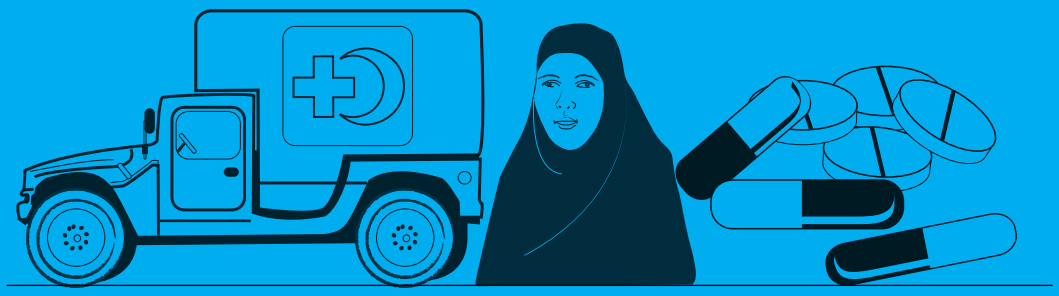
Report 9



COSTING THE ESSENTIAL PACKAGE OF HEALTH SERVICES

SOMALIA

unicef
unite for children

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Contents

Acronyms

CHW	Community Health Worker
CSZ	Central South Zone
EPHS	Essential Package of Health Services
H	Hospital
HC	Health Centre
HP	Health Post
MCH	Maternal and Child Health (clinic)
MOH	Ministry of Health
NEZ	North East Zone
NGO	Non Governmental Organization
NWZ	North West Zone
OPD	Out Patient Department
PHU	Primary Health Unit
RHC	Referral Health Centre
RHO	Regional Health Office
RMO	Regional Medical Office
RMS	Regional Medical Stores
SCZ	South Central Zone
TB	Tuberculosis
UN	United Nations
UNICEF	United Nations Children's Fund
USD	United States Dollars

COSTING THE EPHS

1 Introduction

1.1 Background to the EPHS

In May 2008, UNICEF Somalia commissioned a team of consultants to develop an "Essential Package of Health Services" (EPHS) for the three Somali zones. In 2009, UNICEF established that nearly 900 primary health facilities are functioning (see Table 1 below).

Table 1: Numbers of Health Posts and Maternal and Child Health Centres, by zone

Zone	No. of HPs	No. of MCHs
Somaliland	150	70
Puntland	119	48
Central South	356	138
Totals	**625**	**256**

However, these facilities operate to greatly differing standards, with different levels of:

- Infrastructure – (for example roughly 50 percent of all health posts are estimated to not have any formal building/s at all, operating out of a private house or shop);
- Staffing – some MCHs have as many as 12 professional staff assigned to them, but most rural MCHs do not have a single professional nurse or midwife, relying solely on auxiliaries and TBAS;
- Service packages – all MCHs are supplied with UNICEF's basic and renewable kits. To a certain extent the range of services that are offered depend on the supplies given. However, these vast differences in staffing and capacity result in some MCHs having quite high-level services with some degree of inpatient capacity and the ability to assist in deliveries (births), while others are barely functional above the HP level.

The differing standards of operation, combined with different geographical locations (urban, rural, next to roads), opening hours and costs of services, result in very different levels of utilization. The location and degree of support a facility receives is driven more by the presence of a supporting NGO programme and security/access constraints, than by a national public health/equity logic (they are too low in number to do so, anyway). In general, services are underutilized with low public trust in quality of services, low availability of services (e.g. limited opening hours and frequent stock outs of drugs), poor management and limited ability to refer to a higher level facility when needed. **While the health services are underfinanced, they also offer very poor return on investment.**

It is clear that reform is needed. Too little money is available to meaningfully assist the numbers of facilities running, and too little is achieved with the current levels of investment. Reform will therefore require:

- expanding investment in health services to increase quality, build user trust and improve the utility of each facility and the network as a whole (e.g., increased referral); or
- reducing the number of facilities to ensure higher-quality services in the facilities that are affordable, or
- both of the above.

As a first step in defining, analyzing and proposing a way out of this conundrum, the various health sector actors in Somalia (MoHs, donors, UN, NGOs and local organizations) agreed to the formation of an Essential Package of Health Services (EPHS), which set out to define a relevant standardised model for the different tiers of an eventual health system. The EPHS is similar in many ways to those developed for other post-conflict countries such as Afghanistan or Southern Sudan, which sought to define a template for nationwide implementation. The Somali EPHS however, was not designed as a countrywide blanket roll-out. While the EPHS could serve as a template for reconstruction of the entire health system, current realities on the ground (e.g. insecurity, lack of governance, poor human resource availability and insufficient strategic investment in health) resulted in the EPHS being designed to be flexible and deployable at local and sub-national levels. As such, the EPHS sought to define operationally-relevant standardized health facilities in order to:

- define a level of service required to achieve real return on investment in the public health sector (and serve as a platform to allow genuine advances to be made in public health);
- ensure investment in like units to construct the foundations for a future health system;
- estimate inputs necessary to achieve each tier of service delivery and therefore allow projections of cost, staffing, medical supplies and infrastructure needs; and
- provide a model to aim for (for each facility, region or zone) as well as an operational framework around which to plan and predict resource requirements.

The EPHS **does not** define the "health system" or how many units of each type of facility should exist in which geospatial relationship. The EPHS **does not** define a path towards construction of a health system. These are decisions outside of the remit of the work and have enormous financial and political ramifications. Using the EPHS as a set of guidelines, one could:

- start upgrading all facilities that now exist;
- do a performance review and begin upgrading the best performing facilities;
- take a regional view and establish coherent local systems with referral and coverage; or
- implement a mix of the strategies suggested above.

A strategy needs to be developed with knowledge of the extent of resources available now and over time (e.g., finances, staff, management, drugs). The EPHS permits projections of costs (the subject of this report), staffing needs and infrastructure needs (standard blueprints), to allow an appreciation of what might or might not be possible within current funding limitations.

The EPHS consists of essential health services implemented across four levels of service provision (building blocks), each with a standardised service profile and each supported by a standardised set of management and support components. Any system, as elaborate or as simple as is affordable, could then be constructed out of the building blocks.

Table 2: Current and equivalent health facility tiers

EPHS Standard Facility	Current Comparable Facility Level
Primary health unit (PHU)	Health Post (HP)
Health Centre (HC)	Maternal and Child Health centre (MCH)
Referral Health Centre (RHC)	District Hospital
Hospital (H)	Regional Hospital

There is no well established district health system at present; for this reason, the focus in the short- to medium-term will be to develop the health system on a regional basis (see Annex 1 for a schematic representation of the "regional health system").

To facilitate a health systems development approach to regional services provision, **Regional Health Offices** need to be established or strengthened in each region to provide managerial, supervisory and health systems support inputs to each of the four levels of care. As capacities are built up at the regional level, efforts in the longer term can move towards the establishment of a district health system[1].

In some regions, particularly in more rural areas, Referral Health Centres will be established where there are no hospitals. Although "district hospitals" are in place in many districts, many of those facilities do not presently provide hospital-level care and the health system cannot bear the costs of starting and running a district hospital in all districts. Hence, a more pragmatic approach needs to be taken, prioritising geographic areas/populations for services and then developing outwards as and when the system can manage it. In such cases, existing district hospitals may be downgraded to the level of a Referral Health Centre or Health Centre. Cost projections in this document provide for both RHCs and "generic" hospitals.

1.2 Assumptions underlying the EPHS cost projections

As the EPHS was designed to be a flexible planning tool, its costing depends on how many of each kind of facility to be developed, in which areas. This document provides a set of cost projections at both at the "micro" level of the individual health facility (section 2 below) and at the "macro" level of the health system (section 3 below). Projections were produced using a spreadsheet tool developed to complement the EPHS model. The reader should note that the spreadsheet tool is limited and meant only for developing cost projections for discussion, advocacy and initial planning purposes. The tool reflects design elements of the EPHS and in its current format is inappropriate for other basic health service packages, and cannot be used for retrospective cost analyses.

The costing tool is based on a set of spreadsheets of estimated costs around a range of functions. As experience with implementing the EPHS grows, these costing sheets should be revised and the costing tool made progressively more accurate and useful.

1.2.1 General assumptions

The spreadsheet tool is based on the standard concept of a cost profile for a health facility, and includes a range of assumptions elaborated on below. Some cost elements that are normally considered in a costing estimate exercise are not included in the EPHS cost projections. For example, there is no consideration of recurrent costs associated with vehicles allocated to the central Ministry of Health offices. Specific cost elements included in the projections are deliberate and

1 Further details of the EPHS are available in reports 2 and 3 - Essential Package of Health Services – 2009.

assumed to be those elements that will be funded primarily by donors, at least in a short- to medium-term implementation timeframe.

The EPHS design also omits potential construction or renovation expenditures in all but two cases: maternity wards will be constructed for many, if not most, HCs - and RHOs may decide to construct a new Regional Medical Stores (RMS) building. No construction expenditures are included for PHUs, RHCs or "generic" hospitals. Finally, cost projections in this document do not include projections for national/referral hospitals, TB facilities or mental health hospitals. The EPHS spreadsheet tool covers the cost elements shown in Table 3 below.

staffing levels, both to reduce any possible confusion and complexity resulting from switching from Phases 1 to 2 and also because it is not yet clear how long Phase 1 staffing levels are likely to persist. It should be clear that staff costs will be higher in Phase 2 than in Phase 1.

Specific assumptions concerning some of the more important cost elements are discussed in the following sub-sections. The macro level cost projections in section 3 below will include additional scenario-specific assumptions.

1.2.2 Specific assumptions for staffing and salaries

The EPHS explicitly requires larger numbers of

Table 3: Cost elements included in the EPHS spreadsheet tool

Capital cost elements	Recurrent cost elements
Vehicles	Staffing
Construction (for HCs and RHOs)	Drug supply
Non-consumable equipment	Consumable supplies & equipment
	Transportation
	Maintenance of non-consumable equipment
	Maintenance of physical plant

It is envisaged that the EPHS will be implemented in two phases. During Phase 1 each health facility will have a minimum complement of appropriately-trained health workers. In Phase 2 each facility is allocated additional staff, resulting in an adequate number of health workers of each cadre being present. The phased introduction of EPHS is to account for the time it will take to train and deploy sufficient numbers of health workers, particularly the higher-skilled cadres.

As an example, during Phase 1 a Health Centre is required to have one registered midwife and one registered nurse. During Phase 2, an HC would be allocated two registered nurses and two registered midwives. Other staff cadres would be added to the HC during Phase 2, including an additional auxiliary nurse and a laboratory assistant. For the purposes of this document, ***costs are projected only for Phase 1***

appropriately skilled staff than are currently available in the present health care system. For some cadres of health workers (e.g. Community Health Workers or CHWs) new training programmes need to be implemented, providing for a higher skill level than presently exists among CHWs. Other cadres of health worker such as registered nurses and midwives are currently being trained through donor-supported training programmes at training institutes throughout the zones, but these cadres need to be incorporated and retained within the public sector health system.

A key sticking point will be the salary level offered to each cadre. Currently, official salary scales are far too low to retain skilled personnel in the public sector health system. Two alternate salary scales are used in cost projections in this document: a) US dollar amounts based on a "standard proposal" salary scale developed

locally (which is higher than current official salary scales) and b) US dollar amounts based on a UNICEF-proposed salary scale which incorporates a system of graduated factors for increasing both the absolute amount of pay for many cadres, as well as the differences in pay between grades.

Both the standard proposal and the UNICEF-proposed salary scales increase the base levels of pay over the current official pay scales, but the UNICEF proposal is considerably higher, particularly for grades A and B. The table below provides several examples. See Annex 2 for a table outlining all currently considered grades (note: the table in Annex 2 is not complete, as a final determination of cadres and their grades is still underway).

Table 4: Examples of "standard proposal" vs. "UNICEF-proposed" salary scales

Grade	Cadre	Standard proposal USD	UNICEF-proposed factor	UNICEF-proposed salary USD
Grade A8	General doctor	132	3	396
Grade B10	Registered nurse	108	2	217
Grade C9	Community health worker	108	1.5	163
Grade D13	Health aide	59	1	59

1.2.3 Specific assumptions for drug supplies and consumable medical supplies/equipment

One of the most useful elements of the EPHS is the development of full lists of drugs and consumable medical supplies and equipment for each level of care. For the individual facility projections in section 2, a lack of accurate actual consumption data has necessitated the development of a set of assumptions concerning when re-ordering must take place:

- Low consumption: drug/medical supplies are consumed every six months
- Medium consumption: drug/medical supplies are consumed every three months
- High consumption: drug/medical supplies are consumed every month

For the macro level health systems projections in section 3, all calculations are based on a standard "medium level" of consumption.

1.2.4 Specific assumptions for transportation expenditures

Transportation (funded by donors) under the EPHS consists of bicycles, motorbikes and 4x4s for use as administrative vehicles (e.g. supervision, supplies) and ambulances. Bicycles are provided for PHUs and HCs; an ambulance and a motorbike for each RHC; three ambulances, two admin 4x4s and a motorbike at each generic hospital; and an admin 4x4 and two motorbikes at each RHO (in addition to a single admin 4x4 for each central level MoH office).

Difficulties arise when estimating future transportation costs, as information on current transport usage is hard to find. Cost estimates are thus based on crude percentages or lump sums, as depicted in Table 3 below. Any estimation figure can be changed in the spreadsheet tool by the user; it is anticipated that changes will be made to the estimation figures as more accurate data become available.

Table 5: Assumptions concerning recurrent costs for transportation operations

Recurrent cost element	Means of estimation
Fuel	Litres per week x unit cost x weeks of operation
Spare parts, lubricants	20% of original capital cost of vehicle
Maintenance and repairs	115% of annual fuel costs
Insurance, taxes, licenses	Lump sum estimate

1.2.5 Specific assumptions for construction expenditures

As mentioned above, construction costs are projected for only two structures: a) a new maternity ward for each HC and b) the optional construction of a new RMS for each RHO. Each structure has a specified size: maternity wards are 20x10 metres, while RMS structures are 20 x15 metres. Construction costs per square metre have been estimated at USD 160. Each of these items can be changed in the spreadsheet tool to reflect new or different information.

2 Cost projections for individual health facilities

The cost projections in this section provide estimates of how much it might cost to operate a particular type of EPHS facility for one year. The facility projections provided below represent "annualised costs" in that they include allocations for capital expenditures spread across the lifespan of the capital item. New physical plant is estimated to last 10 years; new vehicles and equipment have an estimated lifespan of five years.

Recurrent costs include those listed in Table 3 above. For salaries, each example below uses the UNICEF-proposed salary scales. In addition, allocations are made for sea freight and overland shipping (15% and 20% respectively) for drugs and consumable medical supplies. Maintenance and repair of non-consumable equipment is estimated at 15% of annualised capital costs, while maintenance of physical plant plus utilities is estimated at 110% of the annual equipment maintenance amount.

Annualised costs are calculated for three of the key facilities in the EPHS: PHUs, HCs and RHCs. It is anticipated that these facilities will be crucial to the successful implementation of the EPHS on any scale, so health system planners will need to focus on the costs of these facilities.

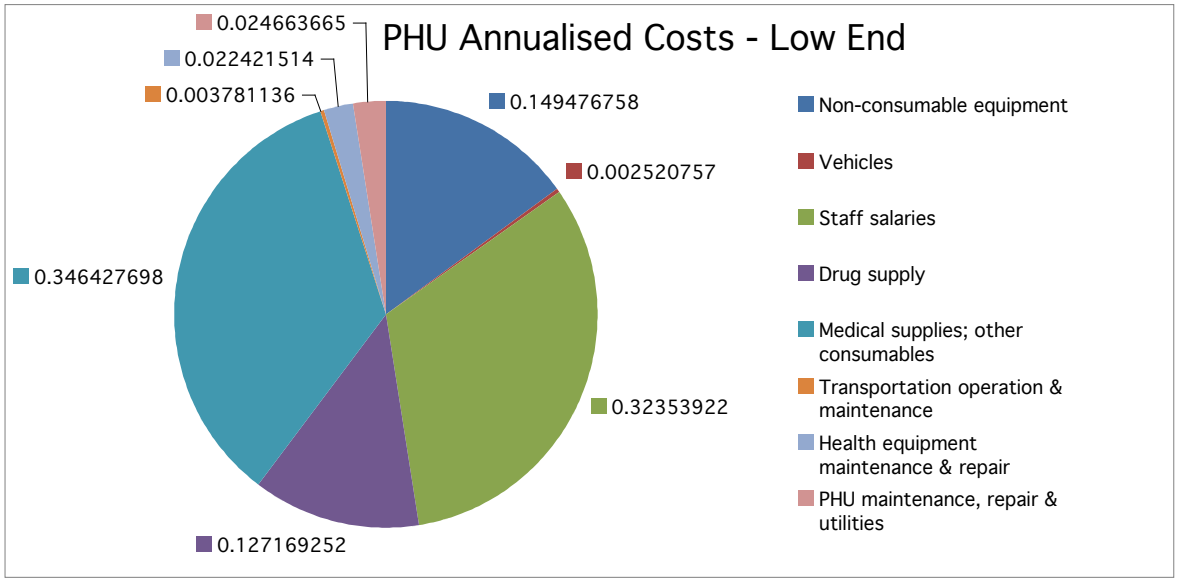
With these assumptions in mind, Table 6 provides low and high end estimates of the annualised costs for PHUs, HCs and RHUs, based on low and high levels of "utilization" (modelled via estimates of consumption of drugs and consumable medical supplies & equipment)[2]. As can be seen in the charts below, the percentage of total facility costs accounted for by salary expenditures decreases (as absolute salary costs remain constant) as "utilization" increases, with major differences arising in terms of larger percentages of total facility costs allocated to drugs and consumable supplies & equipment.

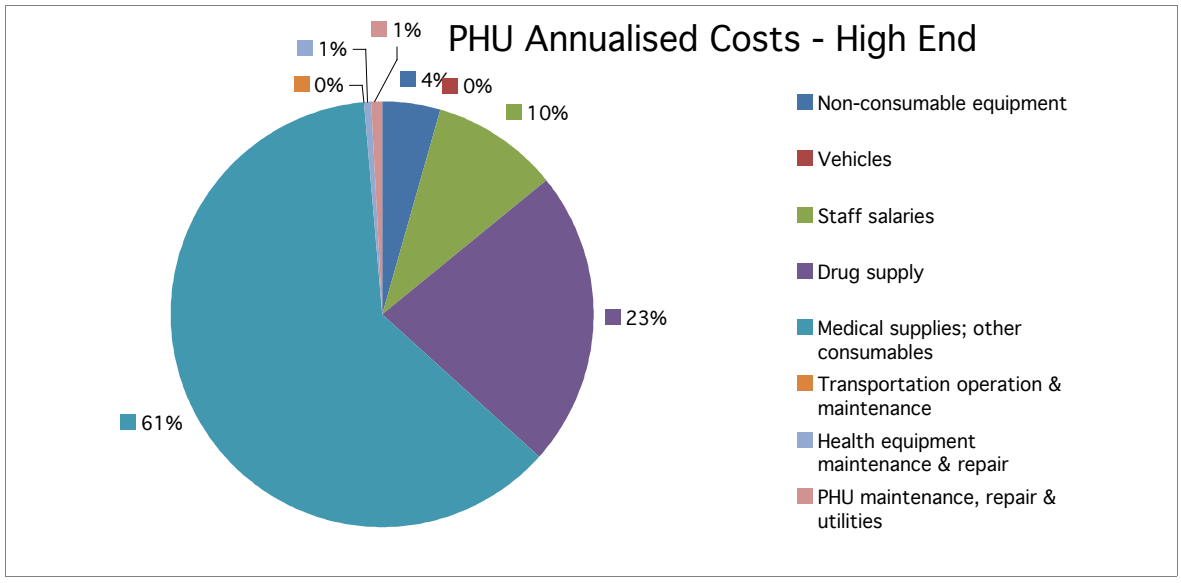
Table 6: Low to high end annualised costs (USD) for specific EPHS facilities

Facility Level	Low End	High End
Primary Health Unit	15,868	53,444
Health Centre	56,858	158,211
Referral Health Centre	146,884	329,552

2 The reader should note the EPHS spreadsheet tool uses separate spreadsheets to estimate the costs ofty drug supply (purple in the charts) and consumable medical supplies & equipment (medium blue in the charts), e.g., bandages, syringes, etc.

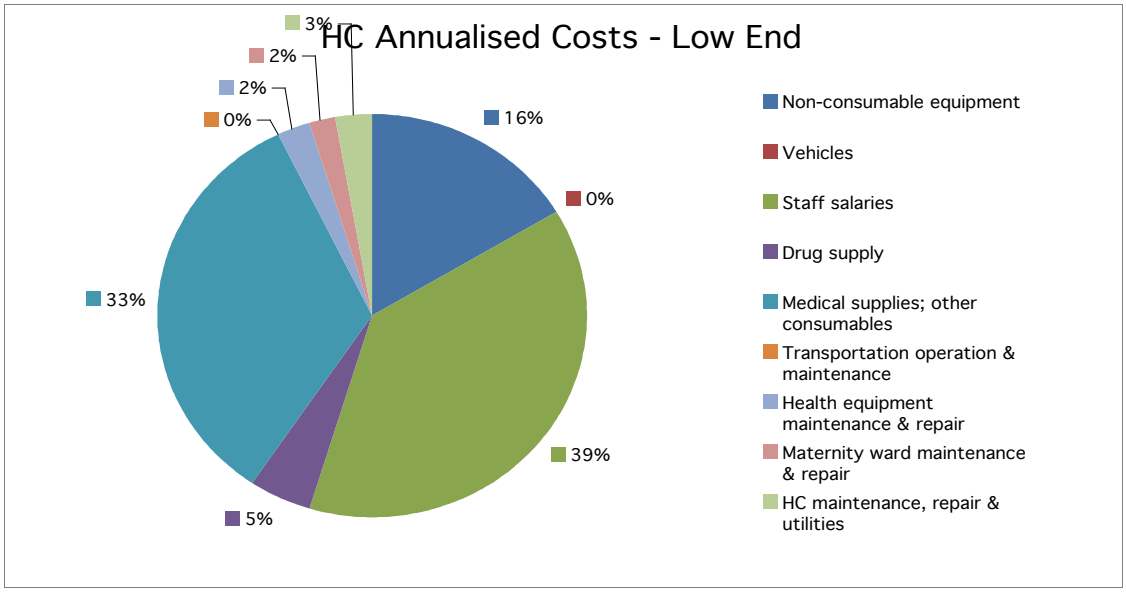
Chart 1: Primary Health Unit

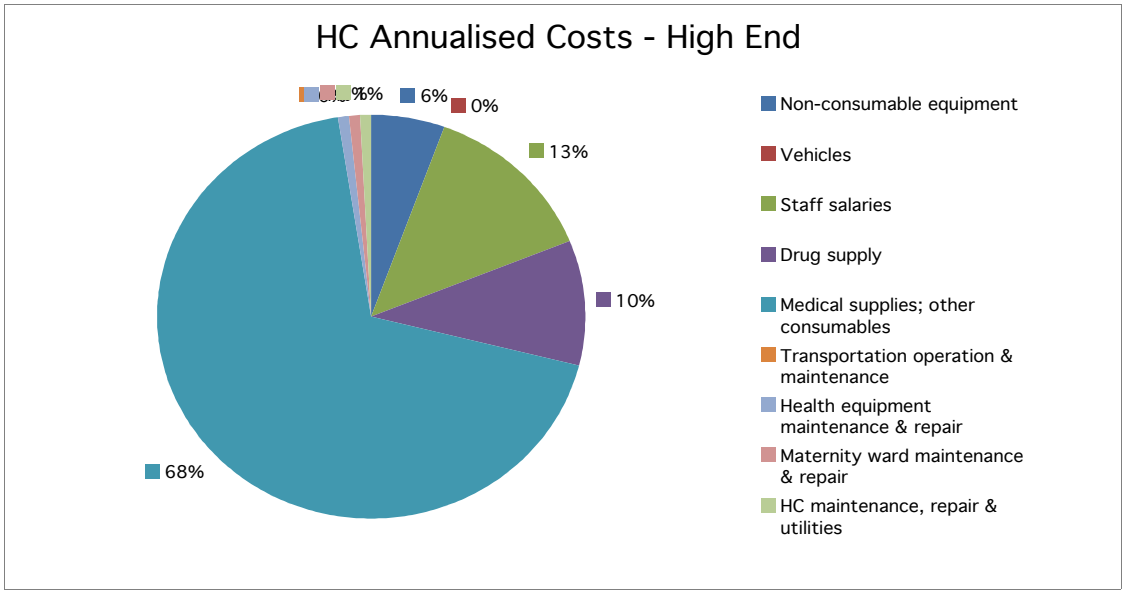




For Primary Health Units, the largest cost is for drug supplies and consumable medical supplies & equipment (48% for the low end estimate and 85% for the high end estimate). In other words, if the PHU becomes busier, this portion of costs grows while other budget line items become proportionately smaller. Hence if PHUs are to "earn" a good return on investment they need to increase their patient loads.

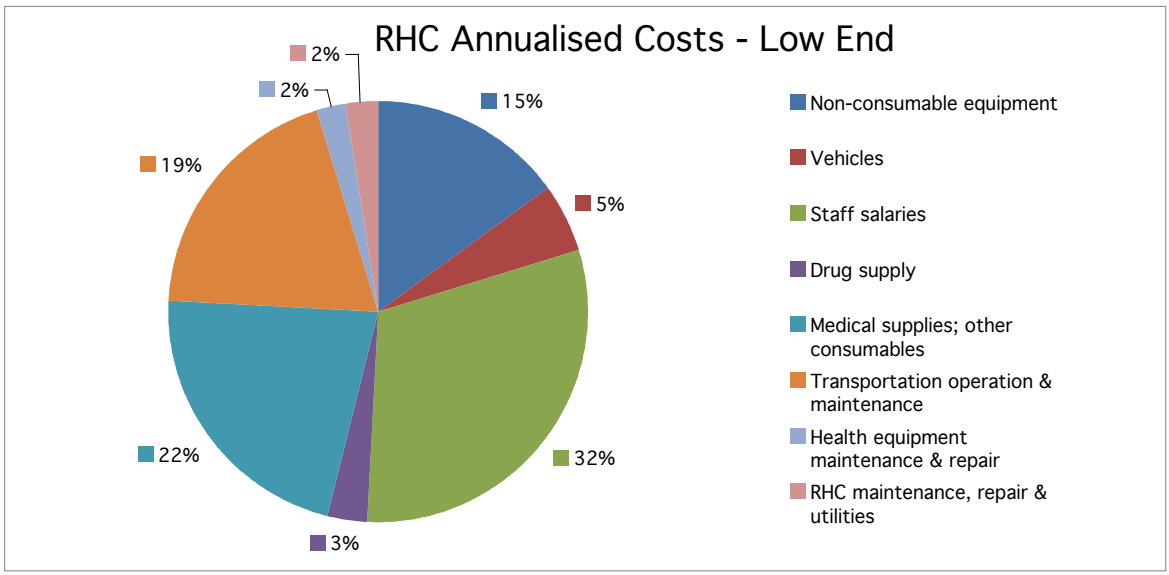
Chart 2: Health Centre

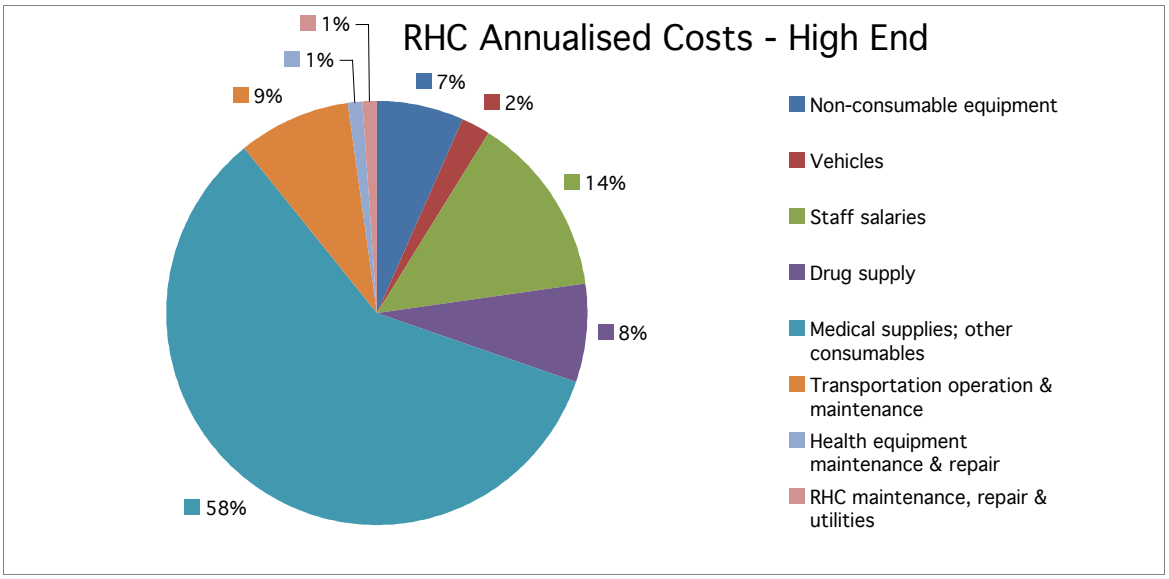




Roughly the same situation obtains for the Health Centre level. Salary costs are a higher proportion of the cost profile at both low and high ends, primarily because higher-trained (and thus higher-paid) cadres are based at HCs. Also note that the cost profile at the HC level includes an additional annualised capital cost related to the construction of a new maternity ward.

Chart 3: Referral Health Centre





At the RHC level, the same pattern emerges. The addition of significant resources allocated to transportation changes the profile to some extent; in the absence of transportation expenditures, the proportion of costs allocated to, e.g., salaries would be greater than at the HC level.

In all cases, allocations to staff and equipment are proportionately larger at low utilization levels. If we are able to increase utilization while maintaining the same level of these inputs, then the associated costs "shrink" proportionately and consumable items become the predominant expense.

3 Cost projections for macro level health system scenarios

Three macro level scenarios are considered in this section, each of which is based on a different approach to determining the number of health facilities for EPHS implementation and donor support. Each macro scenario is also based on 3 common assumptions, all of which are specifically related to capital costs:

Capital cost assumptions under each macro level scenario

1. **Each** region in each zone establishes and staffs a Regional Health Office (RHO).
2. **Each** RHO purchases equipment for a Regional Medical Stores (RMS), but does not construct a building for the RMS, on the assumption that existing physical plant is available.
3. **Each** Health Centre constructs a new 20x10m maternity ward.

Based on the common assumptions above, the capital costs for each scenario below will be quite high. The reader will recognise that any of these assumptions can be relaxed in order to lower up-front capital costs. However, the common assumptions reflect several important considerations built into the EPHS model. First, each regional health system will require extensive supervisory support from the RHO (assumption 1). The current drug supply system is deeply flawed and it is expected that a regional approach to drug supply procurement and distribution will strengthen and rationalise the system (assumption 2). Finally, a high priority of the EPHS is to improve the quality of maternal and child care, which will be facilitated by strengthening the capabilities of Health Centres to conduct facility-based deliveries assisted by a trained birth attendant (assumption 3).

Also note that for each macro scenario below, the regions of Sool and Sanaaq are kept separate from both NWZ and NEZ.

3.1 Scenario 1: Distribution of health facilities by population-based norms

As discussed in section 1 above, the ultimate costs of the EPHS-based health system will be highly dependent on the salary scales eventually agreed by the three zonal Ministries of Health and the donor community. For Scenario 1, health facilities are assumed to be distributed across the three zones according to a set of standard international population-based norms, specifically:

- 1 PHU per 7,500 population in rural areas only
- 1 HC per 20,000 in all areas (rural + urban)
- 1 RHC per 100,000 in rural areas only
- 1 Hospital (district or "generic") per 150,000 in all areas (rural + urban)

Based on the norms above, Table 7 provides the number of health facilities for each zone, plus Sool and Sanaaq.

Table 7: Number of health facilities according to population-based norms

	Urban Pop.	Rural Pop.	Total Pop.	#PHU	#HC	#RHC	#Hospitals
Central	223,921	950,848	1,174,769	127	59	10	8
Mogadishu	901,183		901,183	0	45	0	6
South	621,688	2,113,197	2,734,885	282	137	21	18
Sub-total SCZ	1,746,792	3,064,045	4,810,837	409	241	31	32
Puntland	328,787	534,291	863,078	71	43	5	6
Somaliland	724,776	683,319	1,408,095	79	69	6	9
Sool and Sanaaq	95,213	325,431	420,644	56	22	4	3
Total	2,895,568	4,607,086	7,502,654	615	375	46	50

Table 8 below provides the capital costs for Scenario 1, again based on the common capital cost assumptions listed above.

Table 8: Capital costs for Scenario 1

Capital Costs	NWZ	NEZ	SCZ	Sool and Sanaaq
Central MoH				
Vehicles	30,000	30,000	30,000	0
Regional Health Offices				
Vehicles	152,000	152,000	418,000	76,000
Equipment	153,300	153,300	421,575	76,650
Regional Medical Stores				
RMS Equipment	203,460	203,460	559,515	101,730
District or Generic Hospitals	0	0	0	0
Referral Health Centres				
Vehicles	234,000	195,000	1,209,000	156,000
Equipment	657,764	548,137	3,398,448	438,509
Health Centres				
Vehicles	27,600	17,200	96,400	8,800
Equipment	2,998,601	1,868,693	10,473,373	956,076
Build new maternity ward	2,428,800	1,513,600	8,483,200	774,400
Primary health Units				
Vehicles	15,800	14,200	81,800	11,200
Equipment	936,914	842,037	4,850,605	664,142
Sub-total capital cost	7,838,239	5,537,626	***30,021,916***	***3,263,506***
Grand total capital costs scenario 1				46,661,287

The total capital cost for all three zones is a considerable sum, but the reader should bear in mind that this amount is likely to be an outer bound for capital expenditures, as in reality some HCs may not need new maternity ward construction (i.e., only ward equipment will be needed if sufficient space is already available) and it is likely that some regions will continue to rely on central level procurement for drugs and consumable medical supplies and equipment, and will thus not require equipment for a RMS.

For recurrent costs under Scenario 1, a comparison is made between the "standard proposal" salary scales and the UNICEF-proposed salary scales, to assess the extent to which a system focused on more realistic income incentives will impact the overall recurrent cost structure. Recurrent costs under both salary scales are provided in table 9.

Table 9: Comparison of recurrent costs under Scenario 1 for lower vs. higher salaries

Recurrent Costs	**Lower range of salaries**				**Higher (UNICEF) proposed salaries**			
	NWZ	**NEZ**	**SCZ**	**Sool + Sanaaq**	**NWZ**	**NEZ**	**SCZ**	**Sool + Sanaaq**
Central MoH	0	0	0	0	0	0	0	0
Regional Health Offices	215,331	215,331	592,160	107,665	289,315	289,315	795,616	107,665
RMS Equipment	6,104	6,104	16,785	3,052	6,104	6,104	16,785	3,052
District or Generic Hospitals	3,024,400	2,016,267	10,753,422	1,008,133	3,437,878	2,291,919	12,223,566	1,008,133
Referral Health Centres	413,092	344,243	2,134,309	275,395	521,272	434,393	2,693,239	275,395
Health Centres	3,176,783	1,979,734	11,095,720	1,012,887	3,6679,793	2,293,204	12,852,610	1,012,887
HC maternity wards	36,432	22,704	127,248	11,616	36,432	22,704	127,248	11,616
Primary health Units	1,297,553	1,166,155	6,717,710	919,784	1,348,903	1,212,305	6,983,560	919,784
Sub-total recurrent costs	***8,169,695***	***5,750,538***	***31,437,355***	***3,338,533***	***9,319,697***	***6,549,944***	***35,692,625***	***3,338,533***
Grand total capital costs scenario 1			48,696,121				54,900,799	

Table 9 indicates that although differences in salary levels between the two proposed scales vary from 0% (for grade D) to 300% (for grade A), the overall impact on annual recurrent costs of introducing the UNICEF-proposed scales is an increase of approximately 13%. This relatively low increase in total recurrent costs is due to the fact that large numbers of lower-paid (but adequately trained) workers are needed to staff many PHUs and HCs, while smaller numbers of higher-paid staff are based in fewer numbers of RHCs and hospitals, as well as the fact that the UNICEF-proposed graduated factors are considerably lower for grades C and D (1.5 and 1, respectively) than for grades A and B (3 and 2, respectively).

To the extent that higher salary scales provide a sufficient incentive for recruitment, deployment and retention of professional and semi-professional staff, it is likely that such investments would result in good value for money, given the impact of adequate staffing and management on overall productivity. Or looking at it another way given the huge investments (e.g., capital and recurrent costs) needed to construct a public sector health system – and the relatively small proportion of costs that go to staff – it is essential to deploy appropriately trained and adequate numbers of staff in order to optimize the effective and efficient use of the total investment.

3.2 Scenario 2: Currently functioning health facilities

Under Scenario 2, the number of health facilities for assessment is based on "currently functioning" health facilities.[3] The notion is that the EPHS service and staff profiles would be introduced at all facilities that are currently operational. The problem is that estimates of currently functioning facilities are quite variable. Zonal Ministries of Health have their own estimates, while UNICEF has developed a separate set of estimates based on whether or not a facility has (at least periodically) received direct UNICEF support.

In some cases, the two sources of information provide similar estimates. For example, the number of MCH-OPDs in CSZ is estimated by the MoH as 126, while UNICEF's estimate is 130. In other cases, the two sources diverge considerably. The MoH in CSZ lists 131 operational HPs, while UNICEF estimates 356. For the purposes of projecting costs for Scenario 2, a smoothed estimate has been established for each type of facility in each zone, as shown in Table 10 below.

Note that Scenario 2 does not include allocations for RHCs as none are "currently functioning." Allocations are still included for Regional Health Offices however, as regional-level supervision is another high priority of the EPHS model. Additionally, the common assumption of a new maternity ward for each MCH-OPDs is included in the capital cost projections.

Salary scales for Scenario 2 are assumed to be the UNICEF-proposed levels.

3 Current health facilities are Health Posts (HPs), MCH-OPDs and district hospitals.

Table 10: number of health facilities identified as "currently functioning"

Scenario 2 – Current functioning health facilities			
	# HPs	**# MCHs**	**# Distr. Hospitals**
SCZ	340	130	15
Puntland	110	35	4
Somaliland	90	55	6
Sool & Sanaaq	60	15	2
Total no. facilities	600	235	27

Tables 11 and 12 provide capital and recurrent costs projections for Scenario 2.

Table 11: Capital costs for Scenario 2

Capital Costs	NWZ	NEZ	SCZ	Sool and Sanaaq
Central MoH				
Vehicles	30,000	30,000	30,000	0
Regional Health Offices				
Vehicles	152,000	152,000	418,000	76,000
Equipment	153,300	153,300	421,575	76,650
Regional Medical Stores				
RMS Equipment	203,460	203,460	559,515	101,730
District or Generic Hospitals	0	0	0	0
Referral Health Centres				
Vehicles	0	0	0	0
Equipment	0	0	0	0
Health Centres				
Vehicles	22,000	14,000	68,000	6,000
Equipment	2,390,189	1,521,029	5,649,537	651,870
Build new maternity ward	1,936,000	1,232,000	4,576,000	528,000
Primary health Units				
Vehicles	18,000	22,000	68,000	12,000
Equipment	1,067,370	1,304,564	4,032,288	711,580
Sub-total capital cost	5,972,319	4,632,353	***15,822,915***	***2,163,830***
Grand total capital costs scenario 2				28,591,417

Note that capital costs are considerably less than in Scenario 1, due to a much smaller number of Health Centres (or MCH-OPDs in the terminology of the current health system), and no allocations were made for Referral Health Centres. The number of district hospitals is also roughly half of the number provided for under Scenario 1.

Table 12: Recurrent costs under Scenario 2 (at UNICEF-proposed salary scales)

Recurrent Costs	Lower range of salaries			
	NWZ	**NEZ**	**SCZ**	**Sool + Sanaaq**
Central MoH	0	0	0	0
Regional Health Offices	289,315	289,315	795,616	144,657
RMS Equipment	6,104	6,104	16,785	3,052
District or Generic Hospitals	2,291,919	2,291,919	5,729,797	763,973
Referral Health Centres	0	0	0	0
Health Centres	2,933,168	1,866,562	6,932,943	799,955
HC maternity wards	29,040	18,480	68,640	7,920
Primary health Units	1,536,725	1,878,219	5,805,405	1,024,483
Sub-total recurrent costs	***7,086,270***	***6,350,598***	***19,349,186***	***2,744,040***
Grand total capital costs scenario 2				35,530,095

Total recurrent costs are less than the lower-end estimates under Scenario 1, again due to the significantly lower number of facilities in the projection. Both Scenarios 1 and 2 are likely to be too expensive to enable sustainable support from either the zonal Ministries of Health or the donor community, however. A more realistic approach is necessary.

3.3 Scenario 3: Capacity-based distribution

The final macro scenario represents a more rational distribution of health facilities, based on the short- to medium-term capacities of the zones to implement a high-quality health system, and on the ability of the various health training institutes to turn out sufficient numbers of qualified graduates.

For this scenario, the numbers of EPHS-enabled facilities are based on a bias towards PHUs and RHCs in rural areas with low population density, and a bias towards HCs and district hospitals in urban and high population density areas.

Table 13: Capacity-based distribution of health facilities

Scenario 3 – Projections based on capacity and rational distributions				
	PHUs	**# HCs**	**# RHCs**	**Distr./Generic hospitals**
SCZ	165	94	17	11
Puntland	37	14	3	2
Somaliland	59	24	4	4
Sool and Sanaaq	22	9	2	2
Total no. facilities	283	141	26	19

Tables 14 and 15 provide capital and recurrent costs for Scenario 3.

Table 14: Capital costs for Scenario 3

Capital Costs	NWZ	NEZ	SCZ	Sool and Sanaaq
Central MoH				
Vehicles	30,000	30,000	30,000	0
Regional Health Offices				
Vehicles	152,000	152,000	418,000	76,000
Equipment	153,300	153,300	421,575	76,650
Regional Medical Stores				
RMS Equipment	203,460	203,460	559,515	101,730
District or Generic Hospitals	0	0	0	0
Referral Health Centres				
Vehicles	156,000	117,000	663,000	78,000
Equipment	438,509	328,882	1,863,665	219,255
Health Centres				
Vehicles	9,600	5,600	37,600	3,600
Equipment	1,042,992	608,412	4,085,050	391,122
Build new maternity ward	844,800	492,800	3,308,800	316,800
Primary health Units				
Vehicles	11,800	7,400	33,000	4,400
Equipment	699,721	438,808	1,956,846	260,913
Sub-total capital cost	3,742,181	2,537,662	***13,377,050***	***1,528,469***
Grand total capital costs scenario 3				21,185,36**3**

Capital costs under Scenario 3 are approaching levels that might entice medium- to longer-term donor support. The reader will note that capital costs associated with the Regional Health Offices have stayed constant in all three scenarios, by way of the common assumptions.

Table 15: Recurrent costs under Scenario 3 (at UNICEF-proposed salary scales)

Recurrent Costs	Lower range of salaries			
	NWZ	**NEZ**	**SCZ**	**Sool + Sanaaq**
Central MoH	0	0	0	0
Regional Health Offices	289,315	289,315	795,616	144,657
RMS Equipment	6,104	6,104	16,785	3,052
District or Generic Hospitals	1,527,946	763,973	4,201,851	763,973
Referral Health Centres	347,515	260,636	1,476,938	173,757
Health Centres	1,279,928	746,625	5,013,051	479,973
HC maternity wards	12,672	7,392	49,632	4,752
Primary health Units	1,007,408	631,765	2,817,329	375,644
Sub-total recurrent costs	***4,470,888***	***2,705,809***	***14,371,202***	***1,945,808***
Grand total capital costs scenario 3				23,493,707

3.4 HR projections

The number of staff required is not just an issue of cost. There are few health professionals being trained inside Somalia and even fewer who enter the public system. There is a major time lag in production of professionals and in particular the production of higher-level professionals (it takes seven years to produce a medical doctor).

In Annex 3 we present a projection of staff requirements for the three costed scenarios. The table is daunting as large numbers of staff are required, needing to be distributed across the public health system.

In particular there is a need for mass production of specific cadres, ranked in order of numbers needed:

1. Nurse
2. Community Health Worker – trained (CHW)
3. Midwife (MW)
4. Auxiliary nurse
5. Auxiliary midwife
6. Health professional able to perform C-section
7. Medical Doctor
8. Lab assistant
9. Lab technician

4 Discussion

The scenarios above have demonstrated that there is no cheap way of introducing EPHS on a wider scale, particularly if one applies international norms and standards for facilities per population[4]. Considerable resources will be needed to support the training institutes and pay health workers at a level that will entice them to stay in the public sector, to adequately supply each facility and to ensure that sufficient levels of supervision and managerial oversight are available.

However, if resources are aggregated in a fully functioning health system one can expect enhanced performance. The current operational setting, which involves long-term underinvestment in a relatively high number of facilities with low utilization rates, generates very little public benefit and limited return on investment. It is cheap but with little return for the money.

A few key conclusions can be reached:

- There are limited resources (financial and human), therefore, the numbers of facilities should be limited.
- Facilities receiving investment must perform; in order to perform well, facilities must serve a relatively large population in a relatively small area.
- Costs are higher for highly utilized facilities, but many absolute costs remain the same (e.g. for staff and non-consumable equipment). Hence, the "return on investment" is better for high utilization facilities than for low utilization facilities. The focus should be on developing well-functioning and accessible health facilities in populous areas, that can be relatively easily staffed, supervised and supplied. As the system develops, facilities can be established and supported in lower-priority areas, but performance is key!
- Facilities should operate as parts of functional regional systems. The planning and prioritization of which locations to invest in will be important, both to limit the numbers of facilities (and focus on quality/performance) and to ensure that all facilities are fully supported and interlinked (e.g. facilities can refer upwards, thereby ensuring that public resources are targeted to those with higher needs and enhancing the public utility, efficiency and equity of each facility).
- When assessing overall health system costs, higher salary scales are surprisingly not a major additional cost because the system relies on large numbers of lower-cadre workers who must be trained, organized and paid. It is worth paying higher salaries to retain higher-skilled staff cadres necessary to ensure that good quality services are provided and that the 'system' functions well.

4 Somalia is a very low population density country, meaning that it is hard to aggregate demand geospatially. People are spread out over vast areas with low infrastructure development and difficult access.

- Once provided a realistic wage, all staff must be managed and supported in working full working weeks and providing higher levels of care, as members of functional teams.
- Equipment and supply costs are high. Efficiency gains (lower costs or less waste or better stocking/ range of services) can be attained through careful reform. Supplies need to be reformed in tandem with improved staffing and management, but are key to cost management and performance enhancement.

The reader can use the projections and the costing tool to develop any number of calculations according to the needs of individual donors or SWAp-like donor groups. For example, if it is assumed that Phase 1 of the EPHS will run from three to five years, under Scenario 3 the resulting costs can be estimated as below.

It is likely that a useful approach to introducing the EPHS will be to implement the model on a pilot basis initially, perhaps in just a handful of regions across the three zones. Fortunately, the spreadsheet tool will enable planners to develop cost projections for any number of facilities, in any number of regions. If cost data are collected during pilot phases, the costing tool can be significantly improved.

Regarding the development of human resources, projections of required staff clearly indicate the need to start training larger numbers of a broader range of cadres to staff the public health system. In addition, some professional cadres are needed in such small numbers that it may not be worth training them in Somalia; Somalis could have a bilateral relationship

Table 16: Costs for a five-year timeframe for EPHS in Phase 1

Cost	Year 1	Year 2	Year 3	Year 4	Year 5
Capital	21,200,000				
Recurrent	23,500,000	23,500,000	23,500,000	23,500,000	23,500,000
Total over 5 yrs					**138,700,000**

Note: amounts for inflation may be applied at one's discretion

This document has not considered additional costs involved in Phase 2 of the EPHS. As mentioned above, Phase 2 will require the deployment of additional staff from specific cadres,in order to fully and adequately staff each facility. The EPHS spreadsheet tool is designed to incorporate Phase 2 projections; the user's guide provides instructions on how to develop cost projections for both Phase 1 and Phase 2 staffing levels.

with institutes in neighbouring countries with higher or regionally aggregated demand. However, an enormous increase in training capacity is required as well as a complete revolution or reshaping of the current health workforce. Because of the long time needed to train health professionals, this massive exercise will take considerable foresight and planning.

II USERS' GUIDE FOR THE EPHS COST PROJECTIONS TOOL

A Introduction

This guide provides instructions for using the ***EPHS Cost Projections Tool – v.1*** workbook, a set of Excel spreadsheets that permit you to develop estimated cost projections for implementing the EPHS under various scenarios and at various scales. The tool can be used to develop cost projections at the macro level of the overall health system, or the micro level of the individual health facility.

It is envisaged that the EPHS will be implemented in two phases. During Phase 1, each EPHS-enabled health facility will have a minimum complement of appropriately-trained health workers. In Phase 2, each health facility will be allocated additional staff, resulting in an adequate number of health workers of each cadre. In other words, from a cost perspective the only difference between Phase 1 and Phase 2 is the cost of staff[5]. Phase 1 and 2 staffing recommendations in the EPHS have been made only for Primary Health Units (PHUs), Health Centres (HCs) and Referral Health Centres (RHCs). The EPHS model does not include staffing recommendations for district or "generic" hospitals, although district hospitals are included in the EPHS cost projections tool. The EPHS-enabled Regional Health Offices (RHOs) are assumed to be fully staffed no matter when they are established. Finally, note that Regional and/or National referral hospitals, TB centres and mental hospitals are not included in the EPHS cost projections.

The spreadsheet tool is based on the standard concept of a cost profile for a health facility, consisting of a set of capital and recurrent budget line items. However, the tool projects costs only for the specific design elements of the EPHS and ***does not include all of the cost elements*** that normally would be included in a full cost analysis of a health system or an individual health facility. The specific budget line items that are incorporated into the cost projections tool are shown in Table 1 below and are assumed to be those elements that will be funded primarily by donors, at least in a short- to medium-term implementation timeframe.

5 The phased introduction of EPHS is designed to account for the time it will take to train and deploy sufficient numbers of health workers, particularly for the higher-skilled cadres.

Table 1: Budget line items included in the EPHS spreadsheet tool

Capital line items	Recurrent line items
Vehicles	Staffing
Construction (for HCs and RHOs)	Drug supply
Non-consumable supplies & equipment	Consumable supplies & equipment
	Transportation
	Maintenance of non-consumable equipment
	Maintenance of physical plant & utilities

As such, the spreadsheet tool is limited in capability and is meant only for developing cost projections for discussion, advocacy and initial planning purposes. It is not appropriate for other basic health services packages, at least not without revision, and it cannot not be used for retrospective cost analyses.

It is expected that users will refine the information in the spreadsheet tool as more accurate information about the cost of inputs becomes available. It is assumed that users have basic skills in using Excel spreadsheets, in order to allow you to modify all variables and formulas in the workbook.

Over time the workbook can be made more user friendly through, for e.g., the use of VBA techniques available in the Excel spreadsheet package.

B Using the spreadsheet tool for "macro" analyses

Worksheet tabs in the workbook are colour-coded to represent different components of the cost projections. In the sections below, each colour-coded group of worksheets is reviewed.

B.1 The basics

Before beginning a cost projection scenario, you should first save a new copy of the workbook file, using an appropriate naming convention. Depending on the complexity of the scenario(s) under analysis, you may need to save several new copies. For example, if you want to run scenarios based on two different salary scales, you should save one new copy as a "low salary" version and one as a "high salary" version.

The summary worksheets at the beginning of the workbook (labelled "Phase 1 Costs" and "Phase 2 Costs") are where the final cost projections will appear after you have filled out the appropriate worksheets elsewhere in the workbook. As all of the other worksheets must be reviewed or filled out prior to calculating the cost projections, these two worksheets will be described at the end of this section, after the other worksheet groups have been reviewed.

B.2 Yellow tabs: salary scales

The salary scales that will be offered to each cadre of health worker are listed in the yellow-tabbed worksheets. Two alternate salary scales are used in the cost projections tool: a) US dollar amounts based on a standard salary scale that has been proposed locally, and b) US dollar amounts based on a UNICEF-proposed salary scale which incorporates a system of graduated factors for increasing both the absolute amount of pay for many cadres, as well as the differences in pay between the broad pay grades.

Both the standard proposal and the UNICEF-proposed salary scales increase the base levels of pay over the current official pay scales, but the UNICEF-proposed salaries are considerably higher, particularly for grades A and B. Table 2 below provides several examples.

Table 2: Examples of "standard" vs. "UNICEF-proposed" salary scales

Grade	Cadre	Standard salary USD	UNICEF-proposed factor	UNICEF-proposed salary USD
Grade A8	General doctor	132	3	396
Grade B10	Registered nurse	108	2	217
Grade C9	Community health worker	108	1.5	163
Grade D13	Health aide	59	1	59

B.2.1 Salary Scales NWZ

On this worksheet, columns A and B list the different grades and categories of health workers in each grade. The list of staff grades and job titles is in draft form; it is expected that users will make changes to the list as staff grades are finalized in the zones.

There are three columns related to salary scales: column D contains salary recommendations for NWZ developed by the NCSC, in Somaliland shillings (SLSH). Column E calculates USD values for the SLSH amounts, and column F calculates the UNICEF-proposed salary scales based on the UNICEF-proposed multiplier factors listed in cells F4, F13, F19 and F25.

One may change any values in this worksheet, keeping in mind that the cells in columns E and F contain formulae, so it's easiest to change salary values in terms of SLSH in column D.

B.2.2 Salary Scales NEZ

At time of writing, no locally-recommended salary scales are available for NEZ. For this reason, salary scales for NWZ have been cut and pasted into the worksheet for NEZ. Note that two temporary columns – columns F and G – incorporate the NWZ salary data.

When one has identified relevant data for NEZ in either Somalia shillings (SOSH) or USD, one may delete the temporary columns and use the worksheet in the same way as "Salary Scales NWZ". **Please note**: the formulae for calculating staff costs (see section 2.3 below) for NEZ are currently based on the temporary columns F and G. When ready to include NEZ-specific data in the "Salary Scales NEZ" worksheet, one will need to change the associated cell numbers in the formulas in the staff cost worksheets for NEZ.

B.2.3 Salary Scales NEZ

At time of writing, no locally-recommended salary scales are available for CSZ. For this reason, salary scales for NWZ have been pasted into the worksheet for CSZ. Note that two temporary columns – columns F and G – incorporate the NWZ salary data.

When one has identified relevant data for CSZ in either Somalia shillings (SOSH) or USD, one may delete the temporary columns and use the worksheet in the same way as "Salary Scales NWZ". **Please note**: the formulae for calculating staff costs (see section 2.3 below) for CSZ are currently based on the temporary columns F and G. When ready to include CSZ-specific data in the "Salary Scales CSZ" worksheet, one will need to change the associated cell numbers in the formulas in the staff cost worksheets for CSZ.

B.3 Pink tabs: EPHS budget line items

The pink-tabbed worksheets provide information and changeable variables related to the different recurrent and capital line items included in the EPHS. **Remember**: as noted above, not every line item/cost element that would be included in a standard cost analysis is included in the EPHS cost projections. (Examples of line items that are not included will be discussed in sections below.)

B.3.1 Staff Costs

Staff costs for the EPHS are based on the salary scales in the yellow-tabbed worksheets described above in section 2.2. Separate worksheets are provided for standard and UNICEF-proposed salary scales, for each of the three zones. Thus, there are six separate worksheets for staff costs:

- Staff Costs NWZ
- Staff Costs NWZ - UNICEF
- Staff Costs NEZ
- Staff Costs NEZ - UNICEF
- Staff Costs CSZ
- Staff Costs CSZ - UNICEF

Any changes made to the yellow-tabbed salary scales worksheets will be reflected in the pink-tabbed salary cost worksheets. Staff costs are calculated for PHUs, HCs, RHCs, district or "generic" hospitals, and RHOs, all based on the number of facilities of each type selected for each zone (further described in section 2.4 below).

As mentioned in sections 2.2.2 and 2.2.3 above, the salary cost spreadsheets for NEZ and CSZ are currently linked to NWZ-specific salary data. For example, select cell D4 on the "Salary Costs – NEZ" worksheet. You will see that the formula links to "Salary Scales NEZ" worksheet cell F23, which contains the cut and pasted values from the NWZ salary scales worksheet.

When one has replaced the NWZ data with zone-appropriate data in both yellow-tabbed NEZ and CSZ salary scales worksheets, one needs to ensure that the formulae in columns D and K (labelled "monthly salary") in each of the four pink-tabbed NEZ and CSZ salary cost worksheets, link to the appropriate cells in the salary scales worksheets. If one needs to change cell numbers in formulae in columns D and K, use the "Ctrl" key to select all relevant cells in each salary cost worksheet, then use the "Replace" command to change the formulae so that they link to the proper cells in the yellow-tabbed salary scales worksheets.

B.3.2 Drug supplies

The drug supplies worksheet contains a long list of all the drugs that should be available for proper implementation of the EPHS (for PHUs, HCs, RHCs and hospitals – note that no drug supplies are listed for the RHO, as it is not a drug dispensing facility). The worksheet includes the following columns for each level of the EPHS:

- Unit price
- Units
- Stocked?
- Consumption (Low, Medium and High)

The columns under "Consumption" represent a crude method of estimating the costs of drug consumption. In the absence of actual drug consumption data on which to base cost estimates, the spreadsheet tool estimates low, medium and high drug consumption based on timeframes for re-ordering drugs after stock-outs, as below:

- Low consumption = drug supply re-ordered every six months
- Medium consumption = drug supply re-ordered every three months
- High consumption = drug supply re-ordered every month

The current unit prices in the worksheet have come from a variety of sources (note the comment in cell B3). An attempt to check and verify unit prices should be made before calculating cost projections. In addition, users should check and verify the values in the "Units" column to ensure that the unit cost properly reflects the unit under consideration. For example, the drug "Amoxicillin tablet, 250 mg" is listed at a unit price of $28.35. Users will need to ensure that they know whether that unit price is per tablet or per bottle/packet of tablets.

Similarly, the number entered into the "Units" column should be a "composite" number: it should reflect both the unit in which the drug is sold (e.g. bottle, packet, single tablet, etc.) and the number of units that would normally be stocked at a given facility. For example, it will be seen that for "Amoxicillin tablet, 250 mg", the number of units is three. This means that each time there is a stock-out of the drug, three units will be re-ordered. A low-consumption cost projection for this drug would thus be: 28.35 unit price x 3 units x 2 (because re-ordering takes place every six months) = $170.10.

Finally, the "Stocked?" column indicates whether or not the particular item should be in stock at each particular

health facility. Cost projections for the three levels of drug consumption are calculated only if one types in "X" in the appropriate cell.

B.3.3 Consumable supplies and equipment

This worksheet lists and calculates cost projections for consumable medical, laboratory, nutrition programme and administration supplies for all levels of the EPHS, including the Regional Health Offices (RHOs).

Consumption levels are calculated in the same way as in the drug supply worksheet. As with the drug supply worksheet, you should check, verify and update all unit cost and unit data for each item in the list.

B.3.4 Non-consumable supplies and equipment

This worksheet permits cost projections for non-consumable supplies and equipment, i.e. supplies and equipment that can be expected to last longer than one year. (It will be noted that there are no "consumption" columns because these items are non-perishable and are not consumed during the course of a year.)

The list of items includes furniture, non-perishable medical, lab and diagnostic equipment, electrical and lighting fixtures, communications gear, and administrative equipment such as computers and other office appliances. A list of equipment for a Regional Medical Stores (RMS) is also provided (note that a RMS would be based at the Regional Health Office).

As with other items in the sub-sections above, prices and quantities required should be verified for each item before calculating cost projections.

B.3.5 Transportation

The "EPHS Transport" worksheet includes both capital and recurrent costs for transportation, mostly for EPHS-enabled facilities. **Note:** for the central level, the only line item included is the capital cost of a single 4x4 vehicle for the central level MoH in each zone; there is no consideration of the recurrent costs associated with the vehicles, because it is assumed that central level MoH offices would cover recurrent costs for their EPHS-related vehicles.

Transportation capital costs (funded by donors) under the EPHS consists of bicycles, motorbikes for outreach and supervision, and 4x4s for use as admin vehicles and ambulances. Bicycles are provided for PHUs and HCs; an ambulance and a motorbike for each RHC, three ambulances, two admin 4x4s and a motorbike at each generic hospital; and an admin 4x4 and two motorbikes at each RHO (in addition to the single admin 4x4 for each central level MoH office).

Difficulties arise in projecting transportation costs, as limited information on current transport usage exists and is hard to find. Cost estimates are thus based on crude flat rates or lump sums, as depicted in Table 3 below. One can of course change any variable in the worksheet, as more accurate data become available.

Table 3: Assumptions concerning recurrent costs for transportation operations

Recurrent cost element	Means of estimation
• Fuel	• Litres per week x cost per litre x weeks of operation
• Spare parts, lubricants	• 20% of original capital cost of vehicle
• Maintenance and repairs	• 115% of annual fuel costs
• Insurance, taxes, licenses	• Lump sum estimate

If one chooses to change a variable, e.g. a different flat rate estimate for maintenance and repairs, it will be necessary to change the relevant variable at all levels on the "EPHS Transport" worksheet (i.e. at PHU, HC, RHC, hospital, RHO and central levels). Alternatively, one may decide to use different variables at different levels; for example, assuming that since motorbikes at the RHO level will be used extensively for supervision, they may have higher-than-usual maintenance and repair costs.

B.3.6 Renovation & construction

This worksheet demonstrates another instance in which only selected line items are included in the EPHS cost projections. Figures for construction costs are included only for Health Centres (for a new maternity ward) and for Regional Health Offices (for the possible construction of a Regional Medical Stores facility). In each case, the variables that can be changed are:

• length • width • construction cost per square metre

It is also possible to include the costs of renting rather than constructing a RMS facility in the EPHS cost projections.

B.3.7 Foreign exchange rates

This simple spreadsheet includes cells for calculating USD amounts for both Somali shillings (SOSH) and Somaliland shillings (SLSH). Current rates should be included here, as some calculations (e.g. salary scales in USD) use these figures.

B.4 Green tabs: selecting the number of facilities in each zone

There is a separate green-tabbed worksheet for each zone for selecting the number of each type of facility that one wants to include in cost projections. The worksheet layout is the same for each zone.

In each of the green-tabbed worksheets, column A lists the regions for the respective zone. Note that space is left for the possibility that one or more zones may "split" regions so the total number of regions will increase.

Columns C-E allow one to choose to establish a Regional Health Office in each region during Phase 1, and whether to build and equip a RMS at each Phase 1 RHO. For example, users may choose to equip a RMS, but not to build one if sufficient space is already available. Columns F-H are for establishing RHOs and RMSs during Phase 2.

Columns J and K enable decisions to be made on how many PHUs to establish during Phases 1 and 2. It is generally assumed that many existing Health Posts will be upgraded to PHUs, although within the context of the EPHS workbook there is no explicit need to link the number of existing HPs to the number of PHUs to be established in each region.

Columns M-P provide space for selection of how many Health Centres are to be established in each region, and for the number of HCs where maternity wards would be constructed. A key recommendation of the EPHS is that each HC should have a maternity ward. Presently, few MCH-OPDs have sufficient wards for deliveries and post-natal care.

Columns R, S, T, V and W relate to Regional Health Centres (RHCs). In some regions, existing district hospitals will remain designated as "hospitals" – this can be entered in column R. In other regions, some district hospitals may be designated as RHCs – this can be entered in columns S and T (for Phases 1 and 2). Finally, it may be that one or more regional hospitals will be downgraded to RHCs; although this may be unlikely, the possibility is provided for in columns V and W (also for Phases 1 and 2).

B.5 Purple tabs: summary pages for capital and recurrent costs

Once all the information has been checked and verified in the yellow- and pink-tabbed worksheets, and the number of health facilities in each category entered in the green-tabbed worksheets, the results of the cost projections will be available in the purple-tabbed summary worksheets.

(**Note**: If one wishes for cost projections to include the capital cost of a single EPHS vehicle for each zone's central level MoH, one will need to manually type the number 1 in cells B6, D6 and F6 on the "Phase 1 Costs" worksheet. Note that there is no capital cost element for the central level on the "Phase 2 Costs" worksheet.)

C Using the spreadsheet tool for "micro" analyses

C.1 The basics

Using the **red-tabbed** worksheets, it is possible to create projections for the cost of operating an individual EPHS-enabled health facility for one year.

Note that the red-tabbed worksheets include annualised capital costs, i.e. allocations for capital expenditures spread across the estimated lifespan of the capital item (using a straight line approach – new physical plant is estimated to last 10 years; new vehicles and equipment have an estimated lifespan of five years). This is a little different from the approach used in the "macro" analyses, which calculate capital costs as up-front costs incurred in the first year of operation.

Recurrent costs include those listed in Table 1 in section 1 above. In addition, allocations are made for sea freight and overland shipping (15 percent and 20 percent respectively) for drugs and consumable supplies and equipment. Maintenance and repair of non-consumable equipment is estimated at 15 percent of annualised capital costs, while maintenance of physical plant plus utilities is estimated at 110 percent of the annual equipment maintenance amount.

Because the red-tabbed worksheets include annualised capital costs, freight and shipping allocations, and maintenance and repair of equipment and physical plant, the resulting cost projections are likely to be closer to the full costs of operating a health facility for a year. This means that cost projections for an individual health facility using the red-tabbed worksheets will be slightly larger than the amount one would get if one took, say, the total recurrent costs of all Health Centres in a macro analysis (from the purple-tabbed worksheets) and divided that amount by the number of Health Centres in one's green-tabbed worksheets.

C.2 Red tabs: cost projections for individual facilities

Red-tabbed worksheets are provided for the following facilities: Primary Health Units, Health Centres and Referral Health Centres (for Phases 1 and 2) and Regional Health Offices (including Regional Medical Stores). Note that no distinction is made between Phases 1 and 2 for the RHOs, as it is assumed that RHOs will be fully staffed no matter when they are established. Also note that at present there are no red-tabbed worksheets for hospitals.

The red-tabbed worksheets are mostly of the same design, with a few minor variations depending on the type of facility under consideration. To get an idea of how the individual facility worksheets operate, select the worksheet titled "Primary Health Unit – P1" ("P1" refers to Phase 1).

It will be seen that the capital costs section includes non-perishable equipment and vehicles. The figures for each line item are drawn from the pink-tabbed worksheets. The "annualised capital costs" listed under column I are calculated using a straightline depreciation method.

Recurrent cost line items include staffing, drug supply, consumable medical supplies and equipment, transportation operation & maintenance, maintenance and repair of health equipment, and maintenance and repair of the physical plant. Maintenance and repair figures are crude flat rates; users may change these rates in the formulas should they choose to do so.

Now click on cell H11 and choose either: "nwz", "unwz", "nez", "unez", "csz" or "uncsz". These acronyms refer to the relevant salary scales that users want to use. A "un" indicates the UNICEF-proposed salary scales. Note that at present, each zone uses the same scales for MoH salaries and the same scales for UNICEF-proposed salaries. As mentioned above in section 2, once the yellow-tabbed salary scale worksheets have been changed to incorporate zone-specific figures, the red-tabbed worksheets will change as well.

Next, click on cell H13 to select low, medium or high levels of "drug consumption". Similarly, click on cell H19 to select low, medium or high levels of consumption of consumable medical supplies and equipment.

Once values for the yellow-coloured cells has been chosen, one will get an amount that represents an estimate of the annualised cost for a Primary Health Unit during Phase 1. Simply delete the entries in the yellow-coloured cells in order to "reset" the worksheet.

For Health Centres, one must choose whether or not to build a maternity ward. Select "build" if it is wanted to include the annualised cost of maternity ward construction in a cost projection for a Health Centre.

For Regional Health Offices, users can select "build" and "equip" if it is wished to both construct and equip a Regional Medical Stores facility. Leave the "build" cell blank if it one only wants to equip a RMS, if (for example) one already has sufficient space at the RHO to establish a medical stores facility. Please note that there is no selection for "drug consumption" at the RHO, since the regional office is not a dispensing facility.

D The Human Resources Calculator

This guide provides instructions for using the "HR Calculator" workbook, a set of Excel spreadsheets that permit the development of estimated "staff projections" for implementing the EPHS under various scenarios and at various scales. The tool can be used to develop staff needs projections at the "macro" level of the overall health system or at sub-levels such as regional health systems.

It is envisaged that the EPHS will be implemented in two phases: during Phase 1, each EPHS-enabled health facility will have a minimum complement of appropriately-trained health workers. In Phase 2, each health facility will be allocated additional staff, resulting in an adequate number of health workers of each cadre. In other words, from a cost perspective the only difference between Phase 1 and Phase 2 is the cost of staff[6]. Phase 1 and 2 staffing recommendations have cost implications but also *implications for the development, recruitment, deployment and retention of human resources.*

Phase 1 and 2 staffing recommendations in the EPHS have been made only for Primary Health Units (PHUs), Health Centres (HCs) and Referral Health Centres (RHCs). The EPHS model does not include staffing recommendations for district or "generic" hospitals, although district hospitals are included in the EPHS cost projections tool. EPHS-enabled Regional Health Offices (RHOs) are assumed to be fully staffed no matter when they are established. Finally, note that Regional and/or National referral hospitals, TB centres and mental hospitals are not included in the EPHS cost projections.

The spreadsheet tool is based on the standard concept of a staff profile for a health facility.

(1) The first page sets out the numbers of staff for each level of health facility and per phase **(No staff).** This template can be changed if staffing patterns are to be shifted in the EPHS.

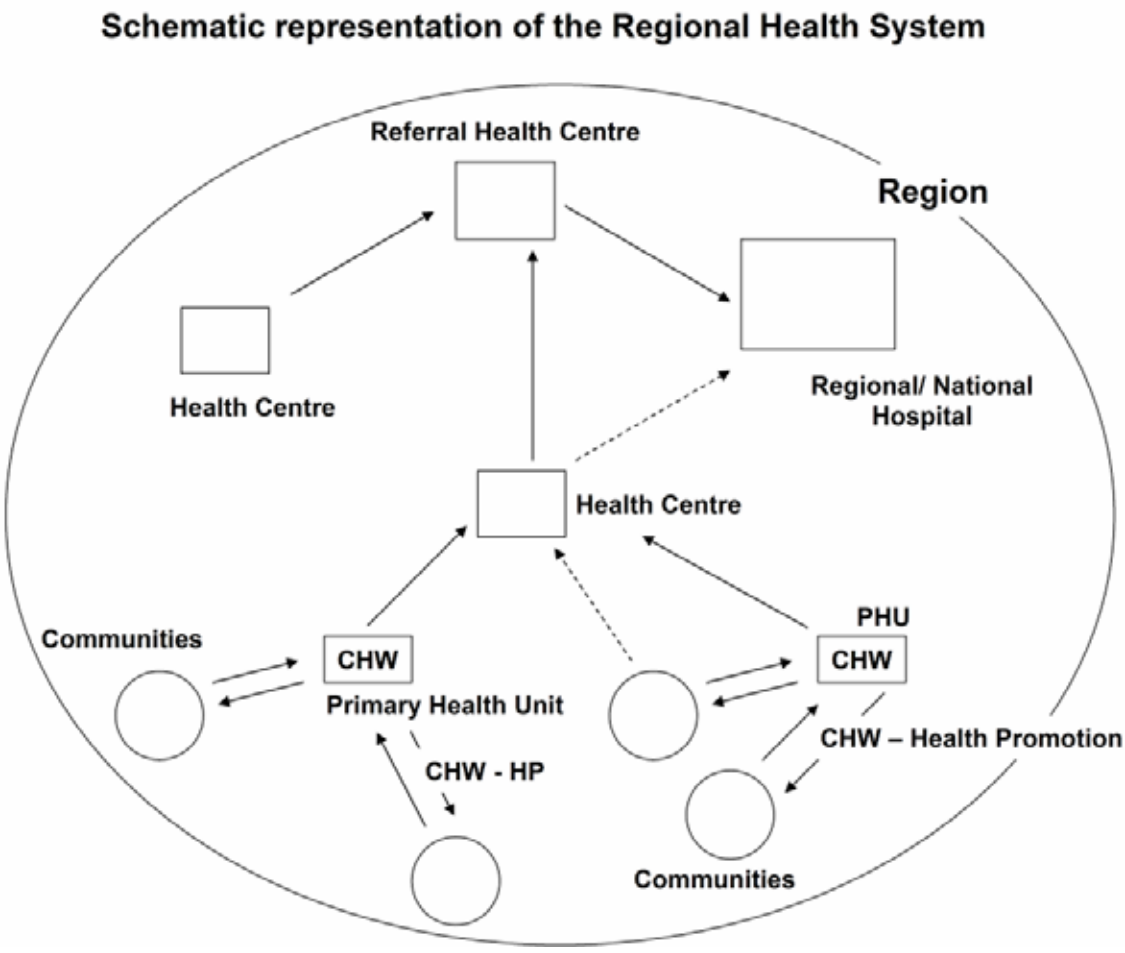
(2) The second page is where users fill in the total number of facilities for each tier to be supported, as well as Regional Health Offices (**total centres – columns B and C)**.

(3) The third page gives a total listing of the staff required.

6 The phased introduction of EPHS is designed to account for the time it will take to train and deploy sufficient numbers of health workers, particularly for higher-skilled cadres.

Annex I

Systematic representation of the Regional Health Systems



Annex II

Staff cadres for the EPHS and two alternate salary ranges

	Category examples (not exhaustive)	"Standard" suggested rates USD	UNICEF proposal = standard x factor
Grade A			Factor = 3
A1	MoH Senior Director	257	772
A2	Departmental Director, Central MoH	234	702
A3	Regional Medical Officer, Regional Health System CEO	213	638
A4	Regional/ National Hospital Chief Medical Officer	192	575
A5	District Hospital CMO, District Hospital CEO	176	527
A6	Referral Health Centre CMO/CEO	160	479
A7	Senior Specialist Doctor (Department Head)	145	436
A8	General Doctor, Specialist Doctor	132	396
A9	HMIS/Transport/RMS Manager (Region/RHC) - university qualified	120	360
Grade B			Factor = 2
B6	Health/Clinical Officer, RHC/ DH Administrator, Hospital Chief Nurse	160	319
B7		145	290
B8	Management-level Nurse, Management-level Pharmacist	132	264
B9	HMIS/Transport/RMS Manager (Region/RHC) - secondary education	120	240
B10	Registered Nurse/Midwife/Pharmacist, Lab Technician	108	217
Grade C			Factor = 1.5
C7		145	218
C8		132	198
C9	Community Midwife, Auxiliary Nurse. Pharm/Lab/X-ray Assistant	120	180
C10	Community Health Worker (CHW), HMIS Officer (HC)	108	163
C11	Senior Maintenance Tech, Senior Driver (RHC, Hospital)	95	143
Grade D			Factor = 1
D12	Maintenance Tech, Driver, Senior Health Aide	65	65
D13	Health Aide	59	59
D14	Senior Cleaner, Senior Security	54	54
D15	Cleaner, Security	49	49

Annex II

Projected staff needs in each scenario

Human Resource Management	Scenario 1		Scenario 2		Scenario 3	
Minimum Staffing	**Phase I**	**Phase II**	**Phase I**	**Phase II**	**Phase I**	**Phase II**
CHW	615	1230	600	1200	283	566
Auxiliary nurse	421	842	235	470	167	334
Community midwife	421	842	235	470	167	334
MW	617	1088	316	578	250	436
Nurse	1238	1905	659	1002	493	762
Health/clinical officer	50	146	27	54	19	64
Doctor	100	246	54	108	38	102
Professional qualified for caesareans	146	196	54	81	64	83
Anaesthetic assistant	96	96	27	27	45	45
Lab assistant	146	617	54	316	64	250
Lab technician	146	242	54	81	64	109
X-ray technician	0	50	0	27	0	19
Pharmacist technician	50	146	27	54	19	64
Pharmacist	0	50	0	27	0	19
Dental technician	50	146	27	54	19	64
Dentist	0	50	0	27	0	19
Ophthalmic technician	50	96	27	27	19	45
Physiotherapist	0	50	0	27	0	19
Hospital administrator (MBA)	0	50	0	27	0	19
Regional Medical Officer	19	19	19	19	19	19
PHC Coordinator	19	19	19	19	19	19
EPI Coordinator	19	19	19	19	19	19
Cold Chain Manager	19	19	19	19	19	19
Nutrition Coordinator	0	19	0	19	0	19
Regional Finance Officer	0	19	0	19	0	19
HMIS Officer/Health Information Manager	19	19	19	19	19	19
Transportation Officer/ Manager	0	19	0	19	0	19
Regional Medical Stores Manager / Pharmacy Assistant	19	19	19	19	19	19
TOTAL	**4260**	**8259**	**2510**	**4828**	**1825**	**3524**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