019, the goal is to have achieved full rural coverage of the CHW program, involving approximately 28,000 CHWs. As of July 2019, approximately 26,000 have been trained and deployed, the distribution of which can be viewed on the program's [online data dashboard](#)¹¹ and [coverage map](#)¹².

CHWs are expected to spend 80% of their time in the community, providing these services via household visits. Per the program guidelines, the CHWs are intended to support the CHPS work, and are not supposed to be specifically attached to any hospitals^{8,10}. In practice however, after the program's initiation in 2014, anecdotal evidence suggests that many CHWs have been functionally reporting to, or interacting with, facility managers at hospitals.

To ensure the quality of their work, CHWs are expected to meet with their CHO supervisors at least quarterly and also interface with the CHVs during the course of their work, especially in the context of organizing community health-related gatherings and educational campaigns^{8,10}.

While the policies for training, supervision, and the responsibilities of CHWs are clearly delineated¹⁰ -- including twenty-eight weeks of pre-service training and one week update training twice yearly -- there is a paucity of data describing the current state of CHW service scale-up across the country, including how the CHWs' work relates to the work of the CHOs and CHVs. Given the extensive efforts that have gone into strengthening community-based health services in Ghana, understanding the present status of CHW services is important for policy makers and program implementers to target improvement initiatives for the future.

Here, we present data describing the supervision and activities provided by CHWs throughout the country. These data were collected from the facility surveys done as part of the 2017 round of the Performance Monitoring and Accountability 2020 (PMA2020) national survey¹³. Given the anecdotal evidence that some CHWs were directly interacting with hospital-level facilities, the survey asked these questions at all facility types, to best characterize the landscape of CHW work nationally.

Methods

Survey

The PMA2020 survey is a nationally representative, rapid-turnaround cross-sectional survey of family planning indicators among women of reproductive age (ages 15–49), and

Table 1. Roles and responsibilities of Community Health Officers (CHOs)⁸.

	Community linkage and outreach services	Key tasks
1	Health promotion and education	Organize health education and promotion through durbars and home visits; conduct community outreaches, record and report.
2	Disease surveillance	Identify diseases requiring prompt reporting, investigate outbreaks, do surveillance, report according to protocol.
3	Home visits	i. Routine house to house visit: day to day service delivery visits to households and individuals in their homes. ii. Special/Targeted: designate special clients; prepare and conduct home visits. Trace defaulters, follow up patients referred by hospital after discharge, and advise and support clients with non-communicable diseases like diabetes and hypertension. Document and report on these activities.
4	School health	Prepare activities, conduct health education and physical examinations, inspect environment, brief school authorities on findings, and write report.
5	Outreach activities	Prepare and conduct outreach activities; document and report.
6	Managing CHVs	Organize meetings, revise CHAPs, and submit reports.
7	Working with the CHMC	Conduct meetings, write community profiles, draw map of community, and give technical assistance.
	Basic clinical services	Key tasks
		A1. Child health
8	Immunization	Education, administration and management of vaccines, recording and reporting.
9	Breastfeeding (BF), growth monitoring, and nutrition	Education, BF support, weighing babies and children, recording, identifying malnourished children, education on prevention of malnutrition.
10	Acute care of infants and children (Integrated Management of Neonatal and Childhood Illness)	History taking; initial assessment; physical examination; identification, classification, and management (jaundice, diarrhea, ARI, fever, measles, ear infection); recording; referral if needed.
		A2. Reproductive health
11	Family planning	Counselling on all methods, education on preferred method, administration of method (i.e. condoms, combined oral contraceptive, injectable, implants), and referral for other or permanent methods.
12	HIV/AIDS and sexually transmitted infections (STIs)	Education, condom use, physical examination, preparing client and using rapid diagnostic test, giving feedback, appropriate management, and referring where necessary.
13	ANC	History taking, identification and management of anemia, malaria in pregnancy, syphilis in pregnancy, implementation of PMTCT activities, counselling pregnant women based on findings, and teaching danger signs in pregnancy
14	Safe emergency delivery and newborn resuscitation	Immediately assess mother, prepare for delivery, monitor labor, deliver baby, resuscitate if baby is not breathing well, and conduct active management of the third stage of labor.
15	Postnatal care (PNC) and essential newborn care	Conduct immediate PNC to mother and baby, educate family on PNC, assess baby and mother at 6 weeks.
		A3. Other clinical services
16	Infection prevention	Manage supplies; decontaminate, clean, sterilize, and store instruments appropriately. Dispose of waste properly.
17	Communicable diseases (HIV, malaria, TB)	Recognize signs and symptoms, refer, follow up, conduct home visits for TB. Perform HIV rapid test. Perform malaria rapid test and treat.
18	Non-communicable and chronic diseases (hypertension, diabetes)	Recognize signs and symptoms, refer, follow up, conduct home visits.
19	Neglected tropical diseases	Recognize signs and symptoms, refer, follow up, conduct home visits.
20	Adolescent health	Adolescent-friendly health services, counselling (e.g. FP, STIs and HIVs, nutrition), provision of services, referral as needed, follow-up and home visits.
21	Mental health	Assess and diagnose clients, give appropriate care, and treat if possible.
22	Minor ailments	Assess, diagnose, give appropriate treatment.
23	First aid and home emergencies	Identify signs and symptoms; diagnose and manage shock, snake bite, poisoning, convulsion and seizures, burns, sprains and strains, fractures and dislocations, and epistaxis; and wound dressing.
24	Caring for the Aged	Home visit to the aged to provide education on care and nutrition.

	Resource management	Key tasks
25	Planning	Plan activities monthly and implement them.
26	Logistics management	Request supplies, manage them, manage vaccines well, and keep CHPS compound clean.
27	Financial management	Keep value books, receive completed books, procure utilized books, and receive cash revenues and bank them daily. Collect cheques and bank them; manage petty cash.
28	National Health Insurance Agency	Record and submit NHIS claims.
29	Data collection, reporting, analysis, and use	Collect and record all data; analyses, interpret, and use for decision-making. Ensure that data is entered separately into the DHIMS2 for that particular CHPS zone.

CHV, community health volunteer; CHMC, community health management committee; CHAP, community health action plan; BF, breast feeding; ARI, acute respiratory infection; STI, sexually transmitted infection; ANC, antenatal care; PNC, postnatal care; PMTCT, prevention of mother-to-child transmission; TB, tuberculosis; NTD, neglected tropical disease; FP, family planning; NHIS, National Health Insurance Scheme; DHIMS, District Health Information Management System

Table 2. Roles and responsibilities of Community Health Volunteers (CHVs)⁸.

1	Disease prevention and environmental sanitation	Report any suspected epidemic-prone disease immediately to the community health officer (CHO); educate community members on proper environmental sanitation practices in their communities.
2	Home visiting	Prepare, conduct, and end visits appropriately.
3	Home management of minor ailments (integrated community case management)	Identify and manage fevers, diarrhea at home.
4	Community outreach	Participate, give health education, promote breast feeding, family planning, and wearing and removal of condoms. Equip oneself with home visiting bag.

water, sanitation, and hygiene indicators among households, in 10 countries¹³. Using a two-stage cluster design, households were selected to estimate the national modern contraceptive prevalence rate within 3%. In order to better understand access to family planning and primary health care in these countries, data were also collected on health care facilities where women received care. The methods used to collect data from health facilities in the PMA2020 survey have been described in detail elsewhere¹³. Briefly, health care facilities in each enumeration area were surveyed by trained enumerators, who used mobile data collection technology to interview the heads of facilities and upload the data into a secure cloud server. Data is uploaded as direct responses to the survey tool, as described elsewhere¹³. We analyzed the PMA2020 survey data collected in Ghana from September 2017 to November 2017 in the 100 enumeration areas surveyed throughout the country¹⁴.

In each enumeration area, a census of the public health facilities that serve the enumeration area was conducted to populate the list of survey facilities. Since the survey focused on the primary level of care, the district hospital that serves as the referral facility for all the surveyed facilities was also studied. Facilities of different sizes and levels, from CHPS facilities to health centers and hospitals, were selected to be included in the overall PMA2020 survey sample with the intent to represent

the variety of available health facilities in each enumeration area, which are utilized by the nationally representative sample of women of reproductive age.

We explored several aspects of CHW service delivery in Ghana. The PMA2020 survey collected data on whether facilities supported CHWs with supervision and/or supplies (yes/no), what type of facility was reporting CHW data (CHPS/health center/hospital), who at the facilities supervised the CHW (community health officer/public health nurse/midwife/health assistant/physician assistant), and how frequently the CHW was supervised. Frequency of supervision was categorized as days between supervision interactions. If “monthly” was reported, that was categorized numerically as every 30 days.

We also investigated the different types of activities CHWs were involved in, and how these varied by facility type and region. Supervisors were asked about activities and services offered by CHWs from their facility, in reference to CHW activities as defined in the National 1 Million CHW Program documentation¹⁰. While not included in the expected scopes of work for CHWs, we also investigated non-communicable disease treatment as a key priority area for potential future service expansion^{8,10}. All data analyzed had been collected as part of the PMA2020 survey, using the methods previously described.

Table 3. Roles and responsibilities of Community Health Workers (CHWs)¹⁰.

Condition	Monitor	Counseling and Prevention	Refer and/or Treat	Materials Needed
Case detection, mobilization and referral				
HIV/AIDS	<ul style="list-style-type: none"> Assess for danger signs Monitor for ART adherence Encourage compliance to 'Know Your Status' campaign Assess for danger signs 	<ul style="list-style-type: none"> Provide information and awareness about HIV and encourage testing at the health facilities Contact tracing Community / family member sensitization 	<ul style="list-style-type: none"> Refer HIV+ individuals for ART consultation, if not already participating Referral of suspected cases of TB Contact tracing for confirmed cases 	
TB				
Manage minor/common ailments and refer more serious afflictions; primary care for simple cases of diarrhea, malaria, acute respiratory diseases, wounds and skin diseases; conduct disease surveillance; submit written reports to the SDHT				
Diarrhea	<ul style="list-style-type: none"> Assess for diarrhea 	<ul style="list-style-type: none"> Provide household counseling on proper sanitary practices, water treatment, and environmental hygiene to reduce onset of diarrhea in their children Advise on household care of child with diarrhea. Emphasize continued feeding or increased breast-feeding during, and increased feeding after the diarrheal episode 	<ul style="list-style-type: none"> Administer ORS Zinc to children (6 months and older) who experience diarrhea and show signs of dehydration but have a MUAC measurement >125 and no indication of edema Provide caretakers with enough zinc supplements to continue home treatment for 10–14 days 	<ul style="list-style-type: none"> Oral rehydration salts Zinc Chlorine to purify water supply
Fever and Malaria	<ul style="list-style-type: none"> Assess for fever Monitor bednet ownership and correct usage Ensure coverage of newly pregnant women and newborns with LLINs 	<ul style="list-style-type: none"> Distribute bednets to households that do not possess them Replace damaged nets (hole greater than 5cm) and cover new sleeping sites 	<ul style="list-style-type: none"> Referral of pregnant women and children under 5 who show fever to a facility for proper check-up Provide ACT (Artesunate Amodiaquine Therapy) for RDT+ and referrals for RDT- in fever cases of children 6 and over Follow-up of all ill children until recovery after 2 days 	<ul style="list-style-type: none"> Malaria Rapid Diagnostic Tests ACTs
Pneumonia	<ul style="list-style-type: none"> Assessing fast breathing Assessing chest in drawing 	<ul style="list-style-type: none"> Provide household counseling on proper sanitary practices (handwashing, etc.) 	<ul style="list-style-type: none"> Administer first dose of antibiotic & refer URGENTLY to hospital if suspected severe pneumonia or other very severe disease If probable pneumonia, give oral antibiotic for five days & soothe the throat and relieve the cough with a safe remedy Follow-up of all ill children until recovery after two days 	<ul style="list-style-type: none"> Cotrimoxazole Paracetamol
Immunize and provide pre- and post- natal care				
Neonatal Care	<ul style="list-style-type: none"> Complete birth registration Conduct first visit within 48 hours of birth; bi weekly visits to a household with a newborn child Monitor EBF Monitor bednet usage 	<ul style="list-style-type: none"> Counsel on assessment for life-threatening conditions and physical and mental health of infants Encourage immunizations Counsel on EBF for first six months, keeping baby warm, care of umbilical cord, hand-washing with soap, newborn temperature management, and recognizing danger signs 	<ul style="list-style-type: none"> Refer any newborn children with danger signs to facility 	
Provision of family planning services and referrals				
Maternal Care & Family Planning	<ul style="list-style-type: none"> Enumeration of pregnant women Monitoring of ANC cards and whether a pregnant woman has received clinical care Conduct bi-weekly postpartum care visits to assess for danger signs 	<ul style="list-style-type: none"> Assess iron and folic acid compliance Review birth plans close to delivery Referral for delivery at health facility Distribute condoms and pills Condom promotion 	<ul style="list-style-type: none"> Referral for ANC services Refer to facility for long-term birth control methods 	<ul style="list-style-type: none"> Measuring tape Folic acid and iron pills Condoms Birth control pills

Condition	Monitor	Counseling and Prevention	Refer and/or Treat	Materials Needed
Safe sex education	<ul style="list-style-type: none"> Assess at risk sexual behavior, multiple sexual partners, alcohol use, long distance truck drivers 	Provide education on prevention and management of STDs (syndromic diagnosis)		
		<ul style="list-style-type: none"> Educate on condom use Educate on partner notification of status 	<ul style="list-style-type: none"> Refer for treatment and counsel on partner notification diagnosis and treatment 	
Cholera	<ul style="list-style-type: none"> Assess household sanitation and hygiene procedures and conditions Identify potential cases of cholera Record all cases in the community and identify water sources that may be contaminated 	<ul style="list-style-type: none"> Provide household counseling on proper sanitary practices, water treatment, and environmental hygiene Demonstrate preparation of home-based ORS, hand washing and water filtration Distribute materials such as soap, aquatabs, and bleach Distribute ORS 	<ul style="list-style-type: none"> Refer suspected cases of cholera or other serious cases of water borne illnesses to the health facility Administer ORS 	<ul style="list-style-type: none"> Oral rehydration salts Zinc Chlorine to purify water supply Soap
		Community and compound (house to house) level education on primary health care; education for health promotion and disease prevention; supervise and monitor sanitation efforts		
Water and Sanitation	<ul style="list-style-type: none"> Assess household sanitation and hygiene procedures and conditions Observe personal hygiene and behavior 	<ul style="list-style-type: none"> Provide household counseling on proper sanitary practices, water treatment, and environmental hygiene Demonstrate preparation of home-based ORS, hand washing & water filtration Distribute ORS 	<ul style="list-style-type: none"> Refer to facility serious cases of diarrhea or symptoms of cholera or other serious water borne illnesses 	<ul style="list-style-type: none"> Oral rehydration salts bags. Chlorine to purify water Soaps
		Provide nutrition education and care		
Nutrition	<ul style="list-style-type: none"> Assess for nutrition status Monitor mid upper arm circumference (MUAC) Conduct growth measurements Monitor for proper infant feeding 	<ul style="list-style-type: none"> Promote immediate and exclusive breastfeeding Promote locally appropriate complementary feeding, highlighting the nutritional value of traditional and locally available foods Educate on and monitor the use of iodized salt to prevent goiter Educate on proper food storage techniques 	<ul style="list-style-type: none"> Referral a child of six months or older to the facility if MUAC measurement <125mm and/or edema are present. 	<ul style="list-style-type: none"> Infant scales MUAC bands
		Supervise and monitor community volunteers and TBAs		
CHVs	<ul style="list-style-type: none"> Home visits, community mobilization, participation in health outreach services, health education 	<ul style="list-style-type: none"> Good and culturally-appropriate behavior, community diplomacy 	<ul style="list-style-type: none"> Conflict prevention, management and resolution 	
		<ul style="list-style-type: none"> Personal and environmental hygiene, clean and safe deliveries, hand washing education, clean materials for cord cutting 	<ul style="list-style-type: none"> Assessment of pregnancies, not to deliver primips, multiple pregnancies, breech Early referral for difficult labor 	

ART, antiretroviral therapy; TB, tuberculosis; SDHT, sub-district health team; MUAC, mid-upper arm circumference; LLIN, long-lasting insecticidal nets; ACT, artemisinin-based combination therapy; RDT, rapid diagnostic test; EBF, exclusive breast feeding; ANC, antenatal care; STD, sexually transmitted disease; TBA, traditional birth attendants; CHV, community health volunteer.

Data analyses

Analyses were conducted using descriptive statistics and figures to report on facility-reported supervision and activities of CHWs within the survey. To assess central tendencies and distributions of CHWs and how frequently they were supervised across different facility types we calculated medians, standard deviations (SD), and interquartile ranges (IQRs) by each facility type. We also calculated counts and percentages to determine who supervised CHWs at each facility type, as well as how frequently they were supervised by each facility and supervisor type. Finally, we examined the types of activities CHWs were performing by examining counts and percentages of each activity by facility type and region and created a heat map based on frequency of each activity. As the purpose of this study was descriptive rather than inferential, no null hypothesis testing was conducted. Any missing data are noted in the data tables. No imputation was done for the purposes of this study. Analyses were performed using Stata 15.1 (StataCorp, College Station, TX).

Ethical statement

This study was approved by the ethical review boards at the School of Medical Sciences / Komfo Anokye Teaching Hospital Committee on Human Research Publications and Ethics (Kumasi, Ghana; protocol CHRPE/AP/740/1.3), Johns Hopkins University (Baltimore, USA; protocol 7238), and Brigham and Women's Hospital (Boston, USA; protocol 2016P002284). All study participants provided informed, written consent.

Results

In 2017, 151 healthcare facilities were surveyed and of those, 86 (57%) facilities reported supporting CHWs. The 86 CHW-supporting facilities were distributed across all 10 regions in Ghana and included a mix of hospitals (33.7%), health centers (39.5%), and CHPS facilities (26.7%) (Table 4).

Nationally, there were more CHWs supervised on a per-facility basis at the hospital and health center levels than the

CHPS facilities (median number of CHWs per facility: 20, 10, and 4, respectively) (Table 2). Most CHWs were supervised by CHOs at health centers and CHPS facilities (74% and 78%, respectively), while hospital-based CHW supervision was managed by both CHOs (38%) and Public Health Nurses (62%) (Table 5).

Nationally, there was considerable variability in the frequency of supervision interactions between CHWs and their supervisors, and these data show that the majority (55.8%) of CHWs interacted with their supervisors approximately once per month (Table 6). An additional 25.6% of CHWs interacted with their supervisors more than once per month, meaning that over 80% of CHWs described in these data had at least monthly supervision interactions (Table 6). The frequency of interactions

Table 5. Characteristics of community health worker (CHW) distribution and supervision by facility type.

<i>Distribution of CHWs at each facility type</i>				
Facility Type	Hospitals	Health centers	CHPS	Total
Number	26	33	23	82
Median	20	10	4	6.5
IQR	31	11	3	16
Minimum	3	3	1	1
Maximum	123	158	12	158
<i>Who supervises CHWs at each facility type? n (%)</i>				
Facility Type	Hospitals	Health centers	CHPS	Total
Community health officer	11 (37.9)	25 (73.5)	18 (78.3)	54 (62.8)
Public health nurse	18 (62.1)	2 (5.9)	0 (0.0)	20 (23.3)
Midwife	0 (0.0)	2 (5.9)	4 (17.4)	6 (7.0)
Health assistant	0 (0.0)	0 (0.0)	1 (4.4)	1 (1.2)
Physician assistant	0 (0.0)	5 (14.7)	0 (0.0)	5 (5.8)

* Missing CHW count data on 4 sites. CHPS, Community-based Health Planning and Services; IQR, interquartile range.

Table 4. Regional distribution of facilities supporting community health workers (CHWs) included in the PMA2020 survey.

Region	Hospitals, n (%)	Health centers, n (%)	CHPS, n (%)	Total, n (%)
Ashanti	6 (37.5)	6 (37.5)	4 (25.0)	16 (100.0)
Brong Ahafo	2 (22.2)	5 (55.6)	2 (22.2)	9 (100.0)
Central	4 (40.0)	3 (30.0)	3 (30.0)	10 (100.0)
Eastern	4 (33.3)	3 (25.0)	5 (41.7)	12 (100.0)
Greater Accra	7 (77.8)	2 (22.2)	0 (0.0)	9 (100.0)
Northern	0 (0.0)	3 (100.0)	0 (0.0)	3 (100.0)
Upper East	1 (16.7)	3 (50.0)	2 (33.3)	6 (100.0)
Upper West	0 (0.0)	3 (75.0)	1 (25.0)	4 (100.0)
Volta	3 (37.5)	4 (50.0)	1 (12.5)	8 (100.0)
Western	2 (22.2)	2 (22.2)	5 (55.6)	9 (100.0)
Total	29 (33.7)	34 (39.5)	23 (26.7)	86 (100.0)

CHPS, Community-based Health Planning and Services.

Table 6. Frequency of community health worker (CHW) supervision interactions.

Days between interactions	Number	Percent
Daily	5	5.8
3	1	1.2
7	14	16.3
14	2	2.3
30	48	55.8
60	4	4.7
90	6	7.0
120	6	7.0
Total	86	100.0

did not seem to vary substantially by facility or supervisor type. CHWs based at hospitals, health centers, and CHPS all interacted with their supervisors at approximately the same frequency (median number of days between interactions: 30, 30, and 30, respectively) (Table 7). The frequency of supervision interactions did not differ between types of supervisors (public health nurses, CHOs, midwives), with a median of 30 days

between interactions for all supervisor types, except for the single Health Assistant supervisor included in the sample (7 days) (Table 7).

There was wide variability in the types of services delivered by CHWs, by both facility type and region, as described in Table 8 and Table 9. Of the activities that are expected to be

Table 7. Frequency of community health worker (CHW) supervision interactions by facility and supervisor types.

<i>Number of days between supervision of CHWs by facility</i>					
Facility Type	Number	Median	IQR	Minimum	Maximum
Hospitals	29	30	23	1	120
Health centers	34	30	0	1	120
CHPS	23	30	0	3	120
Total	86	30	16	1	120
<i>Number of days between supervision of CHWs by supervisor type</i>					
Supervisor Type	Number	Median	IQR	Minimum	Maximum
Community health officer	54	30	0	1	120
Public health nurse	20	30	23	1	120
Midwife	6	30	0	30	30
Health assistant	1	7	0	7	7
Physician assistant	5	30	0	1	120
Total	86	30	16	1	120

CHPS, Community-based Health Planning and Services; IQR, interquartile range.

Table 8. Community health worker (CHW) activities by facility type.

CHW activity	Overall*		Hospitals		Health centers & clinics		CHPS	
	No.	%	No.	%	No.	%	No.	%
Community mobilization	75	88.2	24	82.8	33	97.1	18	81.8
Health education	67	78.8	22	75.9	31	91.2	14	63.6
Outreach for loss to follow-up	65	76.5	21	72.4	29	85.3	15	68.2
Disease surveillance	61	71.8	19	65.5	27	79.4	15	68.2
WASH counseling	58	68.2	18	62.1	26	76.5	14	63.6
Enrollment in facility	56	65.9	20	69.0	26	76.5	10	45.5
Active case finding	54	63.5	17	58.6	24	70.6	13	59.1
FP counseling	47	55.3	14	48.3	24	70.6	9	40.9
FP Provision	45	52.9	12	41.4	21	61.8	12	54.5
ANC counseling	42	49.4	13	44.8	21	61.8	8	36.4
C-IMCI-iCCM	35	41.2	7	24.1	20	58.8	8	36.4
Immunization	34	40.0	15	51.7	12	35.3	7	31.8
Directly observed therapy for TB	32	37.6	11	37.9	16	47.1	5	22.7
Mental Health Counseling	25	29.4	9	31.0	12	35.3	4	18.2
Postnatal care	19	22.4	6	20.7	11	32.4	2	9.1
Non-communicable disease treatment [^]	19	22.4	6	20.7	10	29.4	3	13.6

* Data missing on one facility. [^]Not included in the national CHW guidelines. CHPS, Community-based Health Planning and Services; FP, family planning; TB, tuberculosis; ANC, antenatal care; C-IMCI-iCCM, Community Integrated Management of Childhood Illnesses – Integrated Community Case Management; WASH, water, sanitation and hygiene.

Table 9. Community health worker (CHW) activities by region.

	Overall*		Ashanti		Brong Ahafo		Central		Eastern		Greater Accra		Northern		Upper East		Upper West		Volta		Western	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Community mobilization	75	88.2	15	100	7	77.8	10	100	11	91.7	8	88.9	3	100	6	100	4	100	7	87.5	4	44.4
Health education	67	78.8	11	73.3	8	88.9	10	100	9	75	5	55.6	2	66.7	6	100	4	100	8	100	4	44.4
Outreach for loss to follow-up	65	76.5	10	66.7	6	66.7	10	100	11	91.7	7	77.8	3	100	6	100	4	100	7	87.5	1	11.1
Disease surveillance	61	71.8	13	86.7	8	88.9	7	70	10	83.3	6	66.7	2	66.7	6	100	4	100	5	62.5	0	0
WASH counseling	58	68.2	9	60	7	77.8	10	100	10	83.3	4	44.4	3	100	4	66.7	3	75	6	75	2	22.2
Enrollment in facility	56	65.9	8	53.3	7	77.8	7	70	8	66.7	6	66.7	3	100	6	100	3	75	8	100	0	0
Active case finding	54	63.5	12	80	8	88.9	4	40	8	66.7	6	66.7	2	66.7	5	83.3	4	100	5	62.5	0	0
FP counseling	47	55.3	8	53.3	3	33.3	8	80	8	66.7	1	11.1	3	100	3	50	3	75	7	87.5	3	33.3
FP Provision	45	52.9	4	26.7	4	44.4	8	80	6	50	1	11.1	3	100	1	16.7	3	75	7	87.5	8	88.9
ANC counseling	42	49.4	7	46.7	4	44.4	6	60	6	50	1	11.1	3	100	5	83.3	3	75	6	75	1	11.1
c-IMCh-CCM	35	41.2	7	46.7	3	33.3	4	40	8	66.7	1	11.1	2	66.7	3	50	2	50	5	62.5	0	0
Immunization	34	40	6	40	3	33.3	2	20	2	16.7	9	100	0	0	1	16.7	1	25	6	75	4	44.4
Directly observed therapy for TB	32	37.6	7	46.7	4	44.4	2	20	8	66.7	2	22.2	1	33.3	2	33.3	1	25	5	62.5	0	0
Mental Health Counseling	25	29.4	4	26.7	1	11.1	6	60	5	41.7	0	0	1	33.3	1	16.7	2	50	5	62.5	0	0
Postnatal Care	19	22.4	4	26.7	2	22.2	3	30	2	16.7	0	0	0	0	2	33.3	1	25	5	62.5	0	0
Non-communicable diseases [^]	19	22.4	3	20	1	11.1	3	30	4	33.3	0	0	1	33.3	2	33.3	1	25	3	37.5	1	11.1

* Data missing on one facility.

[^] Not included in the national CHW guidelines.

FP: family planning, TB: tuberculosis, ANC: antenatal care, C-IMCh-CCM: Community Integrated Management of Childhood Illnesses – Integrated Community Case Management, WASH: water, sanitation and hygiene

delivered by CHWs according to the National 1 Million CHW Program policies¹⁰, some services, such as community mobilization, health education, and outreach for loss-to-follow-up, were delivered by over three-quarters of all CHWs (Table 8). In contrast, other services, such as mental health counseling and postnatal care were much less common, being delivered by less than one third of CHWs nationally. Notably, while not included in the expected scope of work by national guidelines, 22.4% of CHWs were reported to be providing non-communicable disease treatment services. Regionally, there was great variation in service delivery, with some services, such as active case finding or immunizations, being delivered by all CHWs in one region but not delivered by any CHWs in other regions (Table 9).

Discussion

In Ghana, where there is a long-standing commitment to quality community-based primary healthcare, the 2014 National 1 Million CHW program was designed to strengthen the pre-existing community-based service provision. To date, however, there is scant data to understand the success of the program implementation. We have presented data that show variability in both supervision and the CHW activities provided across the country. Additionally, these data show very clearly that, while not designed to be posted to hospitals, hospital-supervised CHWs are common across the country. The details of these data offer several important insights to program implementers and policy makers for the future of strong community-based primary healthcare services in Ghana.

The variability in the frequency of supervision interactions between CHWs and their supervisors is notable, in light of national¹⁰ and global^{5,15} guidelines that aspire to consistent, frequent supervision systems for CHWs to ensure quality service delivery. The variability seems to be agnostic of facility type or supervisor type, and over 80% of the CHWs described here were reported to be interacting with their supervisors at least monthly, which is much more frequently than the quarterly goals set forth in the National CHW Program guidelines¹⁰. While more frequent supervision is likely beneficial, this reported variability in frequency of interactions offers a clear area for standardization throughout the program. Additionally, even amongst the CHW-supervisor pairs that are meeting national goals, it would be informative to investigate the ideal frequency of supervision in order to optimize limited resources.

Our data show considerable variability in the type of activities performed by the CHWs, and the degree of availability of each activity, across the different regions of the country. While this survey inquired about only a sample of the expected services included in the national guidelines¹⁰, it is clear that many expected activities are not yet being provided by CHWs, or only minimally provided in certain regions. Only three activities – community mobilization, health education, and outreach for loss to follow-up patients – were reported to be provided by the CHWs affiliated with more than three-quarters of surveyed facilities nationally, and even these were not universally available throughout all regions. Multiple other services that are included in the national guidelines, including antenatal care (ANC) counseling, community-based integrated management

of childhood illness, immunization services, mental health counselling, and post-natal care, were reported to be provided by less than half of CHWs nationally, and far fewer in some regions.

At the regional level, we also found variability in service provision, with some regions' facilities reporting much higher provision of CHW activities than others. In particular, the Western region reported especially low rates of CHW services provided, with all activities except family planning provision (88.9%) being provided by CHWs affiliated with less than half the facilities, and six expected activities being provided by no facility at all. The Greater Accra region also had lower provision rates of many activities, which may be related to differential implementation of the CHW program within the larger urban area, where services might be provided by other actors and facility types, unlike the more remote areas.

Our data show evidence of an expanded role for CHWs, beyond that specified in the national guidelines. All regions except the Greater Accra region reported CHW provision of non-communicable disease treatment. While these data only describe what the facility managers reported, and thus cannot provide insights into the details of these non-communicable disease services, nor the technical quality of their provision, this is an important finding. Given that these are not included in the national CHW guidelines, this demonstrates that there is at least some implementation of novel service delivery throughout the country. Some of these activities may be provided in the context of local pilot programs or community-based programs, although our survey data are not specific enough to elucidate those details. Regardless, given that non-communicable diseases are priorities for the national health sector⁸, this finding warrants further investigation to better understand the feasibility of CHWs providing these services at a high level of quality, and planning for potential inclusion in the national program in a more standardized manner.

Finally, our data show that, in eight of the ten regions, at least some CHWs are supervised by CHOs who operate from hospitals. These CHOs have been assigned CHPS zones in which they work with the CHWs, as mentioned on the [data summary page](#)¹². Given that the program is intended to support the CHPS work, and that the CHWs are supposed to spend more than 80% of their time in the community, this finding has important implications for the future of the program. Notably, it is plausible that the multiple types of community health cadres, with often-times overlapping or conflicting sets of job descriptions and service delivery guidelines, may have contributed to this phenomenon of CHWs being supervised by CHOs at hospitals. The new guidelines for CHPS were released in 2016⁸, which may help to clarify scopes of work among the different cadres supporting community health activities throughout the country.

Limitations

Our data have several important limitations. First, they are descriptive data only, which were collected in the process of the PMA2020 survey, which is not explicitly designed to study CHW activities. Thus, their level of detail is limited, and further

investigation is required to better characterize and understand the aforementioned findings.

Second, these data are from facility manager reports, who may have limitations in their knowledge, which may impact the quality and accuracy of these data. Relatedly, it is not possible for us to determine what percentage of the entire CHW population is accurately reflected in these data; there may be many CHWs who are not in frequent contact with these managers and thus not well-represented by these data. Additionally, since these data are all from facility managers, who may have their own inherent biases, it is quite possible that some of these data represent over-estimates of CHW supervision and activities.

Third, given that the methodology of the PMA2020 sampling strategy is not designed around CHW staffing, the collected data may not be optimal in all regions of Ghana, and importantly do not reflect the new 16-region geographical distribution, which was expanded from the prior 10-region distribution in early 2019. The new 16-region geographical distribution can be seen on the [Ghanaian Embassy site](#).

Finally, our survey inquired very specifically about “community health workers” during each facility survey, but given the multiple cadres involved in community health-related services throughout the country (including, for example, CHOs and CHVs³), it is plausible that some survey respondents may have provided answers that were not exclusively about the CHWs affiliated with their facility. Thus, our data may represent information about other community health-related cadres in Ghana. Further research and program planning should include survey methods to more explicitly differentiate CHWs from the other cadres, to ensure that the correct conclusions are attributed to the appropriate cohort of health workers.

Conclusions

We have presented descriptive data summarizing the current status of CHW supervision and activities in Ghana. These

data provide policy makers and program implementers helpful insights to inform targeted improvement initiatives throughout the country. Furthermore, these data can help to better inform ongoing monitoring and evaluation strategies of community health programming in Ghana. Other countries that utilize the PMA2020 survey methodology, or comparable survey methods, may consider using similar survey techniques, as described here, to better understand their national community health programming.

Data availability

Underlying data

All data used in this study are available via the [PMA2020 website](#). Per the data use guidelines of the PMA2020 databases, all PMA2020 datasets are free to download and use, although users are required to register for a PMA2020 dataset account. This is to ensure that data use can be appropriately tracked by the PMA2020 database managers. The request form must include a brief description of the research or analysis that the user would like to conduct using the requested data. If the research question is not clear, the database managers of PMA2020 may follow-up for further clarification. Once users are granted access, a zipped folder with the compressed dataset, brief user notes, and survey questionnaires will be made available to the user. All data sets will be de-identified. Users can download the codebooks as well.

Grant information

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The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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 **Henry B. Perry** 

Department of International Health, Johns Hopkins Bloomberg School of Public Health (JHSPH), Baltimore, MD, USA

This is a valuable and important study. We need more independent national assessments of CHW programs published in the peer-reviewed literature, so this is a welcome addition.

- I would like to see a better description of the new CHW cadre in Ghana. How many are there now? How much training did they receive? Are they paid?
- In the limitations section, there should also be an emphasis on the fact that there is no way to know what percentage of the entire CHW cadre is being supervised since the survey only picks up reports from a representative sample of facility managers. There may be a significant percentage of CHWs that are not in contact with a facility or a supervisor and therefore may not be supervised. We can't tell from the data at hand.
- There should be an acknowledgement that CHOs are also considered to be CHWs themselves since they work both at CHPS health posts and in the community outside of the CHPS health post. It might be good to reference the national CHW case study of Ghana that is reported in Perry *et al.* (2017¹).

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Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Community health and primary health care

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 13 Aug 2019

Dan Schwarz, Brigham and Women's Hospital & Harvard T.H. Chan School of Public Health, Boston, USA

We are grateful to Dr. Perry for his thoughtful comments. In version three of this manuscript, we have attempted to address these comments, adding clarifying text throughout the manuscript, additional citations, and correcting prior typographical errors.

Competing Interests: We declare no competing interests.

Reviewer Report 25 June 2019

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Madeleine Ballard 

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The authors are to be commended for their succinct yet comprehensive overview of Ghana's multi-layered community health delivery structure and clear presentation of descriptive

statistics regarding supervision and service delivery.

A few small edits worth considering:

1. The 2016 CHPS Policy notes that there had been confusion about the basic minimum service package due to conflicting messages from different levels of the health system. While the 2016 policy clearly defines a minimum package of services, it may be worth noting in text that this earlier confusion may be one reason for the variability noted and that the newly issued guidance may *potentially* have rectified some of this variability in the years between the survey and now.
2. In many countries, CHWs are only attached to the lowest level of care (e.g. community clinic), not district hospitals. It would be worth noting for the reader the policy in Ghana - are CHWs supposed to be attached to district hospitals or is that a quirk of implementation?
3. In the limitations section, it is noted that the quality and accuracy of the data may have suffered due to incomplete knowledge on the part of facility managers who provided it. Given the interests and responsibilities of the managers, would it not also be fair to consider the strong possibility of bias and potential that - if anything - the supervision frequency was overestimated rather than underestimated?
4. There are a few small typos:
 - Table 1: Incorrect bolding of #1.
 - Table 1: Inconsistent capitalization in key tasks of item 3.
 - Table 3: Inconsistent use of periods/full stops throughout the table.
 - Table 3: Inconsistent capitalization in "5 days & soothe the throat".
 - p. 12: Missing period/full stop "attributed to the appropriate cohort of health workers."

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Implementation science; community health policy design and implementation; quality of care

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 13 Aug 2019

Dan Schwarz, Brigham and Women's Hospital & Harvard T.H. Chan School of Public Health, Boston, USA

We are grateful to Dr. Ballard for her thoughtful comments. In version three of this manuscript, we have attempted to address these comments, adding clarifying text throughout the manuscript, and correcting prior typographical errors.

Competing Interests: We declare no competing interests.

Comments on this article

Version 3

Reader Comment 05 Sep 2019

James F. Phillips, Mailman School of Public Health, Columbia University, New York, USA

Commentary authored by:

James F. Phillips, MS, PhD[1]

Fred N. Binka, MD, MPH, PhD[2]

Commentary on:

The status of Ghanaian community health workers' supervision and service delivery: descriptive analyses from the 2017 Performance Monitoring and Accountability 2020 survey

by

Dan Schwarz, June-Ho Kim, Hannah Ratcliffe, Griffith Bell, John Koku Awoonor-Williams, Belinda Nimako, Easmon Otupiri, Stuart Lipsitz, Lisa Hirschhorn, and Asaf Bitton

Gates Open Research. 2019;3:1468. doi:10.12688/gatesopenres.12979.2

Background:

In May, 2019, Gates Open Research published an implementation scientific investigation of a program in Ghana that has assigned a new cadre of volunteer community health workers to an existing program of community-based nursing services.¹ Entitled “The status of Ghanaian community health workers’ supervision and service delivery: descriptive analyses from the 2017 Performance Monitoring and Accountability 2020 survey,” the paper was a carefully prepared appraisal of the question: Is supervision associated with a new program for assigning Community Health Workers (CHW) being effectively implemented? The program in focus represents Ghana’s response to an international initiative known as the One Million Community Health Worker Campaign which aims to expand community-based primary health care coverage throughout Africa.² Launched in 2014 in Ghana, the Campaign was intended to augment an existing program, known by the acronym, “CHPS,” for Community-based Health Planning and Services.³⁻⁵ The CHPS program was researched in the 1990s,⁶⁻⁸ adopted as national policy in 1999, and launched as a national scaling-up program in 2000.^{9,10} When monitoring during its first decade of operation showed that CHPS was not achieving its planned expansion goals, reforms were instituted that have accelerated CHPS coverage in the second decade of CHPS operation.¹¹ In this context of reform and action, the “One Million CHW Campaign” was also launched in 2014, with the goal of adding a cadre of semi-volunteer personnel, community services, and care to the existing CHPS agenda.^{2,5}

The CHPS program and the CHW initiative are being undertaken in conjunction with CHW deployment policy proliferation throughout sub-Saharan Africa.^{12,13} Evidence from cross-national literature reviews showing that deployment in rural settings of South Asia and sub-Saharan Africa can save lives¹⁴⁻¹⁸ has fostered international endorsement of the regimen of care that is known as “Integrated Management of Childhood Illness (iCCM),^{19,20} a core strategy for achieving universal health coverage (UHC) in resource deprived settings.²¹ Although the need to launch iCCM in Ghana is without question, research also attests to the need for careful primary impact appraisals wherever manpower for addressing this goal is added to an existing system of community based primary health care.²² Home visitation by CHW has been shown to have potential for mortality reducing impact among neonates,²³ and iCCM, if appropriately delivered, can accelerate reductions in childhood mortality.^{14,15,24-26} But, evidence also shows that systems thinking is critical to CHW success,^{27,28} and context specific evaluation is important since integration of CHW into the broader health system is critically important,²⁹ since systems differ markedly by country, and failure to integrate CHW into systems of work, supervision, leadership, and logistics can lead to interlocking problems and unanticipated adverse outcomes.^{30,31}

Comments on the Schwarz *et al.* publication:

It is against this contextual backdrop that we direct this commentary. The Schwarz *et al.* paper was a carefully conducted implementation study that is nonetheless pointless. If primary research had been conducted showing that CHW deployment program saves lives or improves health when it is functioning, then the quality or intensity of supervision of its large scale operation would be of paramount importance. But, in the absence of this primary evidence, implementation research does not matter. It is possible that the package of services that CHW are deployed to provide could save lives, if the services cited by Schwarz *et al.* are actually provided and if these workers do so in isolation of population exposure to other components of Ghana’s primary health care system. But, there is ample reason to question whether the addition of a cadre to CHPS, as envisioned by the 1

Million CHW campaign, is sound:

Has primary research demonstrated that supplementing CHPS with CHW adds value? The CHW program was piloted as an add-on to the Millennium Village Project (MVP) in six districts of the Ashanti Region. When the MVP was replicated in study districts in the Northern and Upper East Regions, the project had only marginal effects on some health indicators, and no discernible survival impact.³² Primary impact research on CHW deployment is needed: Adding CHW to a failed MVP strategy may or may not add value to services already provided by CHPS. The survival effects of adding CHW to Ghana's system of primary health care remains unknown.

The concept of phasing research methodologies is important in this instance. The Schwarz *et al.* article is an application of implementation science, a type of health systems investigation that assesses the causes, consequences and challenges associated with bringing to scale proven improvements in health technology, service quality, or changes in systems of care.^{33,34}

Investigating the gap between innovation potential and actual system functioning can be the subject of a wide variety of types of investigations involving experiments, qualitative diagnostic research, or quantitative appraisals of system functioning. However, Holl such work is predicated on the prospect that the concept in question is, in fact, proven to have potential benefits. This requires prior completion of primary research establishing the fundamental value of changing operations according to a proven alternative to the extant system. Once the potential value of systems change is demonstrated, implementation research can be pursued to determine if change is actually happening, as planned, or if organizational or administrative interventions are required to improve the pace, coverage, or quality of the utilization of proven strategies, processes, or outcomes.

The principal limitation of the Schwarz *et al.* paper is its pursuit of secondary implementation research before essential primary impact research has been conducted. There is no evidence that deploying 20,000 volunteer CHW incrementally improves population health and well-being in the context of Ghana's CHPS program, with its existing extensive community-based staff deployment and service capability. Nor has the deployment of CHW been shown to effectively substitute for CHPS in localities where coverage CHPS coverage has yet to be established. A pilot of CHW deployment was conducted in six districts of the Ashanti Region, but the health and survival impact of CHW deployment were untested by this investigation.³⁵

Does the organizational design of the CHW program make sense? Key organizational and management features of CHW deployment in Ghana are unusual, and prospects for organizational challenges are likely. For example, CHW are deployed to the Ghana Health Service (GHS) system, but are not GHS employees. The program is implemented by the Ministry of Youth and Sports as a national large scale scheme for fostering employment of youth who are provided with two year contracts.⁵ Although CHW job descriptions are somewhat imprecise, policy documents specify clinical functions for CHW that resemble elements of the roles of CHPS nurses.⁵ Procedural integration of this new volunteer cadre into the national primary health care system with supervisory arrangements requires CHW to report to CHPS nurses or other primary health care paramedics. Although some documents of the 1 Million CHW Campaign suggest that CHW are health promoters rather than health providers,³⁵ the national goal is to supplement CHPS by adding a partially compensated CHW volunteer cadre that is employed by one ministry to supplement the clinical service work of another ministry. CHW training is managed by an international non-profit organization, not the manpower development programs of the GHS. The

impact of this organizational design remains unknown.

Does adding volunteer service providers to CHPS improve primary health care impact? The record of volunteer-based programs is mixed, at best, in Ghana.²⁰ For example, in the 1980s, UNICEF promoted a volunteer deployment scheme that was termed the “Bamako Initiative.”^{36,37} When the child survival impact of this approach was tested in a four celled trial in Ghana, the volunteer cell of the trial was found to have no child survival impact.^{38,39} Social mobilization activities of volunteers have proved to be crucial to effective family planning promotion, but their added value as independent health service providers has never been demonstrated in Ghana.⁴⁰ CHW have 28 weeks of training, as noted by Schwarz *et al.*. CHW are allowed to provide a first dose of antibiotics for acute respiratory illness and other primary care curative modalities, but not the full regimen of treatment that global policy pronouncements recommend. Their role is therefore best described as “partial iCCM,” augmented in some localities by tele-medicine support.³⁵ Unlike CHO, who are trained to provide a full regimen of family planning modalities, CHW are also partial family planning workers, allowed to distribute pills and condoms, but not to provide the more popular methods, injectables or subdermal methods. Partial systems of care, provided by lightly trained and poorly compensated workers, can introduce unanticipated clinical risks, particularly if substandard care diverts parental health seeking from competent sources of care.^{41,42}

Is there a need to increase community worker manpower density? While the 1 Million CHW Campaign was implemented in response to evidence that CHPS coverage was incomplete⁴³ subsequent actions of the Government of Ghana have rapidly increased CHPS coverage nationwide.⁴⁴ This has involved a major program of expanding the numbers of trained community nurses, in response to evidence consistently showing that the community deployment of trained nurses can save lives.⁴ A CHPS nurse, termed “Community Health Officer (CHO), has 18 months of clinical training augmented with a six month practicum assignment in primary care delivery. However, ever since the launching of the CHPS initiative in 2000, there have been more CHOs who are available for posting than there are locations where they can reside and provide care. Shortages of equipment, supplies, and facilities were the major impediment to expanding CHPS program implementation in its first decade of operation. In 2009, a comprehensive review of the CHPS program was commissioned by the Ministry of Health that identified organizational, leadership, and resource challenges as primary constraints to implementation.⁴⁵ At no point does this review recommend the addition of a new volunteer cadre. Rather, leadership lapses and resource shortages were found to be the critical barriers to expanding CHPS coverage in its first decade of operation. In response to this review, high level Government of Ghana commitment to CHPS was directed to increasing investment in the costs of CHPS geographic expansion. Ghana Health Service monitoring results suggest that geographic coverage of the CHPS program accelerated markedly since these reforms were instituted. Central to the reform agenda was expanding investment in community-based facilities where nurses could live and provide services. The volume of nurse recruitment and training was also expanded. This set of commitments appears to have worked. If rates of expansion achieved by 2012 have been sustained as planned, CHPS will reach all rural communities by 2021.⁴⁶

Is a systems perspective guiding CHW deployment? If rural workers provide the internationally endorsed regimen of integrated community case management for malaria, respiratory illness, and diarrheal diseases, health impact is highly likely to follow.^{47,19} But potentially effective services can

fail to have their intended impact if their introduction is counter-systemic. The 1 Million CHW Campaign workers are recruited and paid an honorarium of \$50 per month by the Ministry of Youth and Sports. Then, after training spanning 28 weeks, CHW are deployed to their home communities with instruction to liaise with GHS units where they are to be supervised by resident CHO with the expectation that CHW will provide services that supplement care provided by their CHO supervisors.⁵ The Schwarz *et al.* analysis focuses on the intensity of nurse supervision of CHW only, and not on the question of whether CHW are needed at all.

Does the addition of CHW solve CHPS operational problems? The CHPS initiative is encountering significant implementation challenges. The quality of its services are sometimes substandard,⁴⁸ management and supervisory lapses are problematic,^{49,50} CHPS outreach and referral activities are incomplete,^{51,50} links to the National Health Insurance Scheme are fragmentary, and leadership problems persist in many districts.⁴⁵ Official monitoring shows that coverage of functional CHPS units is still incomplete in some districts.⁴⁴ But, whether these problems are appropriately solved by adding 20,000 Ministry of Youth and Sports CHW to the overall system of care, or rather are best resolved by improving CHPS itself merits investigation. A trial of CHPS system reform has demonstrated ways to address such challenges.^{54,55} Other such trials are either completed or in progress⁵⁴⁻⁵⁷ some showing that CHPS can be an effective mechanism for the provision of essential primary care.^{8,9,47} What is needed next is a systems trial of CHPS reform that includes CHW, with a counter-factual condition that lacks CHW, followed by evidence-guided scale up of lessons learned.⁵⁸

Conclusion:

We have found no evidence to support the proposition that adding CHW manpower to the existing CHPS program saves lives, improves child health, or augments CHPS effectiveness in any way. If that evidence exists, then this literature should be cited by Schwarz *et al.* as justification for their implementation research project. Or, if this evidence does not exist, the Campaign's CHW deployment strategy merits the fielding of a trial with health indicators or survival endpoints. Then, based on evidence that the strategy can improve health or save lives in the context of the CHPS primary care program, there would be sound justification for pursuing implementation science that investigates the functionality of supervision in the scaled-up program. The rationale for conducting implementation science must be grounded in primary evidence that adding CHW volunteers to CHPS adds value. But, to the knowledge of the authors of this commentary, this evidence does not yet exist.

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Competing Interests: I have a longstanding collaboration with the Ghana Health Service --James Phillips