

Estimation of the Resources Required to Scale-up the Community Health Strategy Implementation in Kenya

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Abstract

The Kenyan Community Health Strategy (CHS), launched in June 2006 as one of the main strategies for achieving the goals in Kenya's second National Health Sector Strategic Plan, is incurring slow progress, partly attributed to financial constraints. Few studies have been undertaken to estimate the resource requirements for establishing community units (CUs) and undertaking CHS-related activities. Consequently, it is difficult for the Ministry of Health to make appropriate budgetary plans for the CHS implementation and expansion; and for counties, decentralized administration units operating in Kenya since 2013, to develop plans for the CHS.

This study estimates the financial resources required to increase the number of CUs and expand the CHS implementation across Kenya, while also identifying shortfalls in funding for scaling-up the implementation. The study employs a normative approach to establish the cost of expanding the CHS implementation to reach the entire Kenyan population within the 4-year period from 2014 to 2017. The cost of scaling-up the CHS under the Scheme of Service 2013 model, which increases the number of Community Health Extension Workers (CHEWs) and provides them with increased responsibility, is compared with the cost of the CHS-ICC 2010 scenario, which provides allowances to Community Health Workers (CHWs).

Under the Scheme of Service 2013 scenario, establishing a CU costs approximately Ksh 2.6 million and operating a CU cost relatively the same amount Kshs. 2.58 million per annum. Under the CHS-ICC 2010 scenario, establishing a CU costs approximately 3.0 million Ksh and operating a CU costs 18 million Ksh. The CHS-ICC 2010 scenario requires approximately 598,000 million Ksh to increase the number of CUs to cover the Kenyan population over the 4-years, while the Scheme of Service 2013 scenario requires approximately 168,000 million Ksh.

The CHS-ICC 2010 scenario utilises more resources to operate a CU than the Scheme of Service 2013 scenario due to a larger number of CHWs, requiring more resources for kit distribution and CHW monthly allowances. It is possible that at the completion of the 4-year period, more resources will be required to operate a CU under the Scheme of Service 2013 scenario as CHEWs may be promoted to higher positions with higher salaries. Additionally, a number of areas of the Scheme of Services 2013 scenario were not clearly described at the time of the cost estimation and may incur additional costs. There is scope for the government to increase revenue by increasing indirect taxes (such as VAT) and re-prioritizing the roll-out of the CHS across Kenya. However, the decentralization process currently occurring in Kenya is likely to incur significant costs, both for central and county governments, and affect government's ability to mobilize resources for the CHS. Furthermore, if counties are not clearly advised of funding expectations, some may not prioritize the CHS implementation and the national government may have to absorb unbudgeted CHS implementation costs to avoid undermining the implementation. Given the wide variations in implementation practices, the government should specify who will coordinate the CHS implementation and the extent to which the CHS implementation needs to be aligned across CUs.

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I. Background

Scaling-up the CHS implementation is high on Kenya's policy agenda to help effectively deliver 'tier 1' health care services to its people. Identifying the resources required to scale-up the CHS implementation will assist policy-makers to make appropriate decisions about resource allocation. In 2013, the Kenyan government introduced a county-based administration system in an attempt to produce stronger, devolved decision-making across the country. Each county must consider the budgetary implications of the CHS implementation and

develop plans to mobilize resources to roll-out the CHS within their own region. This study will provide policy-makers with an estimation of the resources required to scale-up the CHS implementation over a 4-year period.

II. The community-based approach and the Community Health Workers (CHWs) program

The Kenyan CHS mobilizes community health workers (CHWs) / community health volunteers (CHVs) to provide preventive care and undertake health promotion activities within local communities. CHWs / CHVs are community members who have received training to promote health or to carry out specific healthcare services, but are not health care professionals.

Health service delivery programs promoting the primary health care approach using community health workers (CHWs) have been established in many LMICs since the Alma Ata declaration in 1978 [1]. Although there are wide variations in the role of CHWs and the objectives of CHW programs between settings [2], the CHW approach has potential for improving: (1) the health status of people in the community (through a reduction in risk-taking behavior and uptake of health interventions); (2) non-health benefits for individuals (obtained through: the process of care and the exchange of information in the CHW intervention; the cultural appropriateness of the intervention; and the degree of autonomy afforded to patients in the treatment process); (3) non-health benefits to the community (such as changes in the wider community as a result of the program, e.g. community empowerment, sustainability, economic benefits including employment and production gains) [1]. The CHW approach also contributes to improving the cost-effectiveness of health care systems by reaching large numbers of previously underserved people with basic but high-impact services at a low cost [1].

A systematic literature review on the effectiveness of CHWs / CHVs found that they provide: (1) promising benefits in promoting immunization uptake and breastfeeding; (2) improved TB treatment outcomes; and (3) reduced child morbidity and mortality when compared to usual care models [3]. In addition, CHWs provide a critical link between communities and the health and social services system [2]; improve participant knowledge; and increase appropriate health care utilization for some interventions [4].

Factors that precondition the effective implementation of a CHWs program include the appropriate selection of CHWs, continuing education for CHWs, involvement and reorientation of health service staff and curricula and improvement of supervision and support [5]. In addition to these community and health system-related factors, the success of CHW's programs is also influenced by international, national, socioeconomic and political factors, such as political leadership and substantial and consistent resourcing [2, 6]. Furthermore, in order to address the issue of recruitment and retention of CHWs, further investigation is required on the role of CHWs, communications, routine supplies, improving performance and incentives systems [6].

A number of gaps in knowledge about CHW programs currently exists in the literature including: the effectiveness of CHW programs, particularly relating to the promotion of equity and access; the effectiveness of financial incentives provided to CHWs; and incentive models in terms of their affect on recruitment; retention and motivation [2]. In addition, there is a remarkable dearth of information on the cost-effectiveness of CHW programs [1, 2].

The limited literature available on CHWs suggests that CHWs increase the coverage of service delivery at a low cost compared with alternative modes of service organization, especially in the areas of primary health care; vaccination services; and TB control programs [1, 7, 8]. Conventional economic evaluation of CHW programs, particularly cost-effectiveness analyses, generally focuses too narrowly on health outcomes and the uni-dimensional measures of outcomes do not sufficiently cover all of the key aspects of CHWs programs (such as the non-health benefits for individuals and communities discussed above) [1, 8]. Consequently, further studies on the costs and cost-effectiveness of CHWs programs should adopt a broader and more holistic approaches [8].

Finally, given that coverage by community-based CHW programs is low [2], it is important to consider how such programs can be scaled-up and to ensure that sustained resources are available to support CHW programs and the workers therein, and to identify innovative mechanisms to maintain the sustainability of CHW programs [2].

III. Study context – Health care financing and ‘fiscal space’ for health in Kenya

Three types of health care financing mechanisms operate in Kenya: government-funded arrangements (tax-based); mandatory health insurance for formal sector workers; and voluntary health insurance (private commercial insurance and community-based insurance). Tax-based mechanism covers the majority of the population. Only about 10% of the population have health insurance [9]. All government health facilities charge user fees for service.

Government spending accounts for 29% of the total health expenditure in Kenya, while external funding and private health expenditure account for 35% and 36% respectively. Total health expenditure includes a high proportion of external funding. Out-of-pocket expenditure represents 74% of private health expenditure in Kenya, indicating that there may be inequitable access to health care services [10].

'Fiscal space for health' refers to the ability of government to devote more resources to the health sector without prejudicing the sustainability of its financial position. Assessment of fiscal space looks at: (1) the scope for greater government spending; (2) alignment of government spending with revenue; (3) the scope for increasing government revenue; and (4) the scope for re-prioritizing government spending[11].

In Kenya, government spending declined from 29.1% of GDP to 28.9% from 2010/11 to 2011/12[12]. Spending cuts were caused by reductions to recurrent budgets (from 21.2% of GDP in 2010/11 to 19.7% in 2011/12), while capital spending increased in the same period (from 7.9 to 9.2% of GDP)[12].

Government revenue declined from a peak of 23.9% of GDP in 2009/10 to 22.8% of GDP in 2011/12. In the first half of 2012/2013 tax revenues declined to 10.2% of GDP, against a target of 12.4%. The decrease of tax revenue is attributed to weaker value added tax (VAT) and excise duty collection. In 2011/12, VAT and excise revenues declined by 0.6% and 0.5% of GDP, respectively. Parliament's delay in approving the new VAT Bill, on which targets were based, partly explains the lower VAT collection. Collection of income tax, which accounts for about 40% of domestic tax revenue, increased by 0.2% [12].

General government expenditure on health is 6.5% of total government expenditure, lower than the average in the Africa region (9.6%) and that of the countries with similar economic status (i.e. low income countries) (9.3%), meaning that Kenya is well below the Abuja Declaration target of 15%. Approximately 50% of the public health budget is spent at the hospital level[12].

Although not significant, there is scope for the Kenyan government to mobilize domestic resources by introducing more efficient and effective VAT collection processes and increasing government spending. Given the current low rates of government health spending, re-prioritizing government spending is critical to expanding fiscal space for health in Kenya. It is important to note that the process of introducing the devolved county mechanism (the 'devaluation' process) is likely to increase total public expenditure by national and county governments, posing fiscal challenges over the next three years.

IV. Aim and objectives

The study aims to estimate the financial resources required to increase the number of community units (CUs) and expand the implementation of CHS across Kenya, while also identifying shortfalls in funding for scaling-up the CHS implementation. Community Units (CUs) are the basic organizational structure for the CHS implementation, and operate with a team that includes a facility-based community health extension worker (CHEW), a community-based CHEW and community health workers (CHWs) who all provide 'tier 1' services and refer community members to dispensaries or clinics linked to the CUs when facility-based care is required [13].

Specifically, the study will:

- Estimate the financial resources required to expand the establishment of CUs across the nation and implement CHS-related activities.
- Discuss the resource requirements for scaling-up the CHS in the context of health care financing in Kenya.
- Discuss sustainable financing options for scaling-up the CHS implementation.

V. Methods

The study employs a normative approach, specifying activities and levels of coverage, to establish the costs of expanding the CHS implementation to reach the entire population in Kenya within the 4-year period from 2014 to 2017.

5.1 The CHS implementation scenarios

The government has committed to introducing a new CHS implementation model (the Scheme of Service) which increases the number of Community Health Extension Workers (CHEWs) and provides them with more responsibility. Accordingly, the cost of scaling-up the CHS under the Scheme of Service 2013 model will be compared with the cost of the CHS-ICC 2010 scenario, the updated CHS implementation model, which provides an allowance to Community Health Workers (CHWs).

Under the CHS-ICC 2010 scenario:

- Community Health Workers (CHWs) act as service providers at the community level
- The number of households per CHW depends on the population covered by the CU
- CHWs are provided with a monthly allowance of Ksh 2,000

Under the Scheme of Service 2013 scenario:

- Community Health Extension Workers (CHEWs) support the delivery of health prevention, promotion and basic curative services at the household level
- CHEWs supervise Community Health Volunteers (CHVs)
- Each CU has 5 CHEWs, with one CHEW supported by 2 CHVs
- CHEWs undertake an initial 90-day training session (divided into 3 phases)

5.2 Data collection

The main sources of information were the Division of Community Health Services (DCHS) in the Ministry of Public Health and Sanitation and District Health Management Teams (DHMT).

Information was initially gathered through a review of DCHS records, interviews with relevant DCHS staff and telephone interviews with DHMT staff. Field visits to the DHMTs were undertaken by DCHS staff in order to validate the information gathered through the telephone interviews with DHMT.

The study used a stratified approach to select DHMTs for telephone interviews [14-16]. Representativity and feasibility were considered when making specific choices about samples and sample sizes. Given that the geographical diversity in Kenya is likely to influence the cost of implementing the CHS at any particular location, the study used an online list of established CUs [17] to compile information on the location of CUs within regions (the previous provincial administration unit), counties, and districts. Specifically, for the nomadic districts: (1) three nomadic districts in the North-Eastern region were randomly selected; and (2) two nomadic districts in the Rift Valley region were selected. For the urban informal settlements: (1) three urban districts were randomly selected from Nairobi county; and (2) two urban districts were randomly selected from Mombasa county. For the rural agrarian communities: two counties were randomly selected from each of the Central, Nyanza and Western regions (where most counties and districts are rural agrarian), and one rural agrarian district was selected from each county. For mixed regions: Two counties were randomly selected from each of the Coast and Eastern regions, where a mixture of nomadic and rural agrarian communities exist, and one district was randomly selected from each county. Using the above sampling strategies, the following districts were selected for the study:

- Nomadic districts: Garissa (NE), Ijara (NE), Wajir North (NE), Samburu East (RV), Narok North (RV)
- Urban districts: Embakasi (Nairobi), Kamukunji (Nairobi), Dagoretti (Nairobi), Kisauni (Mombasa), Changamwe (Mombasa)
- Rural agrarian: Kikuyu (CE), Mathioya (CE), Homa Bay (NY), Marani (NY), Butere (WE), Butula (WE)
- Districts from the mixed regions: Rabai (CO), Kinango (CO), Embu East (EA), Isiolo (EA)

Interviews were undertaken in a total of twenty districts, providing a sufficiently large sample to undertake meaningful analysis [14-16]. Additionally, given that only two people undertook the data collection and were constrained by the time available, the number of samples was considered manageable. The districts were selected to represent the urban informal, rural agrarian and nomadic variations in geographic location. In addition, field validation visits were undertaken in Nairobi, Muranga, Embu and Isiolo counties after the data has been collected from DHMTs in order to: (1) confirm the standard model of activities involved in the establishment of CUs and the operation and management of the CHS and determine whether the cost items associated with the standard model of activities were aligned with actual practices in the CHS implementation; and (2) validate the data collected through phone interviews against existing records at selected DHMTs.

5.3 Scope of the costing

The costing examined two dimensions of resource requirements (1) the establishment of CUs; and (2) the operation and management of CUs.

Activities considered in costing of the establishment of CUs encompassed:

1. Community Health Extension Worker (CHEW) training
2. Community entry meeting
3. CHS introduction (sensitization) meeting between village elders and DHMT with people in the community
4. Community health committee (CHC) training
5. Selection of community health workers (CHWs)
6. CHW training (basic training)
7. Household mapping
8. Household registration
9. Meeting of CHEWs and CHWs to collate household registration information
10. Provision of bicycles for CHWs/CHVs
11. Provision of motorbikes for CHEWs

12. Provision of starter kits for CHWs (the CHS-ICC 2010 scenario) / CHEWs (the Scheme of Service 2013 scenario)

The following activities were considered in costing the operation and management of CUs:

1. Household visits by CHWs / CHVs
2. Monthly data collation meeting of CHWs / CHVs and CHEWs
3. Community dialogue day
4. Community action day
5. Supervision of CHWs / CHVs by CHEW
6. Regular supervision of CHEWs by DHMT
7. Printing of manuals
8. Printing of operating tools
9. Salary / remuneration expenses for CHWs / CHVs and CHEWs

The scope of costing each of the activities involved in (1) the establishment of CUs; and (2) the operation and management of CUs is shown in the Annex. The cost items involved in implementing the standard model were identified through document review and telephone interviews with DHMTs on current practices in the establishment, operation and management of CUs.

VI. Results

Establishing a CU will cost approximately Ksh2.8 million and operating a CU will cost 18 million Ksh per year under the CHS-ICC 2010 scenario (Tables 1 and 2). Provision of starter kits to CHWs, provision of motor bikes to CHEWs and training of CHWs are the three major cost items and utilize a large proportion of the resources allocated to establishing CUs. Household visits by CHWs (requiring constant re-stocking of CHW kits), allowances for CHWs and salaries for CHEWs are the major sources of spending in the operation of CUs. Figure 1 shows the resource estimation for the CHS-ICC 2010 scenario by geographical zones. The Northeastern region uses more resources than other regions for both for the establishment and operation of CUs due to the large number of CHWs operating in the region. (The number of households allocated to one CHW depends on the population covered by the CU i.e. 500 households per CHW in high density areas; 200 in densely populated areas; 100 in medium density areas; and 50 in sparsely populated areas.)

Under the Scheme of Service 2013 scenario, establishing a CU will incur costs of approximately 3.4 million Ksh and operating a CU will cost approximately 4.6 million Ksh (Tables 3 and 4). Provision of motorbikes for CHEWs and CHEW training are the greatest costs in establishing a CU, while household visits by community health volunteers (CHV) and salaries for CHEWs are the major expenses in operating CUs.

Figure 2 compares the resources required to establish a CU under the CHS-ICC 2010 scenario and the Scheme of Service 2013 scenario. While the estimated costs of training (for CHEWs, CHCs and CHWs/CHVs) and the provision of transportation to CHEWs and CHWs/CHVs are higher under the Scheme of Service 2013 scenario, the provision of the CHW starter kit requires more resources under the CHS-ICC 2010 scenario. The higher costs associated with the CHW starter kit under the CHS-ICC 2010 scenario is attributed to a larger number of CHWs and the provision of a greater quantity of medicine and consumables (the Scheme of Service 2013 scenario provides a minimum list of medicine and consumables for CHW kits while the CHS-ICC 2010 scenario kits contain a wide range of medicines and consumables).

Figure 3 compares the annual resource requirements for operating a CU under the CHS-ICC 2010 scenario with the Scheme of Service 2013 scenario. The higher costs associated with running activities under the CHS-ICC 2010 scenario are attributed to greater resource use associated with the regular supply of a wide range of medicines and consumables in CHW kits and a larger number of CHWs using the kits. Although the CHS-ICC 2010 scenario provides a monthly allowance to CHWs and the Scheme of Service 2013 scenario does not give CHVs an allowance, the costs associated with human resources are almost the same under the two policy scenarios as there are a larger number of CHEWs, with greater salary requirements, employed under the Scheme of Service 2013 scenario.

Simulation of the costs involved in operating the CHS over four years was undertaken for the CHS-ICC 2010 scenario and the Scheme of Service 2013 scenario (Tables 5 and 6). Under the CHS-ICC 2010 scenario, approximately 598,000 million Ksh is required to increase the number of CUs to cover the entire population (population living below poverty line, which is 46-48% as per the KBS in Kenya over the 4-year period, while under the Scheme of Service 2013 scenario, approximately 168,000 million Ksh is required. For the CHS-ICC 2010 scenario, the 4-year costs were estimated with assumptions of: a 10-day CHW training course; a 5-day CHEW training course; 32 CHWs per CU (average number of CHWs in the 4 geographical zones); 2 CHEWs per CU; 2000 Ksh monthly allowance for CHWs; and, for the Scheme of Service 2013 scenario, with assumptions of: a 10-day CHW training course; a 90-day CHEW training course; 10 CHWs per CU; 5 CHEWs

per CU; and no allowance for CHWs. For both policy scenarios, a 10% annual inflation rate was included in the estimation of resources. Key differences between the two policy scenarios are the number of CHWs / CHVs and the number of CHEWs per CU, the nature and the length of CHEW training and the provision of an allowance to CHWs. In addition, as previously mentioned, the difference in the contents of the CHW / CHV kit for CHW / CHV household visits under the two policy scenarios (i.e. a comprehensive contents list for the CHS-ICC 2010 scenario and a minimum contents list for the Scheme of Service 2013 scenario) contributed to differences in the estimated cost of resources for CU establishment and operation.

Table 1: The CHS-ICC 2010 scenario: Estimation of the resources required to establish a CU

	Activity	Estimated cost per CU (Ksh)
1	Community Health Extension Worker (CHEW) training	41 700
2	Community entry meeting	9 000
3	CHS introduction (sensitization) meeting between village elders and DHMT with people in the community	9 000
4	Community health committee (CHC) training	125 450
5	Selection of community health workers (CHWs)	26 300
6	CHW training (basic training)	382 500
7	Household mapping	62 400
8	Household registration	6 400
9	Meeting of CHEWs and CHWs to collate household registration information	48 600
10	Provision of bicycles for CHWs	80,000
11	Provision of motorbikes for CHEWs	200,000
12	Provision of starter kits for CHWs	2 062 368
13	Total	2,842,368

In the Items 1-9 information was derived from GOK-GAVI supported costs in establishment of Community Units in 21 Districts in Kenya. Through the support the figures for the items were within the bracket of Kshs . 500,000- 600,000

Bicycles were costing 8,000 Kenya shillings and Ten (10) were being provided per every Community unit to support 10 CHWs. Two types of motor cycles were purchased to enable government respond to diverse demands according to the terrains and geographical contexts . One type of Motor cycle purchased was ‘Yamaha’ which can withstand rough terrains and presumed to be long lasting in use in these areas, while the other was a lesser quality to serve other parts. The average cost of the of the two Kshs. 200,000 has been applied as the cost of one .(See item 10 and 11 in the table above). One motor cycle was to be given in to each community unit in the 2010 context.

Table 2: The CHS-ICC 2010 scenario: Estimation of the resources required for CU management and operation

	Activity	Estimated cost per CU per year (Ksh)
1.	Household visits by CHWs	16 479 208
2.	Monthly data collation meeting of CHWs and CHEWs	154 213
3.	Community dialogue day	32 000
4.	Community action day	156 000
5.	Supervision of CHWs by CHEW	24 000
6.	Regular supervision of CHEWs by DHMT	12 000
7.	Allowance for CHWs	771 064
8.	Salaries for CHEWs	480 000
	Total	18 108 485

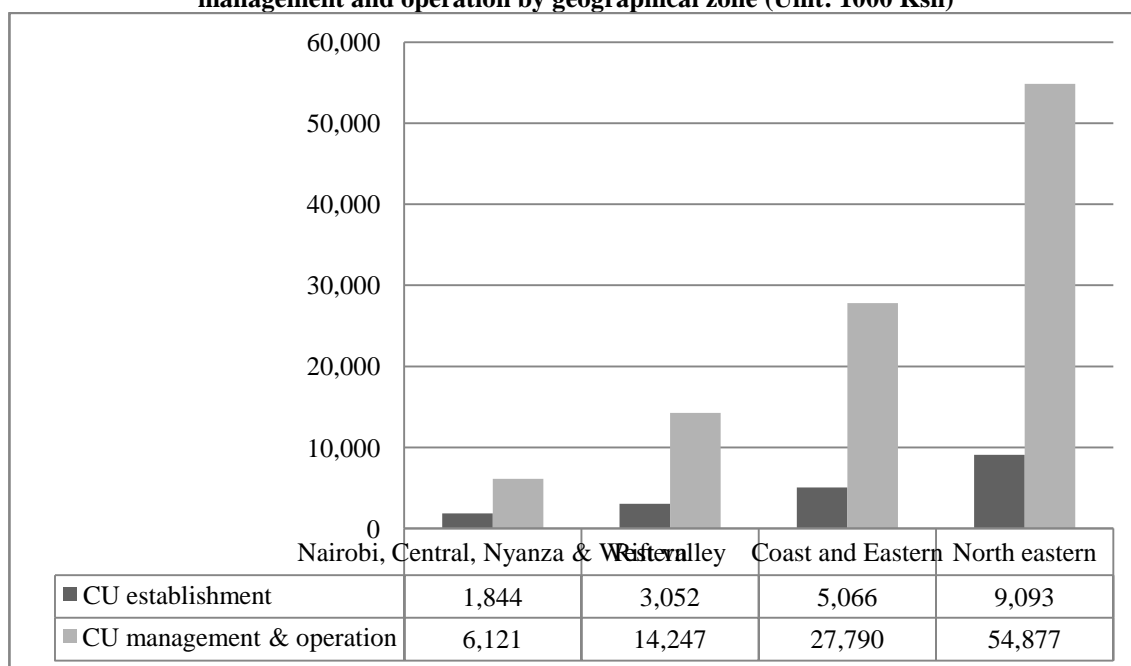
The CHWs whenever they Visit the Households, they need data, collection tools, contextual kit supplies and constant replenishments around the year and motivation to allow them deliver services effectively at the households.

Recurrent expenditure has to be factored to pay salaries for the two CHEWs per community unit at a rate of 20,000 Kshs per month.

A small budget has been factored also to continually engage the communities in the use of data generated from them for evidence based dialoging and actions which leads to focused use of locally available scarce community resources. The practice will enable strengthen appreciation by communities that health

problems are better solved by themselves getting more engaged and eventual sustainability through behavior change.

Figure 1: The CHS-ICC 2010 scenario: Estimation of the resources required to establish a CU and for CU management and operation by geographical zone (Unit: 1000 Ksh)



Different geographical contexts have diverse resource implications when it comes to establishment of community units and their maintenance. The reflection is that , it is cheaper in establishment of CHUs in Nairobi, Nyanza , Western and Central than it is in North Easter. This comes with the diversity in culture, beliefs , population densities and geographical differences.

Table 3: The Scheme of Service 2013 scenario: Estimation of the resources required to establish a CU

	Activity	Estimated cost per CU (Ksh)
1.	Community Health Extension Worker (CHEW) training	500,000
2.	Community entry meeting	15 000
3.	CHS introduction (sensitization) meeting between village elders and DHMT with people in the community	15 000
4.	Community health committee (CHC) training	119 610
5.	Selection of community health volunteers (CHVs)	32 300
6.	CHV training (basic training)	316 800
7.	Household mapping	38 600
8.	Household registration	2 000
9.	Meeting of CHEWs and CHVs to collate household registration information	32 500
10.	Provision of bicycles for CHVs	80,000
11.	Provision of motorbikes for CHEWs	1,000,000
12.	Provision of starter kits for CHEWs	114 495
	Total	2,057,995

Item 1 is based on institutional training of aCHEW at 100,000 per CHEW for the whole training. Each CHU is supposed to have five CHEWs in this model. Each CHEW then is supposed to have a motorbike and each one of them is supported by two (2) community health Volunteers which makes them 10 in a CHU. Item 9 may not attract any cost implication because the collation is being done by CHEW who is paid by the Government and it is presumed as part of their role and not CHV

Table 4: The Scheme of Service 2013 scenario: Estimation of the resources required for CU management and operation

	Activity	Estimated cost per CU per year (Ksh)	Remark
1.	Household visits by CHVs	240,000	
2.	Monthly data collation meeting of CHVs and CHEWs	0	Role is under the TOR for CHEWrecruitment
3.	Community dialogue day	44 000	
4.	Community action day	192 000	
5.	Supervision of CHVs by CHEW	60 000	
6.	Regular supervision of CHEWs by DHMT	12 000	
7.	Salaries for CHEWs	1,500,000	
	Total	2,048,000	

Item 1 is based on policy shift allowing payment of CHVs at 2000 per month x 10 CHVs x 12 months.
 Item 7 is based on cost of community health assistant salary which is 25,000 per month x 5 CHAs X 12 months

scale up of running Community Health Services										
SCENARIO 2010	F/Y	NUMBER OF CUs	Establishment cost in 2010 Scenario	6% inflation rate for Establishment for subsequent years	Total cost for CU establishment	Operational cost	6% annual increment for Operation	Cumulative CHUs	Annual total Cost	GRAND TOTAL
	2012/2013	650	2,842,368	2,842,368	1,847,539,200	18,108,450	18,108,450	2943	53293168350	55,140,707,550
	2013/2014	330	2,842,368	3,012,910.08	994,260,326.40	18,108,450	19194957	3273	62825094261	63,819,354,587
	2014/2015	330	2,842,368	3,193,684.68	1,053,915,944.40	18,108,450	20,346,654	3603	73308995875	74,362,911,820
	2015/2016	330	2,842,368	3,385,305.76	1,117,150,900.80	18,108,450	21,567,454	3933	84824795344	85,941,946,245
	2016/2017	320	2,842,368	3,588,424.11	1,148,295,713.79	18,108,450	22,861,501	4253	97229963355	98,378,259,068
										0
2013 SCENARIO										0
	2012/2013	650	2,233,805	2,057,995	1,451,973,250	2,048,000	2,048,000	2,943	6703104000	8,155,077,250
	2013/2014	330	2,233,805	2,367,833	781,384,989	2,048,000	2170880	3,273	7821680640	8,603,065,629
	2014/2015	330	2,233,805	2,509,903	828,268,088	2,048,000	2301132.8	3,603	9050355302	9,878,623,391
	2015/2016	330	2,233,805	2,660,497	877,964,174	2,048,000	2439200.768	3,933	10373920866	11,251,885,040
	2016/2017	320	2,233,805	2,820,127	902,440,751	2,048,000	2585552.814	4,253	10996356118	11,898,796,869

Data source	Item	Data	Source
	Projection Population 2017	46,000,000	SOS implementation plan
	poverty index	46%	Kenya Health policy 2014-2013, WB indicator
	Targeted population covered by CHU by 2017	21,160,000	
	Targeted no of CHU by 2017	4,232	

The Kenyan population is projected to be 46 million and targeting 46% of those living below poverty will cover approximately 21 million population. These population will be covered by establishing 4 232 community Health units by 2017

Figure 2: Comparison of the resources required to establish a CU under the CHS-ICC 2010 scenario and the Scheme of Service 2013 scenario (Unit: 1000 Ksh)

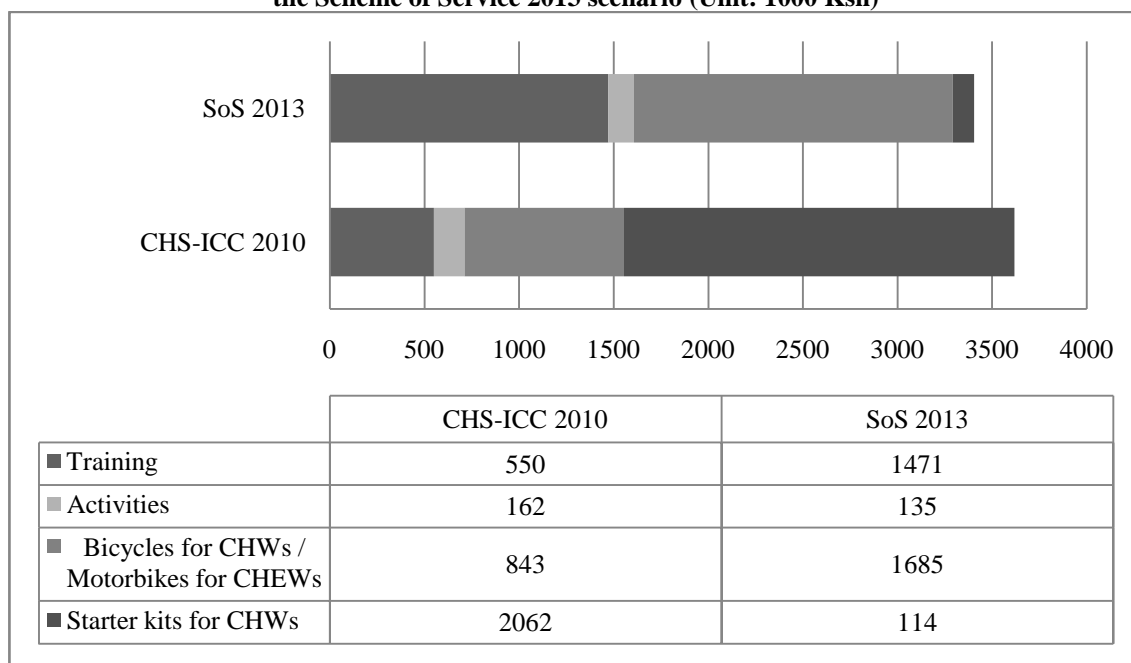


Figure 3: Comparison of the resources required for CU management and operation under the CHS-ICC 2010 scenario and the Scheme of Service 2013 scenario

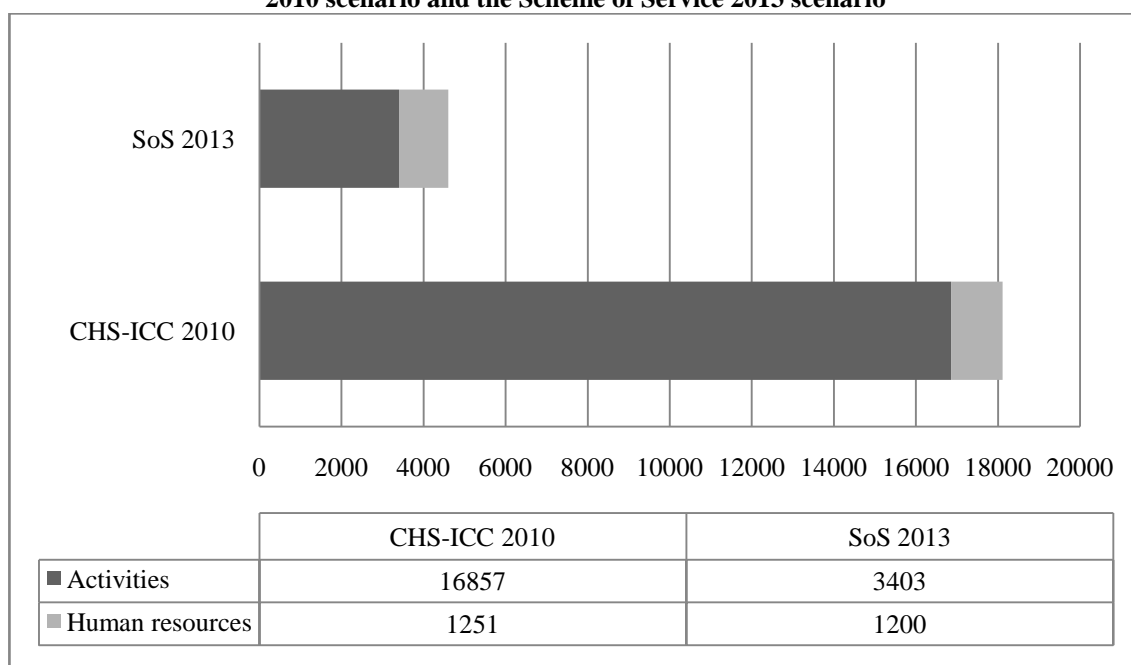


Table 5: 4-year simulation using the CHS-ICC 2010 scenario (Million Ksh)

Item	2014	2015	2016	2017
Establishment of CU				
Activities	952	1 047	1 152	1 267
Bicycles for CHWs / Motorbikes for CHEWs	1 128	1 240	1 364	1 501
Starter kits for CHWs	2 759	3 035	3 339	3 673
Operation of CU				
Activities	77 128	109 651	147 908	192 720
Operating manuals	66	72	79	87
Operating tools	1 127	1 681	2 334	3 102
Human resources	5 724	8 138	10 977	14 303

Total	88 883	124 865	167 154	216 653
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Table 6: 4-year simulation using the Scheme of Service 2013 scenario (Million Ksh)

Item	2014	2015	2016	2017
Establishment of CU				
Activities	2 150	2 365	2 601	2 862
Bicycles for CHWs / Motorbikes for CHEWs	2 255	2 480	2 728	3 001
Starter kits for CHWs	153	169	185	204
Operation of CU				
Activities	15 570	22 136	29 859	38 905
Operating manuals	38	42	46	51
Operating tools	440	625	844	1 099
Human resources	5 490	7 806	10 529	13 719
Total	26 096	35 622	46 792	59 840

VII. Discussion

The CHS-ICC 2010 scenario utilises more resources in the operation of a CU than the Scheme of Service 2013 scenario due to the larger number of CHWs, requiring more resources for kit distribution and CHW monthly allowances. The higher estimation of resource costs under the CHS-ICC 2010 scenario is also attributed to costs associated with the CHW kits, the medicine and consumables in which must be regularly restocked. At the completion of the 4-year cost estimation period, it is possible that more resources will be required to operate a CU under the Scheme of Service 2013 scenario as CHEWs may be promoted to higher positions, resulting in higher salaries. In addition, there are a number of areas in the Scheme of Service 2013 scenario that were not clearly defined at the time of the cost estimation and which may incur additional costs.

In addition to contributing to the small number of resource estimation studies on CHW programs [2], this study is one of the few cost estimation studies that encompasses the entire process of community health service programs using CHWs / CHVs, from the establishment of CUs and covering the operation and management of CUs, and all of the activities undertaken in the process. As the review of existing literature indicates, in order to cover all key dimensions of the programs, it is important for economic evaluation and / or cost-related studies to employ holistic approaches to examine CHW programs, rather than focusing on certain clinical / disease specific aspects of the programs [1, 8]. In this regard, this study contributes to narrowing knowledge gaps relating to the estimation of resources required for CHW programs, looking at both clinical and non-clinical activities. In addition, given the fact that the coverage of such community health service programs is low in LMICs [2], it is important to understand what resources are required to scale-up such programs in order to ensure a constant and sustainable supply of resources to finance the activities of the programs.

The issue of 'fiscal space' relates whether government can mobilize domestic funding to purchase the resources required to scale-up the CHS across the country. As discussed above, there is scope for the government to increase revenue by increasing indirect taxes (such as VAT) and re-prioritizing to importance of the health sector to allow the roll out the CHS across Kenya. However, the devolution process is likely to incur significant costs for the government, both at the central and county levels, which may affect the ability of the government to mobilize domestic resources to scale-up the CHS. In addition, the central government may expect counties to mobilize funds from within their own budgets to scale-up the CHS. However, if counties are not clearly advised of what they are expected to fund, there is a possibility that some counties may not prioritize the CHS implementation and the national budget may have to absorb unbudgeted CHS implementation costs to avoid undermining the government's planned CHS implementation.

The telephone interviews and the data validation visits to DHMTs indicated that there are wide variations in current CHS implementation practices between districts/CUs. Partner organizations (i.e. international organizations, bi-lateral donors, international NGOs) are the main source of funding, which may have contributed to fragmentation in the CHS implementation. Consequently, it is necessary to clarify who should take the lead in coordinating the CHS implementation and to what extent the CHS implementation needs to be aligned across CUs.

VIII. Conclusion

The CHS-ICC 2010 scenario requires more resources to operate CUs than the Scheme of Service 2013 scenario as the larger number of CHWs means more resources are used in kit distribution and monthly allowances for CHWs. It is possible that at the completion of the 4-year period more resources will be required to operate a CU under the Scheme of Service 2013 scenario as CHEWs may be promoted to higher positions with larger salaries. In addition, a number of areas in the Scheme of Service were not clearly described at the time of the cost estimation and may incur additional costs. There is scope for the government to increase revenue by increasing indirect taxes (such as VAT) and use tax income to re-prioritize the roll out of the CHS throughout

Kenya. However, the devolution process is likely to be a significant cost for government, both at central and county levels, and may affect the ability of government to mobilize resources to scale-up the CHS. In addition, if counties are not given clear advice about what they are expected to fund, some counties may not prioritize the CHS implementation and the national government may be required to absorb unbudgeted costs to avoid undermining the planned CHS implementation. Furthermore, given the wide variations in CHS implementation practices between districts and CUs, government should clarify who will take the lead in coordinating the CHS implementation and to what extent the CHS implementation needs to be consistent between CUs.

References:

- [1]. Walker, D. and S. Jan, How do we determine whether community health workers are cost-effective? Some core methodological issues. *J Community Health.*, 2005. **30**(3): p. 221-9.
- [2]. Global Health Workforce Alliance, *Global Experience of Community Health Workers for Delivery of Health Related Millennium Development Goals: A Systematic Review, Country Case Studies, and Recommendations for Integration into National Health Systems.* 2010.
- [3]. Lewin, S., et al. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane Database of Systematic Reviews*, 2010. DOI: 10.1002/14651858.CD004015.pub3.
- [4]. Viswanathan, M., et al., Outcomes and Costs of Community Health Worker Interventions: A Systematic Review. *Medical Care*, 2010. **48**(9).
- [5]. World Health Organization, *Community health workers: What do we know about them? The state of the evidence on programmes, activities, costs and impact on health outcomes of using community health workers Evidence*, in *Evidence and Information for Policy*, Department of Human Resources for Health. 2007: Geneva.
- [6]. Haines, A., et al., Achieving child survival goals: potential contribution of community health workers. *The Lancet*, 2007. **369**(9579): p. 2121-2131.
- [7]. Adam, T., et al., Cost effectiveness analysis of strategies for maternal and neonatal health in developing countries. *BMJ*, 2005. **331**(7525): p. 1107.
- [8]. Corluka, A., et al., Are vaccination programmes delivered by lay health workers cost-effective? A systematic review. *Human Resources for Health*, 2009. **7**(81).
- [9]. Chuma, J. and V. Okungu, Viewing the Kenyan health system through an equity lens: implications for universal coverage. *International Journal for Equity in Health*, 2011. **10**(22).
- [10]. Chuma, J., T. Maina, and J. Ataguba, Does the distribution of health care benefits in Kenya meet the principles of universal coverage? *BMC Public Health*, 2012. **12**(1): p. 20.
- [11]. McIntyre, D., Guidance on conducting a situation analysis of health care financing for universal coverage. Forthcoming.
- [12]. World Bank, *Kenya Economic Update: Time to shift gears - Accelerating growth and poverty reduction in the new Kenya.* 2013.
- [13]. Ministry of Health, *Taking the Kenya Essential Package for Health to the Community: A Strategy for the Delivery of Level One Services.* 2006: Nairobi, Kenya.
- [14]. Creese, A. and D. Parker, eds. *Cost analysis in primary health care: a training manual for programme managers.* 1999, World Health Organization.
- [15]. Drummond, M.F., et al., *Methods for the Economic Evaluation of Health Care Programmes.* Third edition ed. 2005: Oxford University Press.
- [16]. Hanson, K. and L. Gilson, *Cost, resource use and financing methodology for basic health services: a practical manual.* 1993, Bamako Initiative Management Unit, UNICEF New York.
- [17]. Division of Community Health Services, *Master Community Health Units List.* Division of Community Health Services, Ministry of Health, Kenya.

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