

COST ANALYSIS OF THE ESSENTIAL PACKAGE OF HEALTH SERVICES (EPHS) IN SOMALIA

Final Report

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This assessment is being carried out by HEART (Health & Education Advice & Resource Team).

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List of abbreviations

ABC	Activity-Based Costing
ANC	Antenatal Care
BPHS	Basic Health Services Package
DCM	Dynamic Costing Model
DFID	UK Department for International Development
EPHS	Essential Package of Health Services
EPI	Expanded Programme on Immunisation
FTE	Full-Time Equivalent
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Society for International Cooperation)
HC	Health Centre
HCS	Health Consortium for the Somali People
HEART	Health & Education Advice & Resource Team
HPA	Health Poverty Action
MoH	Ministry of Health
PHU	Primary Health Unit
PNC	Postnatal Care
PSI	Population Services International
RHC	Referral Health Centre
SCI	Save the Children International
THET	Tropical Health and Education Trust
ToR	Terms of Reference
UNICEF	United Nations Children's Fund
VfM	Value for Money

Executive summary

Background

Since mid-2010, the Essential Package of Health Services (EPHS) has been implemented in three Somali regions by a consortium of partners (known as the Health Consortium for the Somali People; HCS) supporting the Ministries of Health (MoHs). The HCS is a consortium of five international NGOs working together to implement an integrated health programme in targeted areas of Somaliland, Puntland and South Central. This five-year programme (2010–2015) is funded and supported by the UK Department for International Development (DFID). The main implementers of the EPHS are Health Poverty Action (HPA) in Sahil Region, Save the Children International (SCI) in Kakaar Region, and Trocaire in Gedo.

Working in partnership with health authorities, civil society and communities, the HCS aims to increase the range, quality, and use of health services and improve the health status of the Somali people with a focus on reproductive, maternal and child health. The programme supports the provision of essential health services, including antenatal care (ANC) and postnatal care (PNC), skilled birth attendance, vaccinations, and emergency and basic nutrition services, as well as child spacing services and products.

As the EPHS is implemented and potentially expands in both scale and scope, an understanding of the actual costs of EPHS service delivery is significant for achieving cost-efficiency in terms of current activities as well as for attaining cost-effectiveness if carried out on a larger scale.

Key economic questions

There are several key economic questions guiding the overall approach and analysis of the study. These questions include the following:

1. What are the actual total and unit costs of EPHS implementation in the regions where HCS partners are implementing the EPHS?
2. What are the primary cost components of EPHS implementation, including, but not limited to, infrastructure and equipment, human resources, training and capacity building, drugs and medicines, and recurrent costs?
3. What are the main cost drivers in the implementation of the EPHS due to remoteness (urban/rural), security, or level/type of care?
4. How would the costs of the EPHS vary based on changes to either the scope or scale of EPHS implementation? What are the normative costs of EPHS implementation under various scenarios?
5. How can the HCS improve value for money (VfM)/investment in the EPHS in Somalia, including improved application of the costing model?

Methodology

In order to conduct the actual costing of the EPHS, site visits were made within the time allotted for the consultancy to two of the three regions of Somalia. The contacted work began in mid-July 2014, while field visits for data collection in Nairobi and Somalia took place during August 2014. The consultant identified the 'cost perspective' and time period of analysis, possible sources of data, and requirements for visits to the field.

In order to provide a robust, reliable analysis, costing was conducted at two levels. First, using financial data from Population Services International (PSI), the lead partner of HCS, and the

individual implementers, a ‘top-down summary financing for each implementer’ was established. This analysis provides an overview of EPHS implementation by implementer, primary resource category and facility type. In Section 6 of this report – on the cost analyses and findings – these are the first analyses to be presented.

Second, a facility-based costing tool was tailored (from use in previous studies) in order to fully capture the Somalia health centre (HC) and referral health centre (RHC) costs and to ultimately derive the unit costs of EPHS implementation. In this model, cost data are organised using a spreadsheet-based step-down cost-allocation tool, which is composed of both data entry and automated data analysis worksheets. The workbook applies facility-specific allocation factors to apportion the costs among final direct service activity centres so as to generate the unit costs.

Key findings

This cost study of the EPHS in the three zones of Somalia provides an important step in establishing the fundamental building blocks for further economic and VfM analysis of EPHS implementation and impact.

The following points summarise the key findings of the study within each of the economic questions explored:

- **What are the actual total and unit costs of EPHS implementation in the regions where HCS partners are implementing the EPHS?**

As identified in this study, the actual total annual costs of EPHS implementation among the three implementers range from US\$ 1.5 to US\$ 2 million, while amortised costs range from US\$ 1.1 to US\$ 1.3 million. Amortised per capita spending by HPA in Sahil averaged US\$ 5.30, by SCI in Kakaar it averaged US\$ 6.85, and by Trocaire in Gedo it averaged US\$ 5.51. Unit costs of services have been generated for the key EPHS services. The most costly of these services are normal delivery (ranging from US\$ 30 to US\$ 67 per delivery), PNC (US\$ 8.30–US\$ 17.68 per pregnant woman), Expanded Programme on Immunisation (EPI) (US\$ 10.20–US\$ 22.40 per treated case), and pneumonia (US\$ 8.78–US\$ 21.42 per treated case).

- **What are the primary cost components of EPHS implementation, including, but not limited to, infrastructure and equipment, human resources, training and capacity building, drugs and medicines, and recurrent costs?**

These primary cost components were explored in detail for an average facility at different levels of EPHS implementation among the three implementers. HPA incurred the highest average capacity building, infrastructure and medical equipment costs while SCI incurred the highest average human resources and recurrent costs. Trocaire incurred the highest average costs for drugs and medicines.

- **What are the main cost drivers in the implementation of the EPHS due to remoteness (urban/rural), security, or level/type of care?**

Differences in costs captured between implementers have been identified for the following factors: 1) cost structures; 2) input prices for infrastructure, equipment, human resources, and drugs and medicines; and 3) variation in utilisation of services. Given that there is only one EPHS implementer in each region, an analysis of the attribution of variation (e.g. due to factors such as location or policy) has not been conducted in this study.

- **How would the costs of the EPHS vary based on changes to either the scope or scale of EPHS implementation? What are the normative costs of EPHS implementation under various scenarios?**

In this study, a facility-based spreadsheet cost workbook has been established to examine the actual costs of EPHS implementation. This can also be applied for normative costing at an individual facility level, at an average facility level, or for overall EPHS implementation in a specific region or location.

- **How can the HCS improve VfM/investment in the EPHS in Somalia, including improved application of the costing model?**

Now that the unit costs of the EPHS have been established in this study, more advanced economic analysis and assessment of VfM can be conducted and applied to resource-related decision-making at various levels. Specifically: a) the costing tool can be used for normative costing; b) EPHS implementers can apply the model for tracking efficiency and VfM in the provision of services; and c) the methodology can be applied either observationally or prospectively. Furthermore, the collection of additional data or the modelling of factors that could have an impact on the variation of cost could also improve VfM. These activities are further described in the next section of the report.

Recommendations

As a result of the study, the following recommendations are made:

Recommendation #1 – Resource and financial planning for EPHS scale-up for government and development partners (normative costing)

Recommendation #2 – Capacity building of EPHS implementers – cost-efficiency and normative costing scenarios

Recommendation #3 – Enhancing cost-effectiveness

Recommendation #4 – Expansion of costs included in the assessment, including indirect costs in the Somalia and Nairobi levels

Recommendation #5 – Proposed study to examine variation in costs

Recommendation #6 – Proposed study to examine private sector health service provision and costs

1 Background and objectives

Since mid-2010, the EPHS has been implemented in three Somali regions by HCS, supporting the MoHs in these regions. HCS is a consortium of five international NGOs working together to implement an integrated health programme in targeted areas of Somaliland, Puntland and South Central. This five-year programme (2010–2015) is funded and supported by DFID.

Working in partnership with health authorities, civil society and communities, the HCS aims to increase the range, quality, and use of health services and improve the health status of the Somali people, with a focus on reproductive, maternal and child health. The programme supports the provision of essential health services, including ANC and PNC, skilled birth attendance, vaccinations, and emergency and basic nutrition services, as well as child spacing services and products.¹ Therefore, the HCS plays a strategic role in strengthening the health system of the three zones and contributing to the improvement of health indicators.

The influence of the HCS is, however, wider than just the geographical target areas; for instance, support in strengthening local governance and national policy, including human resources, is being shared across the Somalia health sector to improve overall health services.

As the EPHS is implemented and potentially expands in both scale and scope, understanding the actual costs of EPHS service delivery is significant for achieving cost-efficiency in terms of current activities as well as for attaining cost-effectiveness if carried out on a larger scale.

This final report corresponds with the terms of reference (ToR) entitled 'Terms of reference for EPHS costing 0804' that were circulated on 9 March 2014 and the inception report entitled 'Costing of the Essential Health Services Package EPHS in Somalia, Inception Report' that was submitted to DFID on 8 August 2014. The final report provides a summary of the primary objectives of the consultancy, key economic questions to be addressed, the processes for data collection and analysis, and the main findings and recommendations.

More specifically, this final report has 11 primary components, which are outlined below:

1. Background and objectives of the assignment;
2. Key economic and cost questions to be addressed;
3. Brief review of cost analyses of basic/essential packages of health services in similar country contexts;
4. Cost data collection and site visits in Nairobi, Somaliland, and Puntland;
5. Detailed costing methodology and allocation processes;
6. Cost analyses and findings;
7. Interpretations and variation of cost;
8. Limitations;
9. Conclusion and recommendations;
10. Data sources and references; and
11. List of people engaged with during the mission.

1.1 Objectives of the assignment

In accordance with the ToR and inception report, the primary objectives of this assignment are as follows:

¹ The complete list of EPHS components supported by HCS is listed in Section 12 of this report.

- 1) To identify the actual costs of EPHS implementation and variation among these costs in delivering health services in the different regions of Somalia in order to guide the further rollout of EPHS.
- 2) To compare actual costs versus projected costs as per UNICEF's original EPHS costing model, conducted in 2009. This includes an assessment of the changes in scale and scope of the EPHS since the original costing, along with an assessment of key cost drivers.
- 3) To determine ways to improve the VfM in the HCS for EPHS delivery, building on the existing consortium VfM model and analysis and making recommendations on how to improve the ongoing assessment of cost-effectiveness. This includes identifying and addressing the key economic questions where VfM is most pertinent at this point in time (i.e. necessary inputs for capacity building and training for new cadres of health workers, infrastructure development of RHCs, mental health support, and longer-term development).

2 Economic questions

2.1 Key economic questions to be addressed

There are several key economic questions that, once addressed in the investigation, will provide important information for decision-making regarding resource inputs into the EPHS by the government, DFID, HCS and other development partners in both the current phase of implementation and in future planning.

These questions include the following:

1. What are the actual total and unit costs of EPHS implementation in the regions where HCS partners are implementing the EPHS?
2. What are the primary cost components of EPHS implementation, including, but not limited to, infrastructure and equipment, human resources, training and capacity building, drugs and medicines, and recurrent costs?
3. What are the main cost drivers in the implementation of the EPHS due to remoteness (urban/rural), security, or level/type of care?
4. How would the costs of the EPHS vary based on changes to either the scope or scale of EPHS implementation? What are the normative costs of EPHS implementation under various scenarios?
5. How can the HCS improve VfM/investment in the EPHS in Somalia, including improved application of the costing model?

The period of cost analysis pertains to three years of EPHS implementation from 2011 through 2013 across the different regions of Somalia in order to capture important start-up costs and the costs of ongoing recurrent operations. Cost and resource input data were collected and analysed from the primary EPHS implementing partners within the HCS:

- HPA – Sahil Region, Somaliland
- SCI – Kakaar Region, Puntland
- Trocaire – Gedo Region, South Central
- Tropical Health and Education Trust (THET) – Somaliland focus, with some support to South Central and Puntland
- PSI – Somaliland focus, with some support to South Central and Puntland

2.2 Cost measures to be derived

The ToR stipulate that the analysis should include the derivation of the following unit costs:

1. Total cost per facility – capital and recurring costs as defined by the UNICEF costing model, including costs for refurbishment and infrastructure;
2. Average total cost per service provided;
3. Maternal and newborn health – ANC, PNC, delivery by skilled birth attendants, newborn care;

4. Child health and immunisations – Penta 3, Nutrition, Pneumonia, diarrhoea;
5. Chronic health, mental health and trauma;
6. Total and average cost per visit per service;
7. Cost per child reached;
8. Cost per child life saved (if possible to measure with available data);
9. Per capita cost of health facilities (by catchment area);
10. Average cost per facility and per capita cost by each capital and recurrent cost category as outlined by the UNICEF costing model; and
11. Allocation factors (e.g. space, full-time equivalent (FTE) and other factors, in order to step-down necessary overhead and/support centre costs at the facility level) as required.

In order to conduct an analysis of the actual costs of the EPHS, a review of the UNICEF and HCS costing models, along with the establishment of a more comprehensive costing model, is required. A review of the international literature provides the necessary context for establishing the comprehensive approach; a summary of this literature is provided in the next section of the report.

3 Brief review of cost analysis of basic/essential health services packages in other country contexts

In order to conduct and advance the costing of the EPHS in Somalia, it is important to briefly review the main approaches to costing a basic (BPHS) or essential health services package (EPHS), which have been applied in various country contexts, particularly those in the East Africa region.

3.1 Top-down and bottom-up costing of health services

The costing of health services can generally be considered as either **top-down** or **bottom-up**. **Top-down costing** is more amenable to estimating the macro-level costs of resources when implementing a specific strategy or a package of health services. In health services costing at facility level, the term can also be associated with a step-down cost-allocation process. The step-down technique is a method of allocating a supporting department's costs to other direct health service departments, in a sequential manner based on organisational resource relationships and ultimately to establish unit costs. The sequence typically starts with the supporting department that provides the greatest amount of 'service' (e.g. administration and finance, accounting, etc.) to other departments and ultimately down to the direct health service level (e.g. consultations, vaccinations, etc.). Generally, a **bottom-up approach** is used to estimate the costs of a distinct service (e.g. provision of a normal delivery). Ultimately, the step-down cost-allocation approach as applied to costing the delivery of health services combines the two methods.

One of the main influencers of the final unit cost is the series of **allocation factors** applied in the step-down process. In costing services such as a basic or essential packages of health services delivered by a health facility, these can include data points such as FTE staff counts and percentages, as well as area or space counts (e.g. square metres) and percentages.

In recent health service-costing studies in Rwanda² and Malawi,³ the process of costing as described above was applied and captured costs at three cost centre levels: overhead/indirect, support, and direct services. In Kenya, a more detailed costing model, applying a combination of top-down and bottom-up facility data, is the Dynamic Costing Model (DCM), a computerised model that has been developed by GIZ and implemented by the Kenyan Ministry of Health.⁴ The DCM was developed to account for the normative and actual costs of delivering the Kenya Essential Package for Health. Costing of the Basic Package of Health Services in Afghanistan has also applied a blended approach of top-down and bottom-up practices.⁵

For the health service package costing in Rwanda and Malawi, similar health and hospital indirect and support centres were analysed. These cost centres are further detailed below:

Indirect cost centres – Indirect (overhead) cost centres contain the following facility activities: Administration, Finance, Maintenance and Engineering, Cleaning Services, Security, Laundry, and Sterilisation.

² Blaakman et al., 2006 Rwanda Health Centre and Hospital Cost Study Twubakane Decentralization and Health Project, Kigali, Rwanda.

³ A Cost Study of Maternal and Child Health Services in Malawi In Support of Sector Wide Approach (SWAp) Financing, International Health Economics Association Conference, Toronto, Canada, 10–13 July 2011.

⁴ Blaakman and Kioko, Results from the Dynamic Costing Model in Kenya (2012/2013), International Health Economics Association Conference, Sydney, Australia 7–10 July 2013.

⁵ Blaakman, Salehi and Boitard, A cost-efficiency analysis of two alternative models for implementing the BPHS in Afghanistan, Global Public Health, 5 September 2013: <http://dx.doi.org/10.1080/17441692.2013.829862>

Support cost centres – Support cost centres contain the following facility activities: Laboratory, Pharmacy, Ambulance, and Kitchen for both HCs and hospitals and Operating Theatre and Radiology for hospitals only.

Direct cost centres – Direct cost centres contain the following facility activities: normal delivery, family planning, EPI, general outpatient consultations, etc. Direct service cost centres are different for HCs and hospitals given the different medical and health care activities.

In summary, in order to conduct the step-down cost analysis, indirect (overhead) costs are first allocated to both support and direct cost centres and then support centre costs are allocated to direct cost centres for final totals and the derivation of unit costs. These analyses were conducted from the perspective of one year of service implementation and assume a static model of service delivery, but can be adjusted to the needs of the country context and to the key economic and cost questions to be addressed when examining a basic or essential health services package. Additional costing references are listed in Section 10 of this report.

In order to make the step-down costing process applicable to costing the EPHS in the three Somali regions, adaptations were made to the above-described techniques as conducted in Malawi, Rwanda, and Afghanistan. The tool and process applied will be described in detail later in this report.

3.2 Normative costing approaches

Under the above-described methods, we refer to actual costing. This calculation accounts for the variable costs (drugs, medical supplies and other supplies) and the fixed costs (utilities, maintenance, etc.) incurred by each of the cost centres – overhead, support, clinical support and direct patient – as they are allocated to the patient departments based on a specified variable (e.g. space allocation, adjusted bed-day, etc.).

In contrast to the actual cost calculation, which captures the cost of services as it is currently given, the normative cost calculation sets the resource inputs according to national protocols or to facility standards (e.g. the standard drug regimen of a package of health services, clinical pathways as endorsed by professional bodies, etc.) and also national targets. This is an important approach for developing cost-efficiency models, particularly for working toward achieving VfM or cost-effectiveness with limited resources.

3.3 Activity-based costing approaches

While the above-described approaches are generally applied to capturing the costs of health services delivered by facilities, **activity-based costing (ABC)** is an alternative costing methodology that identifies the goals, objectives, activities and sub-activities of an organisation and establishes the cost of each activity/sub-activity by matching resource inputs with a distinctly calculated unit cost, and then establishing a total cost for each sub-activity and activity. **ABC is generally applied to public health activities, health sector strategies, and broader macro-level interventions.** Each sub-activity also has an indicator or set of measures by which the sub-activity can be evaluated for cost-efficiency (e.g. cost per person reached).

A series of costing tools, including ABC tools, can be found at www.who.int/pmnch/knowledge/publications/costing_tools/en/.

3.4 UNICEF costing model for the EPHS and HCS model

3.4.1 The UNICEF model⁶ and HCS model

As the EPHS in Somalia was designed to be a flexible planning tool, its costing depends on how many of each kind of facility are to be developed and in which areas. The UNICEF model provides a set of cost projections both at the ‘micro’ level of the individual health facility and at the ‘macro’ level of the health system. Projections were produced using a tool developed to complement the EPHS model that was designed in 2009. The cost projections established in 2009 indicated how much it might cost to operate a particular type of EPHS facility for one year, including Primary Health Unit (PHU), HC and RHC.

The **UNICEF model** focuses on the following economic analyses:

- Cost projections for individual health facilities; and
- Cost projections for macro health systems scenarios based on assumptions related to capital infrastructure investment, human resources, and the functionality of health facilities.

The **HCS costing model** focuses on generating and comparing the following unit costs of EPHS service delivery in the three regions of Somalia:

- Cost per ANC visit;
- Cost per normal delivery; and
- Cost per outpatient visit.

Both the UNICEF model and the HCS model were reviewed in the context of current planning needs in Somalia.

3.4.2 Limitations of the UNICEF model and the HCS model

The following limitations of these costing models were identified in relation to their application in the actual costing context:

1. As noted in the UNICEF report, the spreadsheet tool that was developed as the ‘UNICEF costing model’ was 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. Retrospective analyses are critical for actual costing and, therefore, it was determined that the UNICEF model would not be applied for this costing exercise.
2. Upon review, it was identified that the HCS costing model focuses on a limited set of unit costs and currently applies a non-standardised approach to cost allocation. As a result, this technique was not applied in the actual costing, although the approach draws on the principles of step-down cost allocation.

Subsequently, a more comprehensive step-down cost-allocation model to conduct the actual costing of the EPHS was established. The model is fully described in Section 5 of this report.

⁶ UNICEF (2009), Costing the Essential Package of Health Services, Somalia.

4 Cost data collection and site visits in Nairobi, Somaliland and Puntland

4.1 Mission activities

In order to conduct the actual costing of the EPHS in the three regions of Somalia within the time allotted for the consultancy, it was necessary to appropriately plan the mission and identify the 'cost perspective' and time period of analysis, possible sources of data, and requirements for visits to the field.

The contacted work began in mid-July 2014, while field visits to Nairobi and Somalia took place during August. In summary, the following approach was undertaken to conduct the required work:

July 2014

- 1) A **desk-based review of the literature** on costing the EPHS in Somalia and internationally was conducted. This included a review of key EPHS documents and an assessment of both bottom-up and top-down costing approaches (as outlined in the previous section) in order to identify the most appropriate model fit for application to the EPHS costing in Somalia.
- 2) Dr Blaakman conducted **desk-based data collection** in collaboration with Ms Saba Khan so that the HCS partners could have the opportunity to provide cost and service utilisation data prior to the in-country mission period. Specific field locations and facilities to be visited were finalised at this stage.

August 2014

3) Field visits to Nairobi and Somalia

Nairobi: Dr Blaakman and Ms Saba Khan conducted interviews with Trocaire and UNICEF during the first part of the field mission to understand Trocaire's specific costs and UNICEF's initial development of the prospective costing tool. It should be noted that, given current security constraints in South Central, Dr Blaakman interviewed representatives from Trocaire in Nairobi. The team also met with Nairobi-based HCS partners to resolve issues identified in the inception period and discuss initial estimates.

Somaliland and Puntland: Dr Blaakman and Ms Saba Khan travelled to Somaliland and Puntland to meet with the HCS partners and the health authorities for each zone to discuss the costing model, to gather EPHS resource and cost data, and to generally discuss current reporting in the context of VfM. Visits to health facilities in Sahil and Quardo were also conducted in order to carry out interviews with key facility staff and to view actual EPHS implementation.

- 4) **Presentation of costing model and analyses to DFID and partners** – On 19 August, Dr Blaakman engaged in a de-briefing with DFID staff and on 22 August he presented the step-down cost model applied in the study and initial findings to DFID and key EPHS stakeholders in Nairobi, at the Swedish Embassy.

5 Detailed costing methodology and allocation processes

In order to provide a robust, reliable analysis, costing was conducted at two levels. First, using financial data from PSI and the individual implementers, a ‘top-down summary financing for each implementer’ was established. This analysis provides an overview of EPHS implementation by implementer, primary resource category and facility type. In Section 6 of this report, these are the first analyses to be presented.

Second, a facility-based costing tool was tailored (from use in previous studies⁷) in order to fully capture the Somalia HC and RHC costs and to ultimately derive the unit costs of EPHS implementation. In this model, cost data are organised using a spreadsheet-based step-down cost-allocation tool, which is composed of both data entry and automated data analysis worksheets. The workbook applies facility-specific allocation factors to apportion the costs among final direct service activity centres to generate the unit costs.

5.1 Resources assessed and data collected

Ideally, for the most detailed costing, data would be captured from a representative sample of each level of facility supported by the EPHS implementers including: PHU or health post, HC, RHC and hospital. Since all health facilities supported by the EPHS implementers could not be assessed within the 30-day consultancy, the **average actual implementation costs for HCs and RHCs** were assessed.⁸ The limitations resulting from this are discussed in Section 8.

Specifically, the following components represent the type of data collected and analysed within each workbook:

5.1.1 Assets

These data pertain to information regarding buildings, machinery and equipment, solar panels, vehicles and furniture. Cost data were amortised using local capital costing estimates such as cost per square metre and estimated duration of useful life (i.e. 20 years for buildings, 10–15 years for machinery and equipment, and 7–9 years for vehicles and furniture).

5.1.2 Human resources/personnel data

Personnel cost data pertain to both salary and allowances from both government and HCS top-ups. In addition, data were collected related to the total number of FTEs by staffing category. In order to allocate salary and allowance information among cost centres and by service, additional data were gathered via key informant interviews at facility sites on how facility staff allocated their time. This effort was conducted at each facility in order to capture detailed staff-time allocations across all cost centres. However, given the difficulty in allocating exactly how time was used, some of the time-allocation estimates may be inaccurate and could lead to overestimation of certain costs of services.

5.1.3 Drug costs

Drug costs were collected from each implementer and allocated among all direct service categories (normal delivery, ANC, PNC, nutrition, outpatient department, etc.). Key informant interviews were used to allocate drug costs when more detailed information was unavailable. For example, in this regard, a ‘bottom-up approach’ was applied by requesting the units and unit prices of drugs for specific EPHS interventions. Drug costs were accounted for as much as possible regardless of

⁷ Including the costing of health services packages in Malawi, Rwanda, and Afghanistan.

⁸ Facility based-costing of PHUs did not generate the unit costs of the EPHS and per capita costs are generated where possible. Detailed hospital-based costing would require greater time input for accurate analyses.

source (UN agencies, direct procurement, etc.).

5.1.4 Recurrent annual expenses and revenues

Information pertaining to other annual recurrent expenses and revenues were captured from each implementer for the average facility. Recurrent expenses include information pertaining to categories such as transportation, electricity, water, food, training, stationery, etc. In addition, the data-collection team requested annual revenues by source in order to get a complete overview of the resource base for each facility, but these data were difficult to obtain in a short period. In principle, taken together, these items should represent the full 2013 operating budget for each average facility.

5.1.5 Utilisation data

Utilisation data are necessary to derive unit costs (total cost of service/measure of utilisation of that service) and are critical for understanding cost-efficiency. It is important that these data have been accurately reported so as to conduct robust analyses. The primary utilisation measures for the study are the number of outpatient visits by service category of the EPHS at the average facility.

5.1.6 Allocation factors

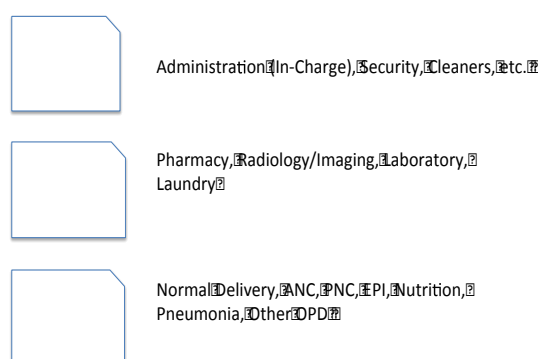
Allocation factors are the key data items necessary to conduct the step-down cost allocation. As applied in the aforementioned Malawi and Rwanda studies, allocation factors collected and derived for the analysis of the EPHS in Somalia include: a) the proportion of outpatient visits; b) the proportion of FTEs;⁹ and c) the proportion of space as appropriate. Rules for the application of these factors for unit costing are detailed in Section 5.3.

5.2 Cost centres and allocation processes

In order to accurately conduct the unit costing, it is important to organise and capture facility-level data by cost centres.

5.2.1 Facility cost centres and step-down cost-allocation processes

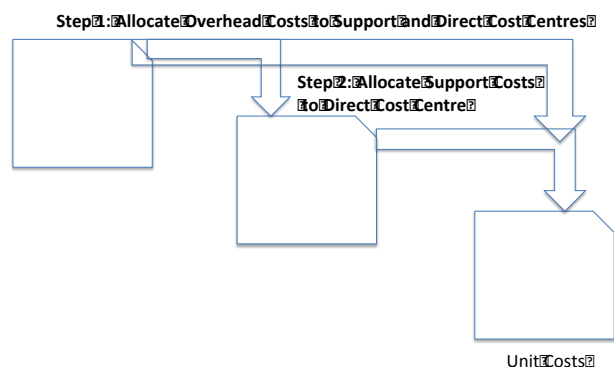
As applied to HCs and RHCs, three cost centres were first established: **a) Overhead;** **b) Support cost centre;** and **c) Direct service cost centre.** These centres and examples of their district resource components are represented below:



⁹ FTE calculation equates to how many hours one full-time employee works.

Once the cost centres are defined and costs for each centre are collected and organised, the data then enter a step-down cost-allocation process.

The illustration below depicts the two steps in the cost-allocation process. First, overhead costs are allocated to support and direct service cost centres and then support centre costs are allocated to the direct cost centre. This enables the final generation of the sought-after unit costs.



5.3 Allocation rules

Certain rules (based on organisational design and resource distribution and flow in health facilities) to allocate indirect costs to both support services costs and direct services costs, and then (in the second step) support service costs to direct service costs, were established in the costing model. These rules are implemented through derived proportions.

The specific allocation factors for indirect cost elements are as follows:

- Administration cost is allocated using the FTE of each service.
- Maintenance and engineering costs are allocated by the area/space used by each service.
- Cleaning services cost is allocated by the area/space used by each service.
- Security cost is allocated by the area/space used by each service.
- Sterilisation cost is allocated by the area/space used by each service.
- Supportive supervision is allocated by FTE.

The specific allocation factors for support centre cost elements are as follows:

- Laboratory cost is allocated by the number of visits for each outpatient service.
- Pharmacy (non-drug operating) cost is allocated by the number of visits for each outpatient service.
- Radiology cost is allocated by the number of visits for each outpatient service.
- Laundry cost is allocated by the number of visits for each outpatient service.

6 Cost analyses and findings

This section presents the cost analyses and findings resulting from the study. In general, the analyses presented here correspond with those in which capital costs or resources incurring a life of greater than one year (e.g. infrastructure, equipment, training, etc.) have been amortised. Costs are indicated in US\$. The results pertaining to non-amortised or total spending analyses have been placed in Annex A of this report.

6.1 Top-down expenditure analyses by HCS EPHS implementer (amortised)

Table 1 presents the annual total spending during the period 2011–2013 by facility type for HPA as allocated across the main resource categories (capacity building/training, infrastructure, human resources, drugs and medicines, and recurrent costs). Results are shown for all facilities supported by HPA in the Sahil region (PHUs, HCs, RHCs, and hospitals). Costs associated with human resources are the highest (US\$ 400,734 per year) while capacity building and drugs and medicines also incur significant costs on an annual basis, at US\$ 257,790 and US\$ 225,000 respectively. The total costs for HPA's implementation of the EPHS are US\$ 1,165,079 per year.

6.1.1 EPHS implementer – HPA

# of Facilities	PHUs 15	HCs 6	RHCs 4	Hospitals 1	1 Year All	3 Years All
Resource Category						
Capacity Building/Training	\$254,448	\$254,448	\$254,448	\$254,448	\$257,790	\$773,371
Infrastructure	\$11,986	\$26,504	\$11,047	\$4,873	\$24,410	\$73,230
Medical Equipment	\$10,182	\$10,182	\$10,182	\$10,182	\$40,727	\$122,182
Human Resources	\$26,130	\$9,368	\$55,616	\$9,620	\$400,734	\$1,202,202
Drugs and Medicines	\$5,000	\$2,000	\$2,000	\$6,000	\$25,000	\$75,000
Recurrent Costs	\$2,146	\$26,860	\$36,767	\$0,644	\$16,417	\$49,251
Total Costs	\$69,892	\$109,362	\$180,059	\$105,766	\$1,165,079	\$3,495,236

6.1.2 EPHS implementer – SCI

Table 2 presents the annual total spending during the period 2011–2013 by facility type for SCI as allocated across the main resource categories (capacity building/training, infrastructure, vehicles and solar panels, medical equipment, human resources, drugs and medicines, and recurrent costs). Results are shown for all facilities supported by SCI in the Kakaar region (PHUs, HCs, RHCs, and hospitals). Costs associated with human resources are the highest (US\$ 664,880 per year) while drugs and medicines and recurrent costs of operation (transport, shipping and logistics, etc.) also incur significant costs on an annual basis, at US\$ 336,924 and US\$ 288,282 respectively. The total costs for SCI's implementation of the EPHS are US\$ 1,369,433 per year.

# of Facilities	PHUs 30	HCs 5	RHCs 4	Hospitals 1	1 Year All	3 Years All
Resource Category						
Capacity Building/Training	\$14,850	\$4,850	\$4,850	\$4,850	\$19,399	\$78,198
Infrastructure	\$22,781	\$4,970	\$6,402	\$5,847	\$20,000	\$200,000
Medical Equipment	\$22,774	\$4,957	\$6,385	\$5,831	\$19,948	\$97,658
Human Resources	\$11,600	\$49,400	\$81,920	\$201,960	\$644,880	\$934,640
Drugs and Medicines	\$57,385	\$107,816	\$107,816	\$53,908	\$336,924	\$1,010,772
Recurrent Costs	\$30,077	\$66,513	\$91,045	\$100,646	\$288,282	\$64,845
Total Costs	\$29,467	\$48,506	\$108,418	\$83,042	\$1,369,433	\$1,108,299

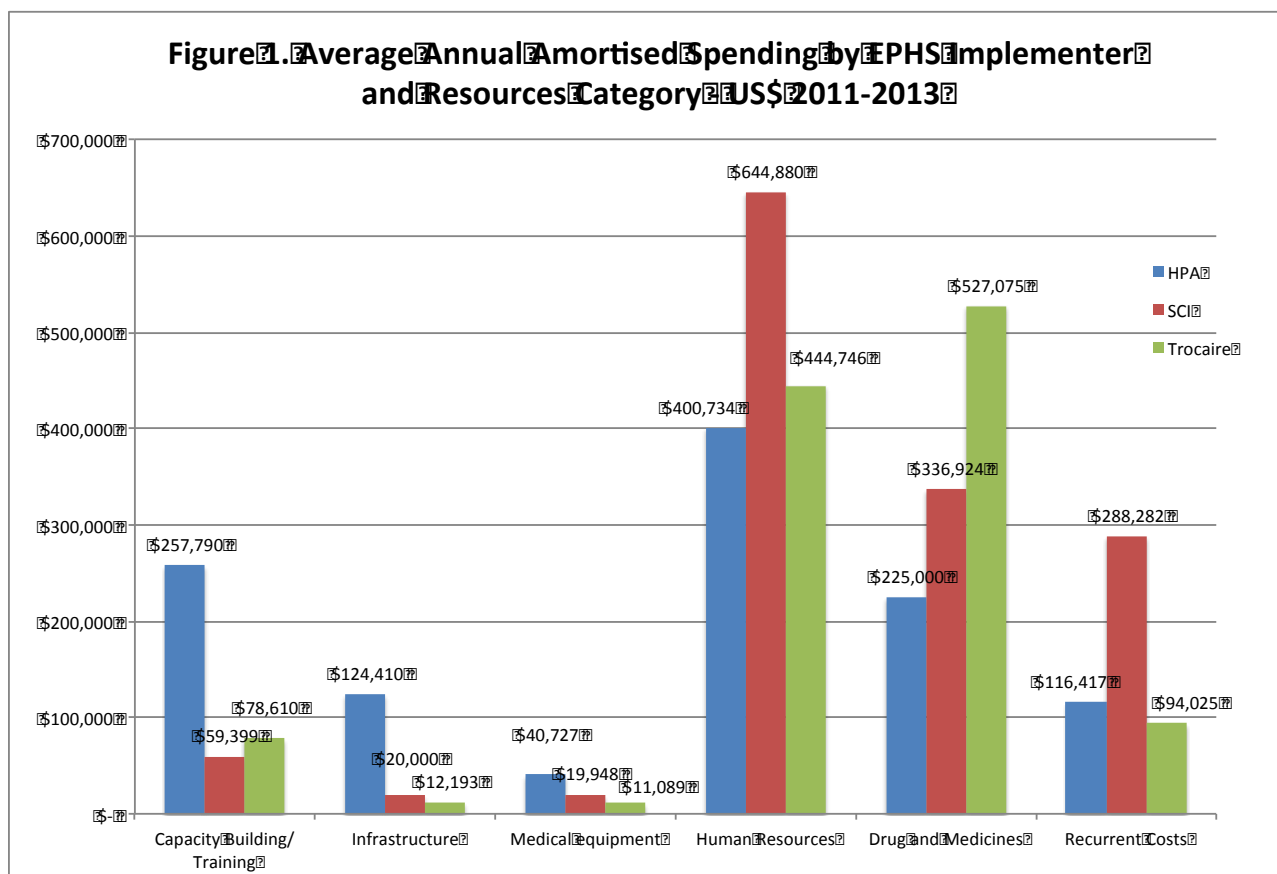
6.1.3 EPHS implementer – Trocaire

Table 3 presents the annual total spending during the period 2011–2013 by facility type for Trocaire as allocated across the main resource categories (capacity building/training, infrastructure, vehicles and solar panels, medical equipment, human resources, drugs and medicines, and recurrent costs). Results are shown for all facilities supported by Trocaire in the South Central/Mogadishu region (HCs and hospitals). Costs associated with drugs and medicines are the highest (US\$ 527,075 per year) while human resources and recurrent costs of operation (transport, shipping and logistics, etc.) also incur significant costs on an annual basis, at US\$ 444,746 and US\$ 94,025 respectively. The total costs for Trocaire's implementation of the EPHS are US\$ 1,167,739 per year.

Table 3. Average Amortised Spending by Facility Type and Resource Category US\$ 2011-2013					
# of Facilities	PHUs	HCs	Hospitals	1 Year	3 Years
Resource Category	8	5	2	All	All
Capacity Building/Training		\$ 39,305	\$ 39,305	\$ 78,610	\$ 235,831
Infrastructure		\$ 5,078	\$ 7,116	\$ 12,193	\$ 36,580
Medical Equipment		\$ 6,337	\$ 4,752	\$ 11,089	\$ 33,267
Human Resources		\$ 16,099	\$ 28,647	\$ 44,746	\$ 1,334,238
Drugs and Medicines		\$ 263,538	\$ 263,538	\$ 527,075	\$ 1,581,225
Recurrent Costs		\$ 39,413	\$ 54,612	\$ 94,025	\$ 282,076
Total Costs		\$ 469,769	\$ 597,970	\$ 1,167,739	\$ 3,503,217

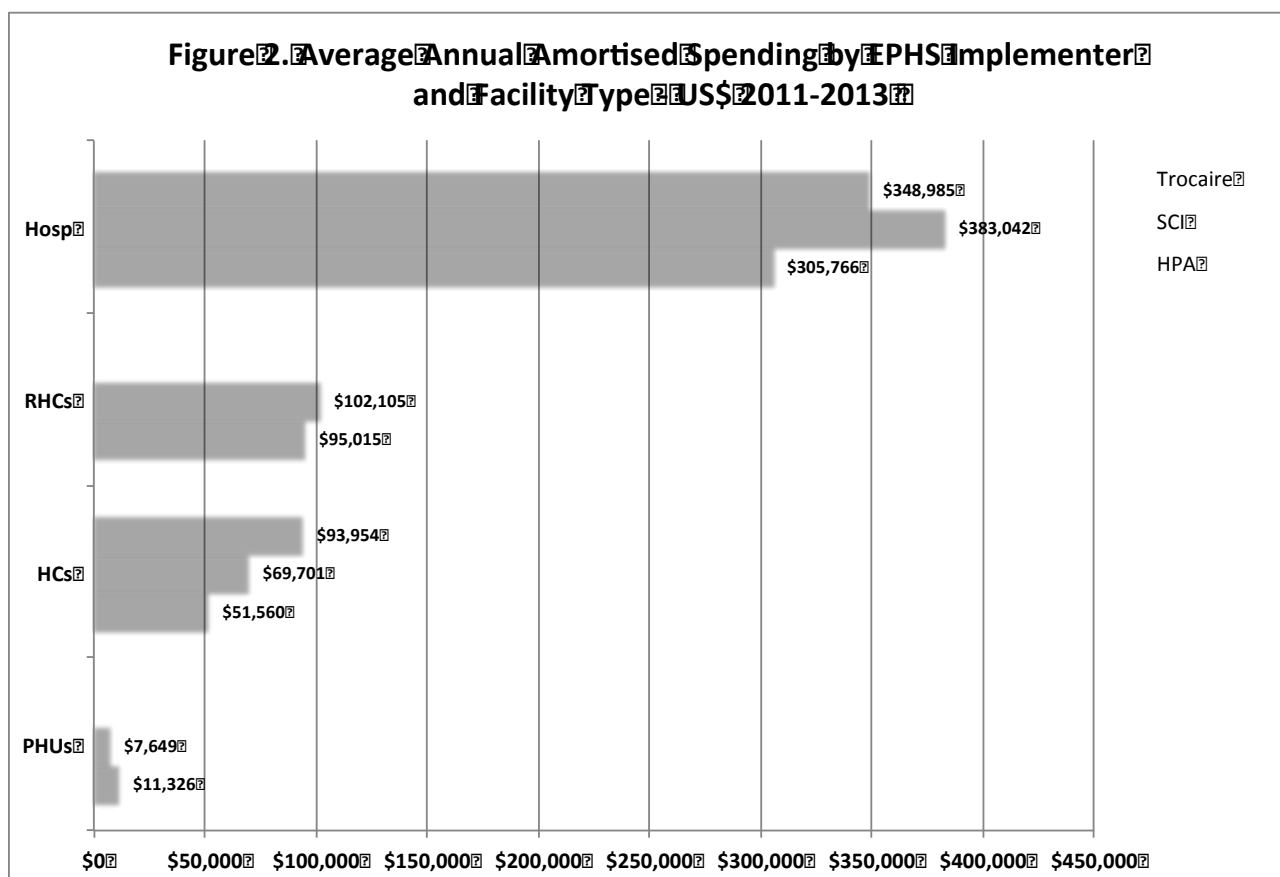
6.1.4 Summary comparison of HCS EPHS implementers

Figure 1 below indicates the average annual amortised spending by EPHS implementer during the 2011–2013 period. HPA incurred the highest average capacity building, infrastructure and medical equipment costs while SCI incurred the highest average human resources costs and recurrent costs. Trocaire incurred the highest average costs for drugs and medicines.



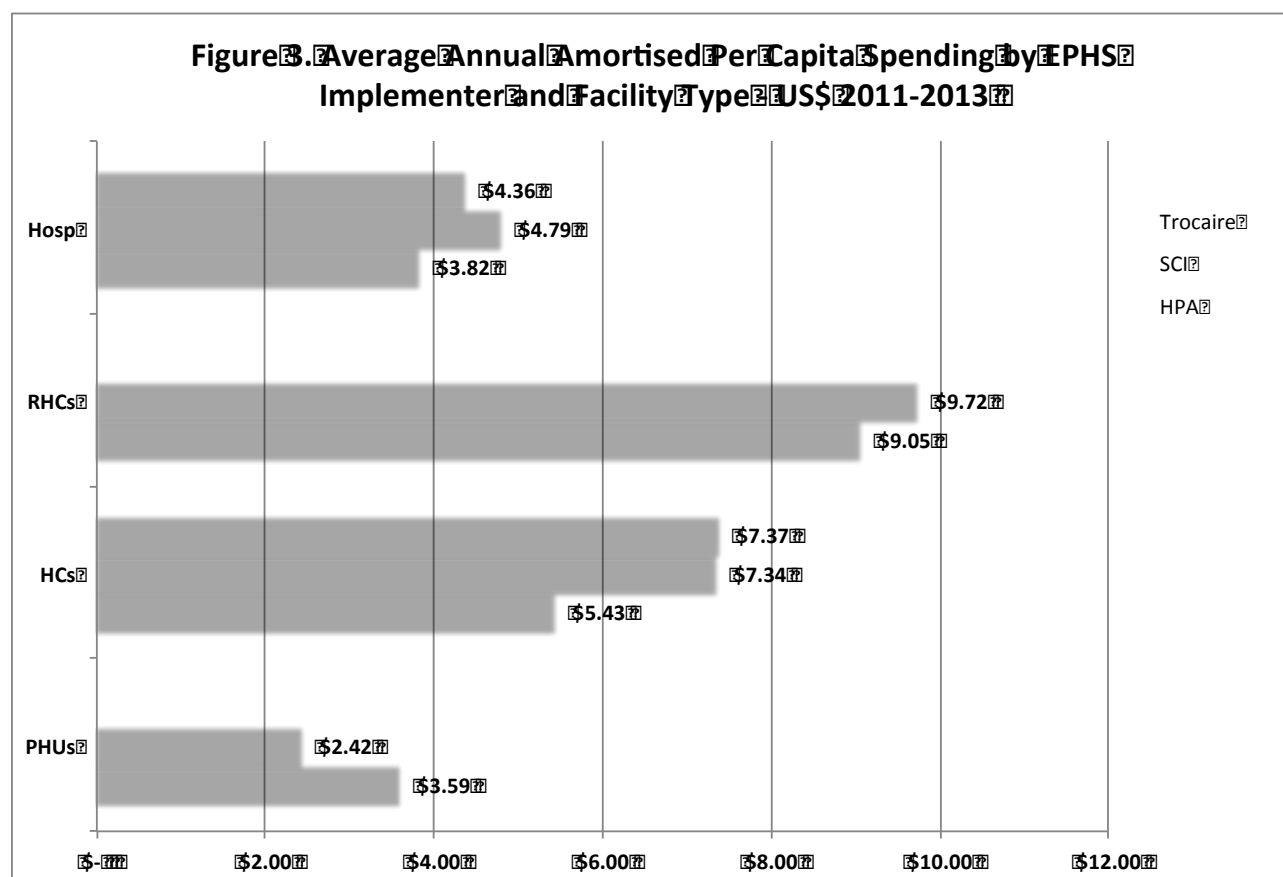
6.2 Average EPHS costs by facility type

Figure 2 below indicates the average annual spending by EPHS implementer and facility type during the 2011–2013 period. Hospitals notably incurred most costs, followed by RHCs, HCs and PHUs. Among the implementers, the average cost for supporting the hospital in Kakaar Region by SCI was the highest, at US\$ 383,042. Among HCs, the costs incurred by Trocaire were the highest at US\$ 93,954.



6.3 Average EPHS per capita costs by facility type

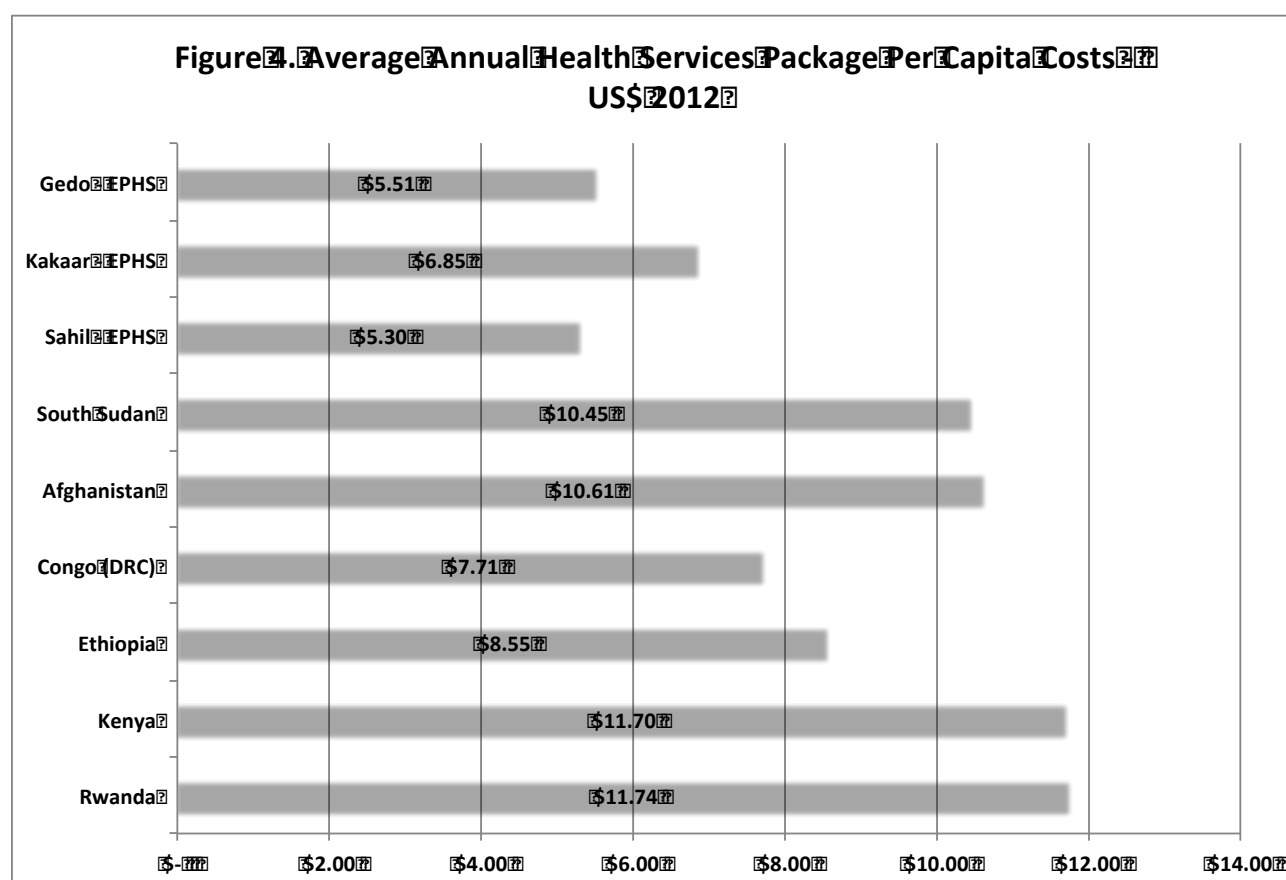
Figure 3 below indicates the average annual spending per capita (catchment population) by EPHS implementer and facility type during the 2011–2013 period. Total catchment population estimates by covered region are as follows: Sahil (220,000), Kakaar (200,000), and Gedo (211,872). Catchment area figures are further estimated by type of facility and location.¹⁰ Overall, the data indicate similar per capita spending among the three implementers of the EPHS. RHCs notably incurred the highest cost per capita (SCI – US\$ 9.72; HPA – US\$ 9.05) followed by HCs, hospitals and PHUs.



¹⁰ HPA (Sahil) and SCI (Kakaar) – (PHUs, est. pop. 3,156; HCs, est. pop. 9,500; RHCs, est. pop. 10,500; Hosp., est. pop. 80,000), Trocaire (Gedo) – (HCs, est. pop. 12,746; Hosp., est. pop. 80,000).

6.4 Average annual health services package per capita costs – sample international comparison

Figure 4 below shows the average annual health services per capita costs of the EPHS as implemented in the three regions of Somalia and a sample of regional countries for comparative purposes using World Bank data (2012)¹¹ and the aforementioned cost studies from Rwanda and Kenya. It is important to note that health services packages are comprised of varying health interventions and that, as a result, inputs and costs will change depending on the specific package delivered. For example, for Afghanistan, the data reported below from the World Bank are comprised of costs from both the basic and essential packages of health services. The Basic Package of Health Services in Afghanistan alone costs approximately US\$ 5.50 per capita, similar to the per capita costs of the EPHS in both Gedo and Sahil.¹² For the regions and countries compared, most per capita costs range between US\$ 5 and US\$12.

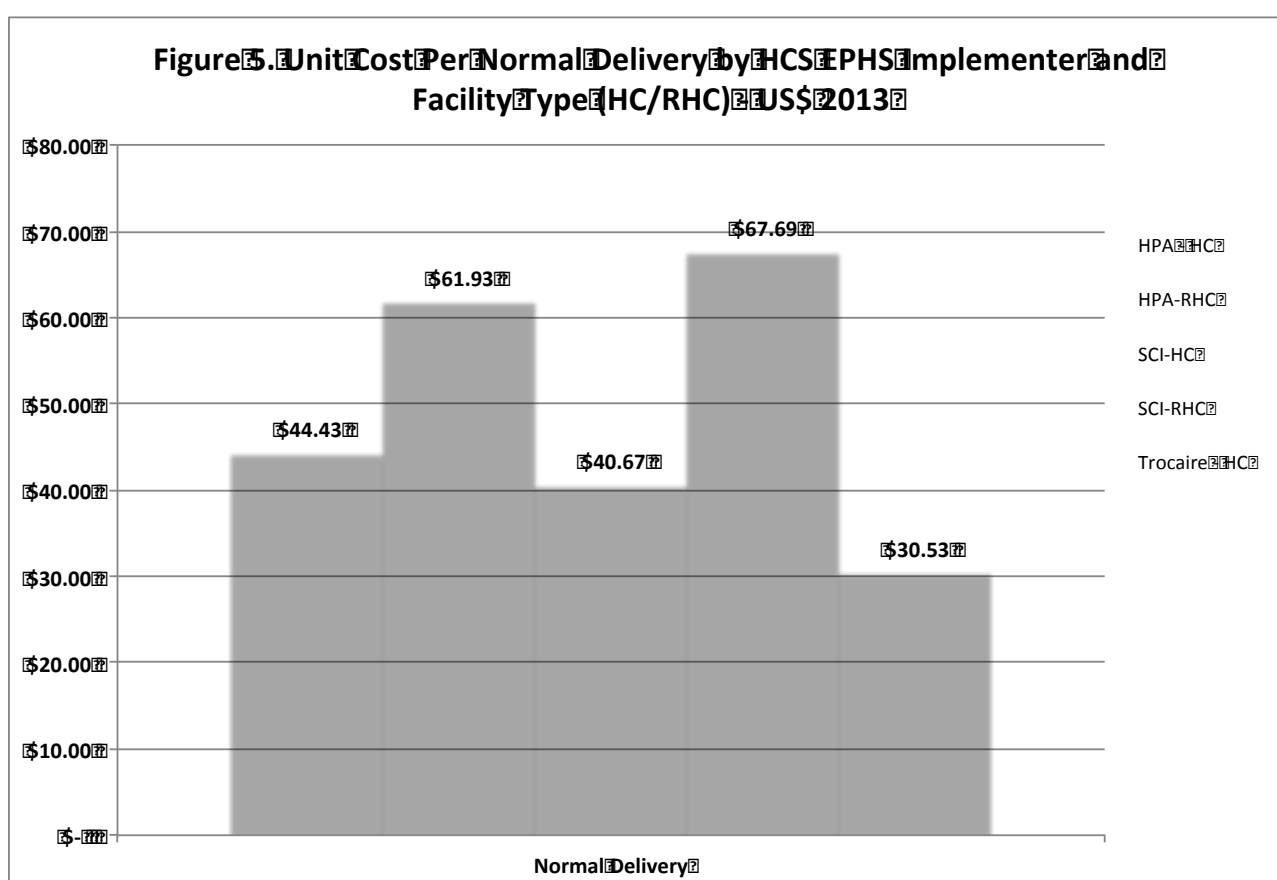


¹¹ Note that country data may differ in terms of definitions, data-collection methods, population coverage and estimation methods used: see <http://wdi.worldbank.org/table/2.15>

¹² Blaakman, Salehi and Boitard, A cost-efficiency analysis of two alternative models for implementing the BPHS in Afghanistan, Global Public Health, 5 September 2013: <http://dx.doi.org/10.1080/17441692.2013.829862>

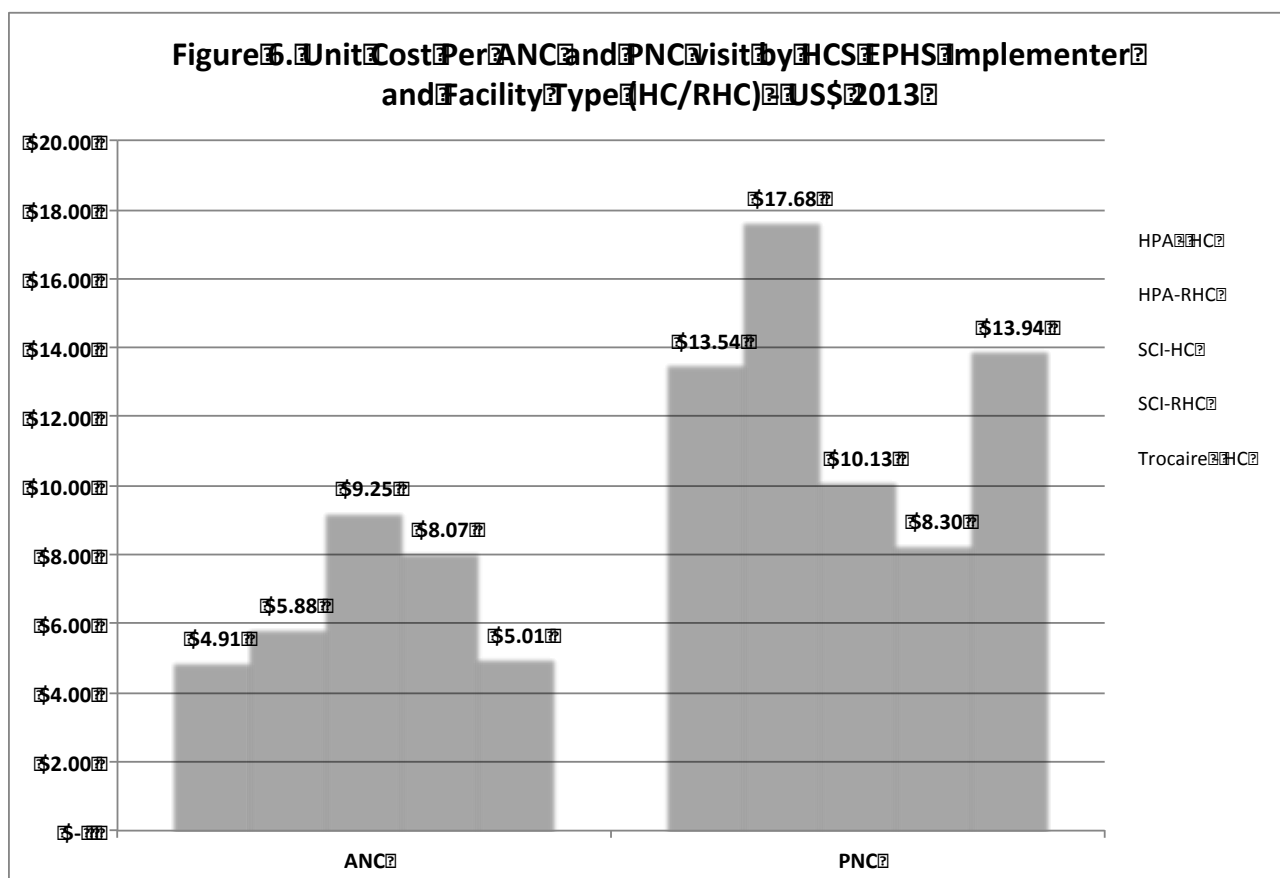
6.5 EPHS service delivery unit costs by facility type

Figure 5 below indicates the unit cost per normal delivery by EPHS implementer and facility type during the 2011–2013 period. The unit costs for a normal delivery at RHCs supported by HPA and SCI are US\$ 61.93 and US\$ 67.69 respectively. The unit costs for a normal delivery at HCs supported by HPA, SCI and Trocaire are US\$ 44.43, US\$ 40.67 and US\$ 30.53, respectively. These costs for a normal delivery within the EPHS are generally higher (particularly at RHCs) than the expected range when compared with basic packages of health care in other country contexts, primarily due to drug shipping costs and early investment start-up costs such as capacity building and equipment investment.¹³ These reasons were suggested to the study team by facility staff during field site visits and require further quantitative assessment to understand in detail. In addition, normal delivery costs may be higher at RHCs due to a greater quality of care than at HC levels. Due to time constraints, understanding the impacts of quality of care variation on costs was not part of the assessment.



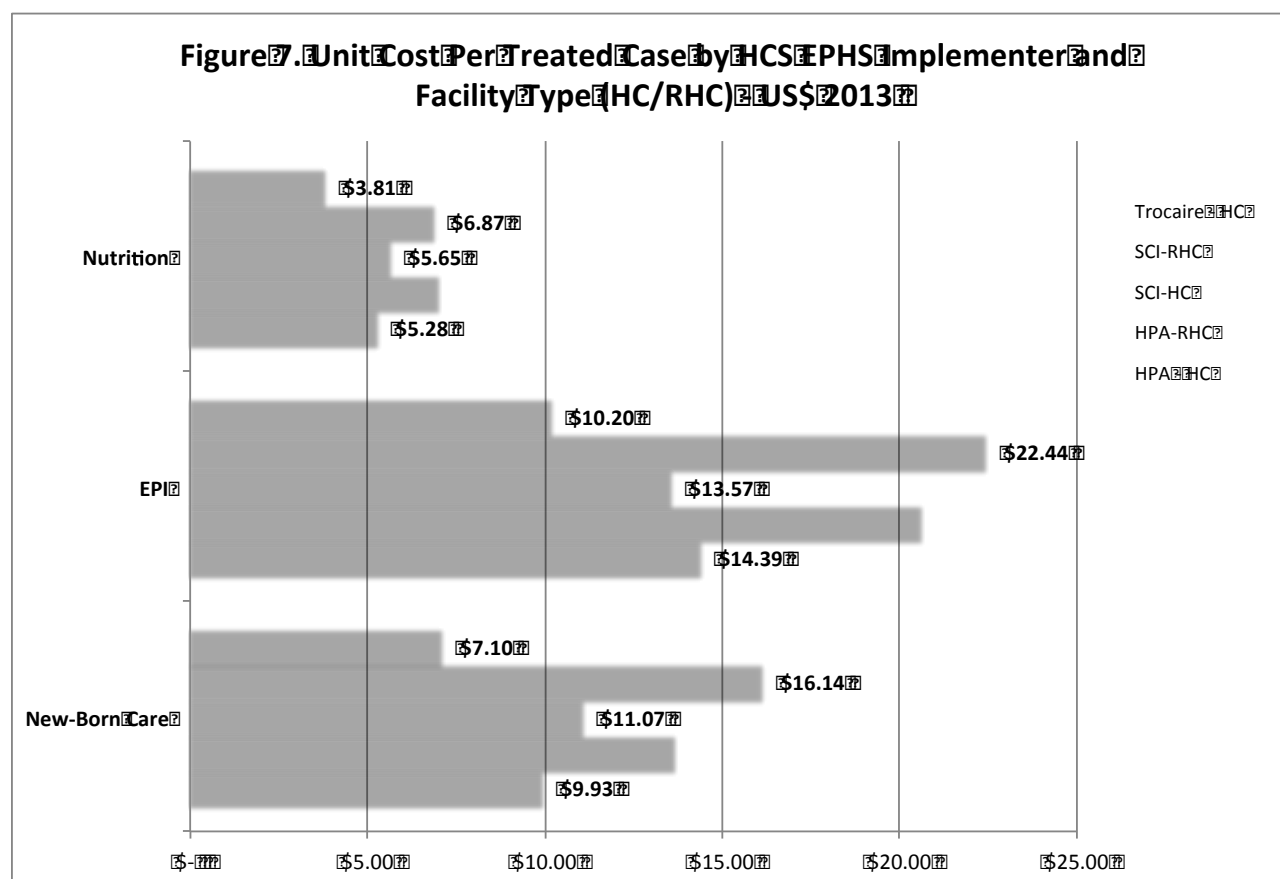
¹³ Recent World Bank estimates for normal delivery in Africa range from US\$ 30 to US\$ 50 for facility-based delivery. See <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/LuleAchievingtheMDGFinal.pdf>

Figure 6 below indicates the unit cost per ANC and PNC visit by EPHS implementer and facility type during the 2011–2013 period. The unit costs for ANC at every facility are less than the unit costs of PNC at the same facilities. This is explained primarily by the fact that more women come for ANC than for PNC and provides a simple example of the cost-efficiencies experienced in the delivery of ANC relative to PNC.



Figures 7 and 8 below indicate the unit cost per treated case by EPHS implementer and facility type during the 2011–2013 period for nutrition counselling, EPI, and newborn care. Among these services, EPI and pneumonia are generally the most costly services while treatment for nutrition counselling, diarrhoea, and other outpatient department visits are the least costly within the EPHS. Generally, the RHCs where SCI and HPA are implementers tend to incur higher costs than HCs for the provision of EPHS services.

Some additional points of comparison can be informative to understand the data in context. For example, a very recent nutrition study in Pakistan by Gowani et al. (2014) indicates that the average cost per child for a nutrition intervention is US\$ 4 per child.¹⁴ The estimated cost of a nutrition visit as identified in the three regions supported by the EPHS in Somalia ranged from US\$ 3.81 to US\$ 6.87. Furthermore, the average total cost of immunisation per live birth internationally, according to UNICEF and GAVI, is presently US\$ 15 to US\$ 18, although these costs are expected to increase with the advance of new technologies.¹⁵ Lastly, the cost of treating pneumonia in the current study ranges from US\$ 8.78 in the HPA RHC to US\$ 21.42 in the SCI RHC. This cost difference may also be explained by the use of different technologies in the treatment of pneumonia. In another study, Graham et al. (2008)¹⁶ estimated that, in Pakistan, the average cost to treat a child with pneumonia as an outpatient was US\$ 13.44.

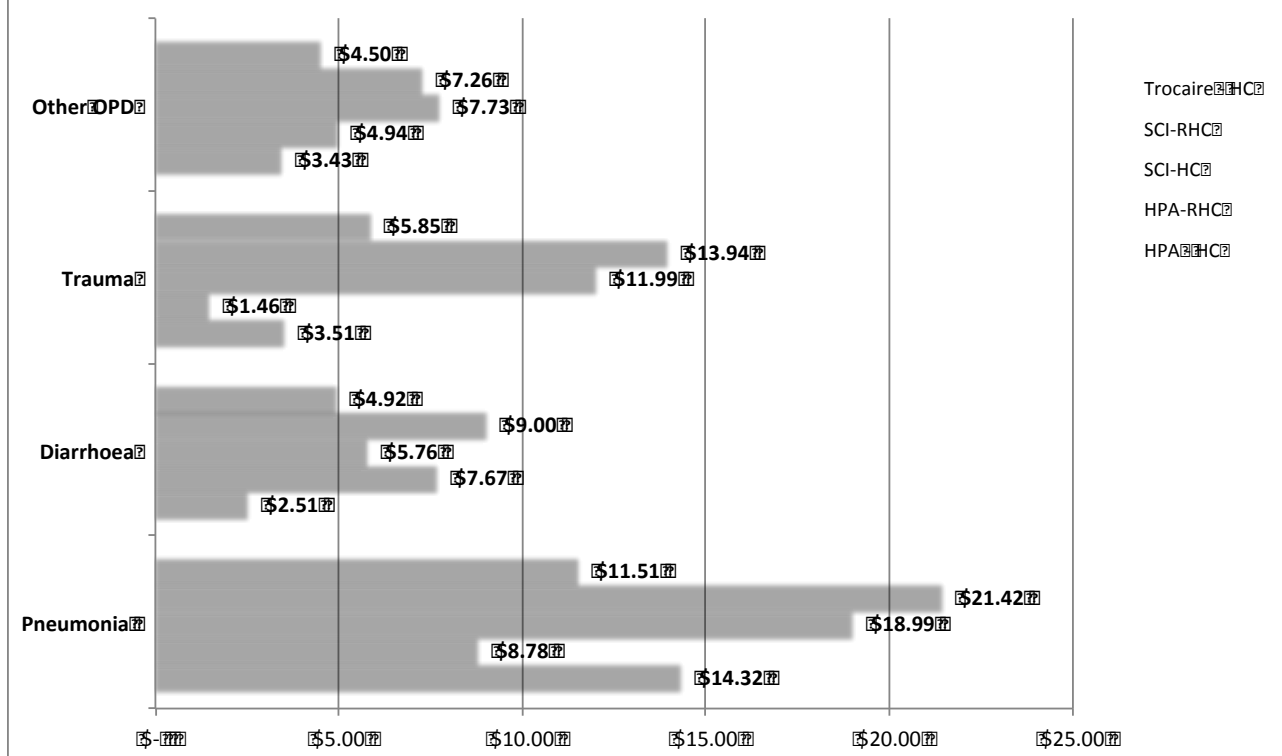


¹⁴ Gowani, Yousafzai, and Bhutta, Cost effectiveness of responsive stimulation and nutrition interventions on early child development outcomes in Pakistan. Annual of New York Academy of Sciences, January 2014: 1308: 149–61: doi: 10.1111/nyas.12367

¹⁵ WHO, UNICEF and World Bank. State of the World Vaccines and Immunization, 3rd Edition, Geneva, World Health Organization, 2009: www.unicef.org/media/files/SOWVI_full_report_english_LR1.pdf

¹⁶ Graham et al., Challenges to improving case management of childhood pneumonia at health facilities in resource-limited settings. Bulletin of the World Health Organization, 86(5), 2008, 349–355.

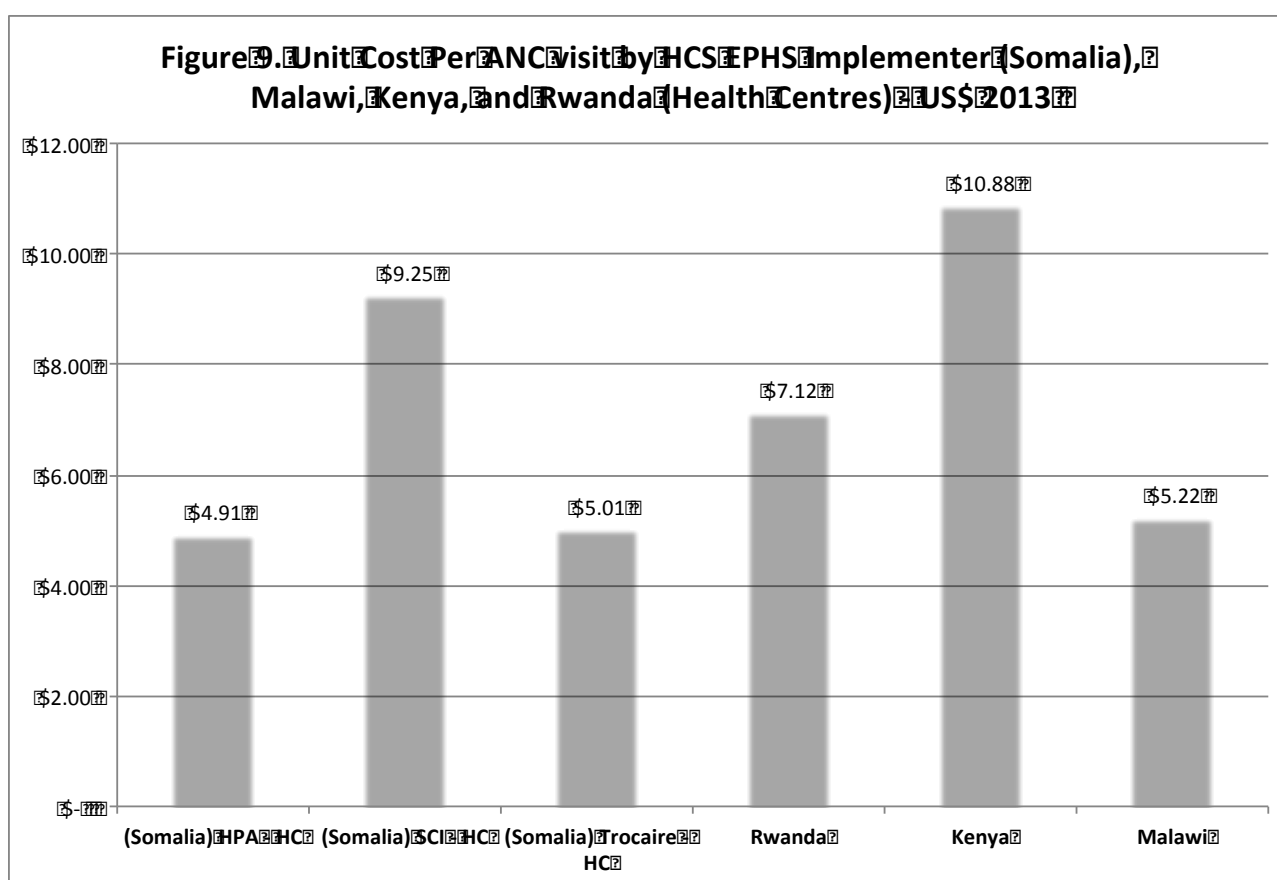
Figure 3.1 Unit Cost Per Treated Case by HCSEPHS Implementer and Facility Type (HC/RHC) 2013



6.6 East Africa regional unit cost comparisons for HCs

As the EPHS is implemented across the three regions of Somalia, it is useful to examine the cost of services relative to other countries in the East Africa region. The availability of data from the aforementioned cost studies from Rwanda, Kenya and Malawi makes such a comparison possible. In order to compare the unit costs of health services between studies that refer to different year periods, it is necessary to make adjustments for inflation. As the cost data from Rwanda and Malawi correspond to 2006 and 2009 respectively, it was necessary to make inflation adjustments so that unit costs are consistent with the 2013 base year. Ideally, health sector inflation estimates would be applied to such indicators but these were not available at the time of this analysis. As a result, general average inflation estimates were introduced – Rwanda's was 6% and Malawi's 7%.¹⁷ In addition, data from a cost study conducted in Rwanda in 2009 by Management Sciences for Health were examined as a consistency check.¹⁸ Indicators available for comparison across the studies include unit costs per ANC visit and per normal delivery, along with unit costs per treated case for diarrhoea, pneumonia, and EPI. Given limited hospital data, these comparisons refer to HC level only. All costs studies refer to amortised costs of direct service delivery, although internal decisions related to the 'length of life' of infrastructure and equipment may vary from study to study.

Figure 9 indicates the unit cost per ANC visit by HCS EPHS implementer in the three regions of Somalia along with unit costs per ANC visit in Rwanda, Kenya, and Malawi. The cost per ANC visit is most costly in Kenya (\$10.88), followed by (Somalia) SCI (\$9.25), and Rwanda (\$7.12). The costs for an ANC visit at a HC as implemented by HPA and Trocaire is more similar to the average cost of an ANC visit at a HC in Malawi (\$5.22)



¹⁷ <http://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG>

¹⁸ www.msh.org/sites/msh.org/files/rwanda_health_service_costing_-_health_center_analysis.pdf

Figure 10 below indicates the unit cost per normal delivery by HCS EPHS implementer in the three regions of Somalia and Rwanda, Kenya, and Malawi. The unit costs of normal delivery under the EPHS are higher in the three regions of Somalia relative to the unit costs of normal delivery in the three comparison countries. This is most likely due to higher drugs and medicines costs, transport costs, and human resources costs, particularly in the northern regions of Sahil and Kakaar. Furthermore, as health systems in the other three countries are more established, they may have achieved a greater level of cost-efficiency in service delivery.

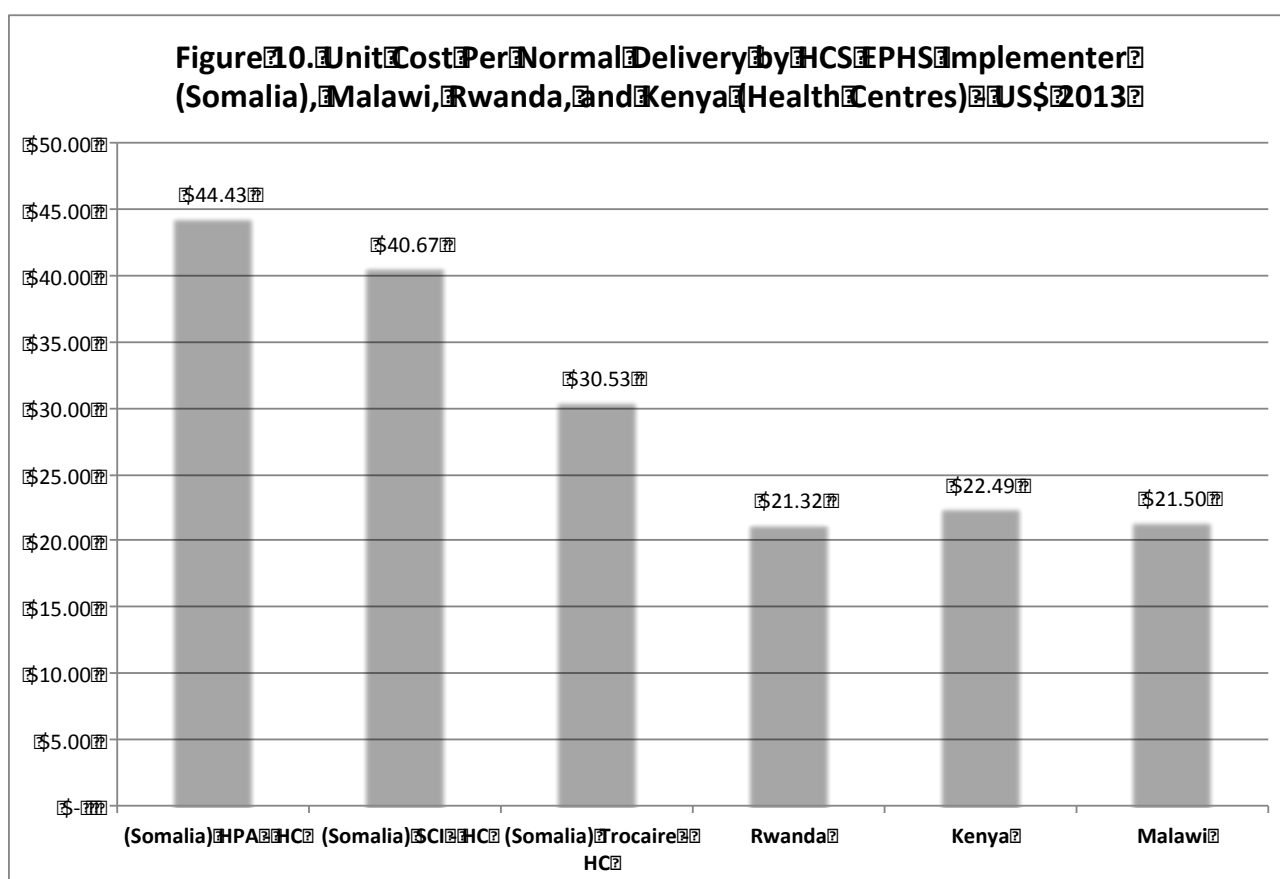
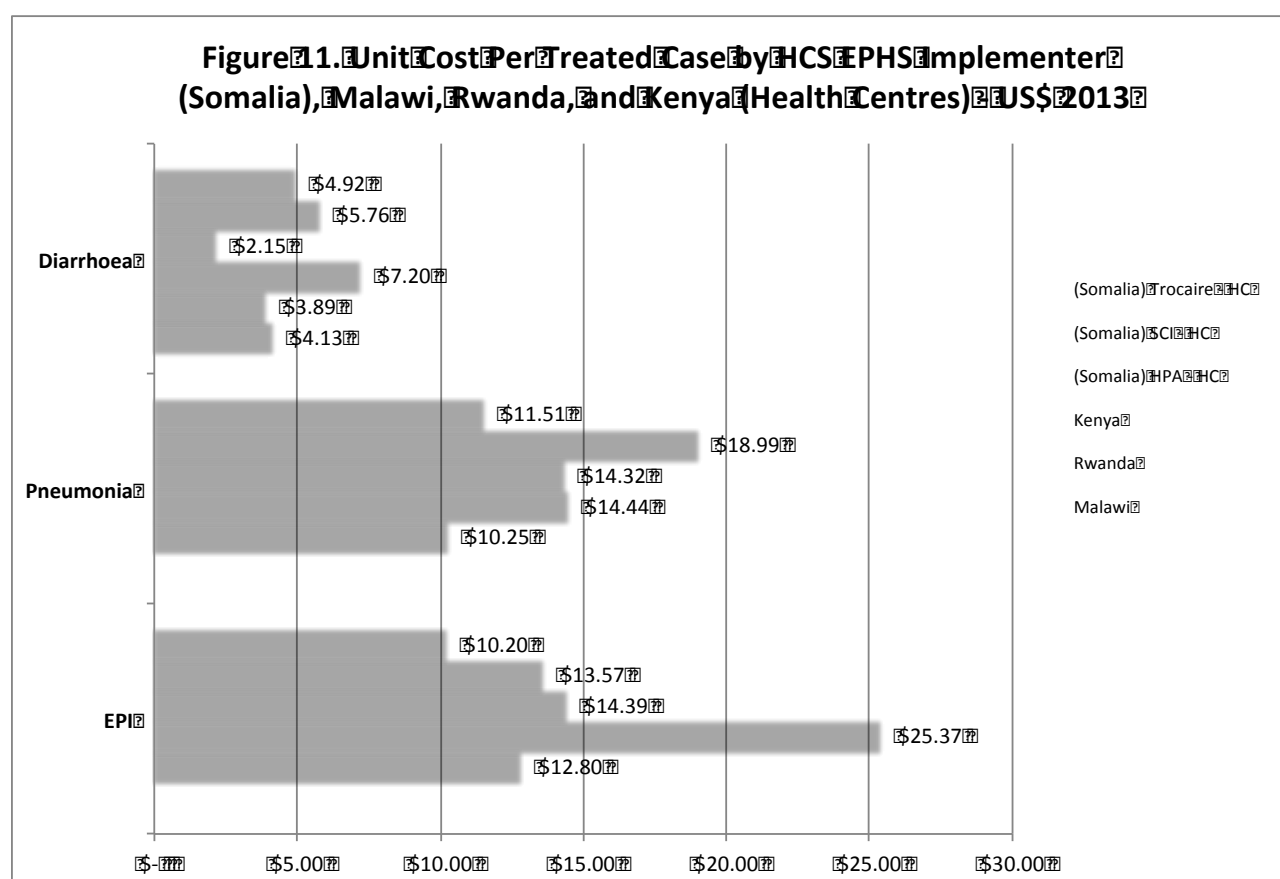


Figure 11 below indicates the unit cost per treated case by HCS EPHS implementer in the three regions of Somalia and Rwanda, Kenya, and Malawi for diarrhoea, pneumonia, and EPI.¹⁹ Unit costs for diarrhoea treatment range from US\$ 2.15 per case under HPA EPHS implementation in Sahil to US\$ 7.20 under the Kenyan essential health services package. The costs of diarrhoea treatment are closely clustered in Gedo region (Trocaire), Kakaar region (SCI), and Rwanda and Malawi, ranging from US\$ 3.89 to US\$ 5.76 per treated case.

The unit cost per treated case of pneumonia is highest in Kakaar region (implemented by SCI) (US\$ 18.99) and lowest in Rwanda (US\$ 10.25). The unit costs per treated case of pneumonia in Sahil region (HPA) and in the Kenyan essential health services package are approximately at the mid-point of the unit cost range, at US\$ 14.32 and US\$ 14.44, respectively.

Lastly, the unit cost per treated case of EPI is lowest in Gedo region of Somalia (Trocaire) (US\$ 10.20) and highest under the Kenya essential health services package (US\$ 25.37). This wide range of EPI costs is most likely attributed to the varying approaches to EPI employed, including the differences in immunisation technology previously referenced in this report.

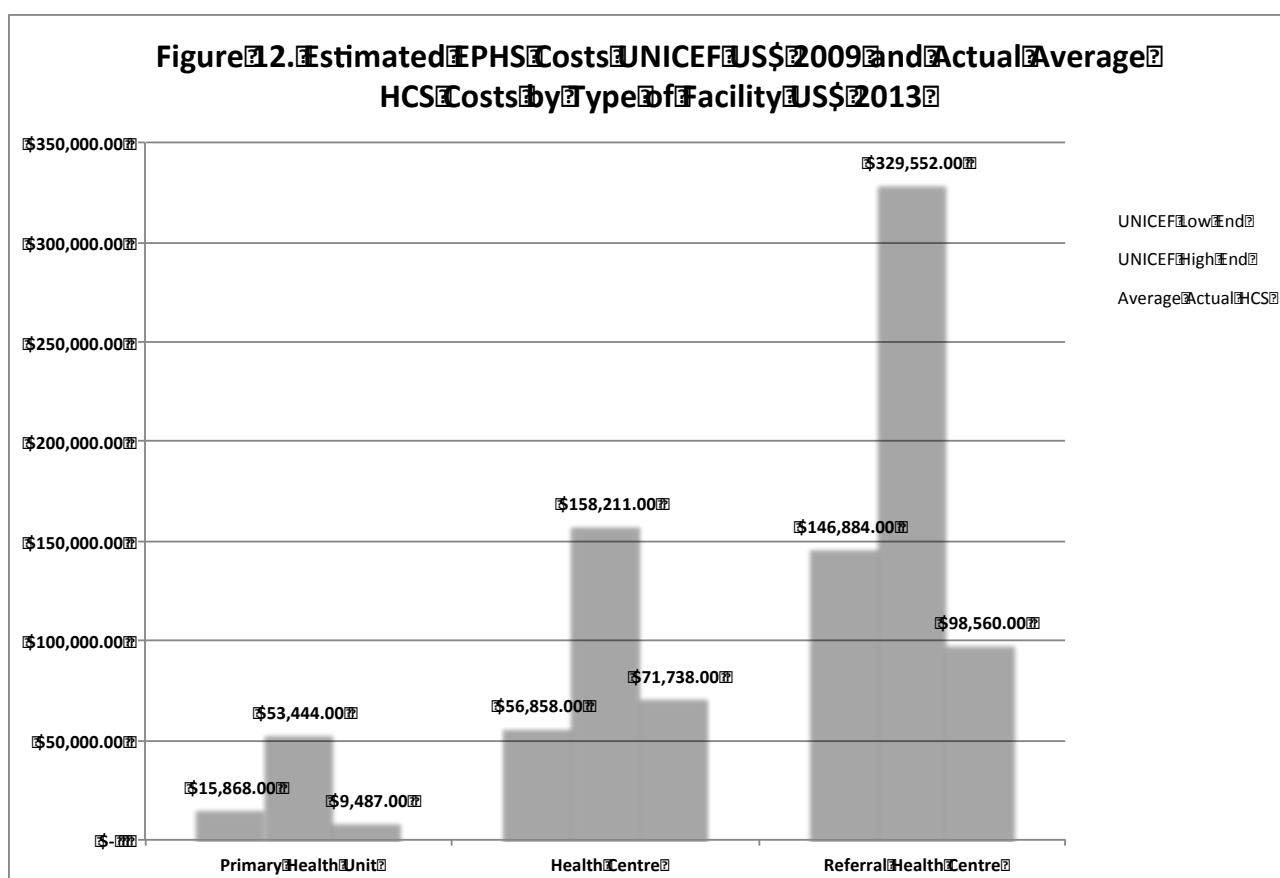


¹⁹ The unit costs of pneumonia and EPI are not available from the Malawi study.

7 Interpretations and variations of cost

7.1 Results comparison with UNICEF costing model

As noted in the UNICEF report, the spreadsheet tool that was developed as the ‘UNICEF costing model’ was meant only for developing cost projections for discussion, advocacy and initial planning purposes. As a result, a detailed comparison has not been undertaken in this study between the two models and their results. Figure 12 does, however, indicate the estimated low- and high-end EPHS costs from the UNICEF planning model as conducted in 2009²⁰ and the actual average HCS facility costs by type of facility and across implementers. The costs of the UNICEF model have not been adjusted for inflation. Most important to note is that the average actual costs of EPHS implementation are indicated to be lower than the initially estimated UNICEF costs for each of the three types of care.



7.2 Variations of cost

There are two distinct questions in regard to the variation in costs among the three zones:

1. **What are the differences in costs between and within the three zones of Somalia?** This is important information in terms of informing government, donors and implementing agencies in regard to budgeting for EPHS provision.

²⁰ UNICEF (2009), Costing the essential package of health services, Somalia.

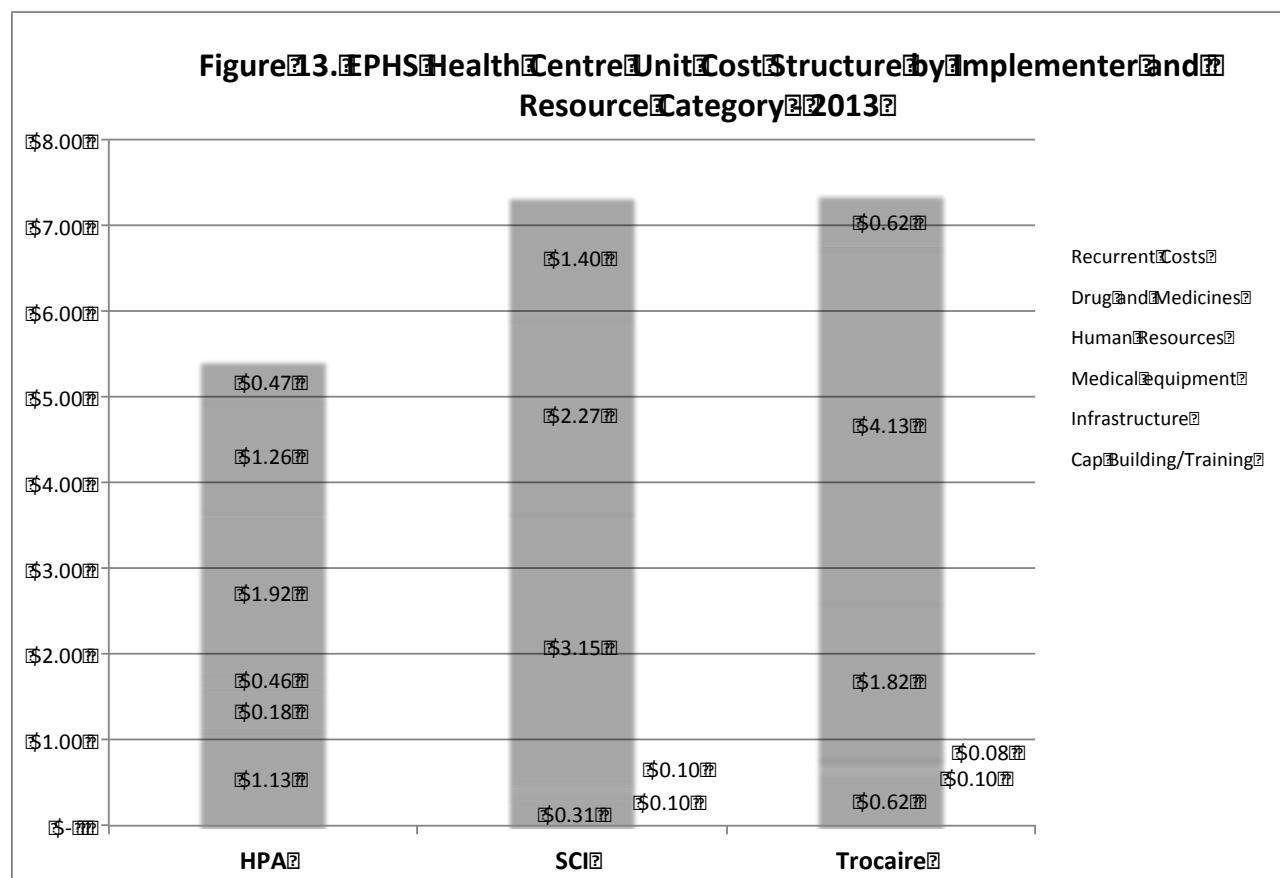
2. **What are the differences in costs and results between the three EPHS implementers based on their different policies and practices?** This is important in order to learn which policies and practices are best for cost-efficiency. These policies and practices can be broken down into the following:

- **Purchasing of inputs (Economy):** what are the best ways to secure inputs of the required quality at the lowest prices? For instance, although HPA procures its drugs more cheaply than SCI because it sources them locally from Hargeisa instead of Europe, there may be a trade-off in terms of quality. If EPHS implementers were to procure drugs jointly (or through the UN), could this be done more cheaply?
- **Choice of type of inputs (Efficiency):** what are the optimal types of inputs to deliver services to the required quality at the lowest cost? Choices are made by EPHS implementers regarding the types of inputs they use, which it would be good to analyse, e.g. there are differences in the skill levels they require for birth attendants (although it should be noted that some of these choices are already set by policy, e.g. the design of HCs).
- **Mix of inputs (Efficiency):** given limited resources, what is the best balance of inputs to deliver services of the required quality at the lowest cost? For instance, some EPHS implementers use two community health workers per HC, whereas others use one. There are also questions on how much to spend on improving HC infrastructure compared to increasing recurrent inputs and how much to spend on training of staff compared to increasing their remuneration.
- **Mix of facilities types (Efficiency):** what should be the relative balance between the different levels of facilities?
- **Size and location of facilities (Efficiency vs. Access):** how many facilities should there be to serve local populations, given that fewer facilities will be able to operate more efficiently given greater utilisation, but at the cost of lower access?

Although the data generated from this study provide the building blocks for examining these questions further, the concern in relation to this study is that, under HCS, each implementer is only operating in one zone, and so it has not been possible to disentangle these two questions. If there is a difference in cost between implementers, it could be due to differences in location or differences in policies and practices. Possible ways to resolve this are discussed in the conclusion of this report. As a result, outlined below are differences in costs captured between implementers, without analysis of attribution of variation due to factors such as location or policy.

7.2.1 Differences in cost structures

Figure 13 below indicates the per capita unit cost structure by implementer and resource category (infrastructure, equipment, human resources, drugs and medicines, and recurrent costs) for HCs. Although this figure presents data similar to those in Figure 1, it provides a perspective of dividing a single unit cost into resource components.



7.2.2 Differences in input prices

- Infrastructure** – The cost in Sahil is estimated at US\$ 222 per square metre on average, while the cost per square metre in Puntland for new construction ranged between US\$ 145 and US\$ 385, depending on the distance from Garowe.
- Equipment** – The cost of equipment varied in relation to the type of equipment purchased along with the recurrent cost of equipment maintenance required. Some implementers factored in the cost of maintenance, while others faced gaps in being able to cover these costs.
- Human resources** – The costs of human resources varied as well. For example, the salary of a qualified nurse or midwife on average is US\$ 238 per month in Sahil, US\$ 400 per month in Puntland, and US\$ 278 per month in South Central.
- Drugs and medicines** – The cost of drugs and medicines varied for different EPHS conditions. For example, the drug costs associated with a normal delivery in Sahil is US\$ 10.67, while the drug costs for normal delivery in Puntland are approximately US\$ 12.50.

In order to capture cost variation in detail, further assessments of the unit pricing of inputs and exploration of local economic conditions and markets are necessary. Examples of key questions to be further explored are listed in Annex A.3.

7.2.3 Differences in service utilisation

Unit costs are also affected by the denominator (service utilisation units or outputs). For example, the unit cost to treat pneumonia can vary based on the number of patients who are treated. If a low number of patients are treated, fixed costs remain constant and, therefore, the unit cost per patient will be higher. If more patients are treated, the cost will decrease to a point of optimal efficiency within current allocated resources and then will increase if additional fixed costs are required (e.g. there is a need to hire more staff).

In summary, in order to understand the variation in cost with greater precision for delivering the EPHS in Somalia, deeper investigation is required at both field and management levels.

8 Limitations

As in any economic study, there are limitations in the methodology, data collection, and analyses. It is important to highlight these limitations in order to understand the context in which the data are reported and possible refinements going forward. Important limitations are highlighted below.

8.1 Reliability of data

There is some variation in the reliability of cost and utilisation data reporting by the three EPHS implementers. This variation highlights the need for capacity building in the fundamentals of cost and cost-efficiency analysis in order to equalise the ongoing monitoring and reporting of cost and economic variables, particularly in relation to VFM.

8.2 Restrictions on facility-level analyses

In this study, facility-level cost analyses are conducted for the ‘average facility’ at different levels (PHU, HC, RHC, etc.). A more thorough cost analysis would engage a sample of facilities within each level in order to capture greater cost detail and variation among facilities and levels of care. This limits the ability to analyse cost variation, efficiencies, and economies of scale and scope with precision using econometric modelling.

In addition, at this point in time, data from hospitals and PHUs are not detailed in the unit costing (beyond per capita costs) as hospitals require more detailed analyses and PHUs do not provide the same direct services as HCs and RHCs in the delivery of the EPHS.

8.3 Assessing ‘other sources of revenue’

Some EPHS implementers failed to provide robust estimates of ‘other sources of revenue’. These data and others (including drug cost breakdowns, etc.) would benefit from further refinement going forward in order to capture the entire revenue base associated with the delivery of the EPHS.

8.4 Refinements of the costing workbook

The facility-based workbook could also use some refinements for data entry, capturing more direct services (i.e. health education), although the cost data allocation processes established are robust. To address this limitation, it might be useful to develop a brief guide for potential users of the workbook.

8.5 Indirect costs at management level

It is important to note that indirect costs at management level (i.e. administration, finance and security) are not included in this analysis, although they were raised and highlighted as an important concern by donors and implementers of the EPHS.

8.6 Single EPHS implementers

Each location (Sahil, Kakaar and Gedo) has only one implementer. As a result, this makes it difficult in a more elaborate cost model to control for ‘implementing partner’ as a variable when examining variation in cost.

9 Conclusions and recommendations

9.1 Key findings

This cost study of the EPHS in the three zones of Somalia represents an important step in establishing the fundamental building blocks for further economic and VfM analysis of EPHS implementation and impact.

In summary, the following points highlight the key findings of the study within each of the economic questions explored:

- **What are the actual total and unit costs of EPHS implementation in the regions where HCS partners are implementing the EPHS?**

As identified in this study, the actual total annual costs of EPHS implementation among the three implementers range from US\$ 1.5 to US\$ 2 million, while amortised costs range from US\$ 1.1 to US\$ 1.3 million. Amortised per capita spending by HPA in Sahil averaged US\$ 5.30, by SCI in Kakaar it averaged US\$ 6.85, and by Trocaire in Gedo it averaged US\$ 5.51. Unit costs of services have been generated for the key EPHS services. The most costly of these services are normal delivery (ranging from US\$ 30 to US\$ 67 per expectant mother), PNC (US\$ 8.30 to US\$ 17.68 per mother), EPI (US\$ 10.20 to US\$ 22.40 per treated case) and pneumonia (US\$ 8.78 to US\$ 21.42 per treated case).

- **What are the primary cost components of EPHS implementation, including, but not limited to, infrastructure and equipment, human resources, training and capacity building, drugs and medicines, and recurrent costs?**

These primary cost components were explored in detail for an average facility at different levels of EPHS implementation among the three implementers. HPA incurred the highest average capacity building, infrastructure and medical equipment costs, while SCI incurred the highest average human resources and recurrent costs. Trocaire incurred the highest average costs for drugs and medicines.

- **What are the main cost drivers in the implementation of the EPHS due to remoteness (urban/rural), security, or level/type of care?**

Differences in costs captured between implementers have been identified for the following factors: 1) cost structures; 2) input prices for infrastructure, equipment, human resources, and drugs and medicines; and 3) variation in utilisation of services. Given that there is only one EPHS implementer in each region, an analysis of the attribution of variation due to factors such as location or policy has not been conducted in this study.

- **How would the costs of the EPHS vary based on changes to either the scope or scale of EPHS implementation? What are the normative costs of EPHS implementation under various scenarios?**

In this study, a facility-based spreadsheet cost workbook has been established to examine the actual costs of EPHS implementation, which can also be applied for normative costing either at an individual facility level, average facility level, or for overall EPHS implementation in a specific region or location.

- **How can the HCS improve VfM/investment in the EPHS in Somalia, including improved application of the costing model?**

Now that the unit costs of the EPHS have been established in this study, more advanced economic analysis and assessment of VfM can be conducted and applied to resource decision-making at various levels. Specifically: a) the costing tool can be used for normative costing; b) EPHS implementers can apply the model for tracking efficiency and VfM in the provision of services; and c) the methodology can be applied either observationally or prospectively. Furthermore, the collection of additional data or the modelling of factors that could have an impact on the variation of cost could also improve VfM.

9.2 Remaining economic questions

In moving forward using these cost data and additional information for enhanced decision-making related to EPHS planning and implementation (particularly in regard to VfM), it is most important to consider the economic questions that remain and the possible advancements that could be made in order to strengthen the overall cost-effectiveness of the EPHS.

As highlighted in this report, there still exist questions about the **variation in costs due to location and implementer policies**. Furthermore, there are unresolved questions about the **different elements of efficiency, particularly as related to the inventory and choice of inputs** (including mixture of resource inputs, facility types, facility size and location). In summary, these factors relate to identifying the appropriate scale and scope of future EPHS implementation and applications of **normative costing**.

At the implementer level, there are outstanding questions about how **EPHS implementers can monitor their own efficiencies and VfM** via an effective, meaningful and streamlined approach.

The following sub-section outlines a series of specific recommendations for possible future expansion of cost and economic analyses and application so as to advance the VfM achieved in the delivery of the EPHS across the three regions of Somalia.

9.3 Recommendations

9.3.1 Recommendation #1 – Resource and financial planning for EPHS scale-up for government and development partners (normative costing)

Given the need for government policy-makers, planners and development partners to have a strong grasp of resources inputs and the ‘production of health services’ within the context of the EPHS in Somalia, it is recommended that the top-down and facility-based costing approaches applied in this study should be adapted to establish an EPHS-wide costing and financial management tool.

The tool could be constructed to manage and monitor resource inputs and outputs from a government policy and development partner contribution level. One specific recommendation is to have the current facility-based tool refined and aggregated to the appropriately determined level and applied as a ‘normative tool’, which allows for modelling varying inputs and estimated outputs of the EPHS, so as to understand possible changes in total and unit costs and prospectively examine efficiencies. This tool could also apply the factors obtained in the proposed study described in recommendation #5.

9.3.2 Recommendation #2 – Capacity building of EPHS implementers: cost-efficiency and normative costing scenarios

The costing and VfM approach taken by HCS implementers to date represents a fundamental first step in reporting on allocating costs to services and reporting unit costs. As shown in this study on actual EPHS costs, a more comprehensive and standardised approach to unit costing will enable

EPHS implementers to have greater control over the relationship between resource inputs and service outputs at the direct service level.

In order to advance cost-efficiency at the implementer level, the following specific steps are recommended:

- Build capacity among each of the implementers to conduct routine unit cost analysis to monitor VfM in EPHS delivery in a streamlined yet meaningful way, in order to inform implementer management decision-making;
- Enhance the capability of implementers to use the costing workbook to conduct normative scenarios to work toward 'optimal efficiency' in service delivery; and
- Develop more standardised unit cost analyses for generating and reporting on VfM in the context of current donor support.

9.3.3 Recommendation #3 – Enhancing cost-effectiveness

It is clear from discussions in country that both government and development partners have an interest in establishing ongoing cost-effectiveness in the delivery of the EPHS. Additional cost-effectiveness analyses will strengthen planning for future EPHS implementation in Somalia in a way similar to recent work conducted in Zimbabwe,²¹ but this requires additional data related to the estimated burden of disease in Somalia. This recommendation would be difficult to implement immediately, but could eventually be conducted as more household data and additional detailed cost analyses become available.

9.3.4 Recommendation #4 – Expansion of costs included in the assessment, including indirect costs in the Somalia and Nairobi levels

During the various meetings with key development partners during the in-country mission, it was apparent that there remain several outstanding questions related to indirect costs at different levels (i.e. the Nairobi and Somalia offices) and the need to understand their impact upon the total cost of delivering the EPHS. It is recommended that this aspect be further explored and detailed, particularly as related to development partner management decision-making and identifying trade-offs between indirect and direct costs. This can also be helpful for future government planning and policy relating to resource allocation for the EPHS.

9.3.5 Recommendation #5 – Proposed study to examine variation in costs

In order to thoroughly examine variation in costs and input prices, either an observational, prospective, or combined study approach should be taken. For example, observationally, one could examine the inputs and costs of implementers working in different locations in Somalia. This would enable one to control for implementer policies and procedures so that location cost factors can be further defined and specified. In this case, examining data from a larger sample of facilities would also increase the validity, reliability, and precision of cost data.

Alternatively, a prospective approach could be taken that applies available national or international data to model possible differences in costing among the three regions.

²¹ See Hansen and Chapman, Setting priorities for the health care sector in Zimbabwe using cost-effectiveness analysis and estimates of the burden of disease. *Cost Effectiveness and Resource Allocation* 2008, 6:14 doi: 10.1186/1478-7547-6-14.

A combined approach (both observational and prospective) is recommended in order to examine variation in costs and input prices where international data are applied to ‘fill in the gaps’ where national data are unavailable.

9.3.6 Recommendation #6 – Proposed study to examine private sector health service provision and costs

Throughout the in-country mission, stakeholders highlighted the need to further understand the current role of the private sector in health services delivery, its costs, and its relationship to EPHS service resources and delivery. As a result, it is recommended that a study to examine the private sector and its resource costs in Somalia be considered. For example, countries such as Afghanistan and Cambodia have recently implemented different models and policies related to health services contracting.²² If Somalia is to consider such models, it should further explore and estimate the potential trade-offs and policy implications.

²² Blaakman, Salehi and Boitard, A cost-efficiency analysis of two alternative models for implementing the BPHS in Afghanistan, *Global Public Health*, 5 September 2013: <http://dx.doi.org/10.1080/17441692.2013.829862> [accessed 02 August 2014]

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11 List of persons met

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Ms Mercy Oduor, Programme Officer, Health, DFID

Ms Katie Bigmore, Health Adviser, DFID

Mohamoud Abdirisak, Puntland, Somalia Country Office, SCI

Abdi Rizak Hassan, Director of Planning, Ministry of Health, Puntland

12 EPHS components

The package of EPHS services, showing the focus of HCS delivery, is as follows:

1. Maternal, reproductive and neonatal health.
2. Child health.
3. Communicable disease surveillance.
4. First aid and care of critically injured.
5. Treatment of common illnesses.
6. HIV, sexually transmitted infections and TB.
7. Chronic disease management and palliative care – not supported.
8. Mental health – not supported.
9. Dental health – not supported.
10. Eye health – not supported.

Annex A Total facility and per capita costs spending (non-amortised)

A.1 Top-down expenditure analyses by EPHS implementer (HPA, SCI and Trocaire)

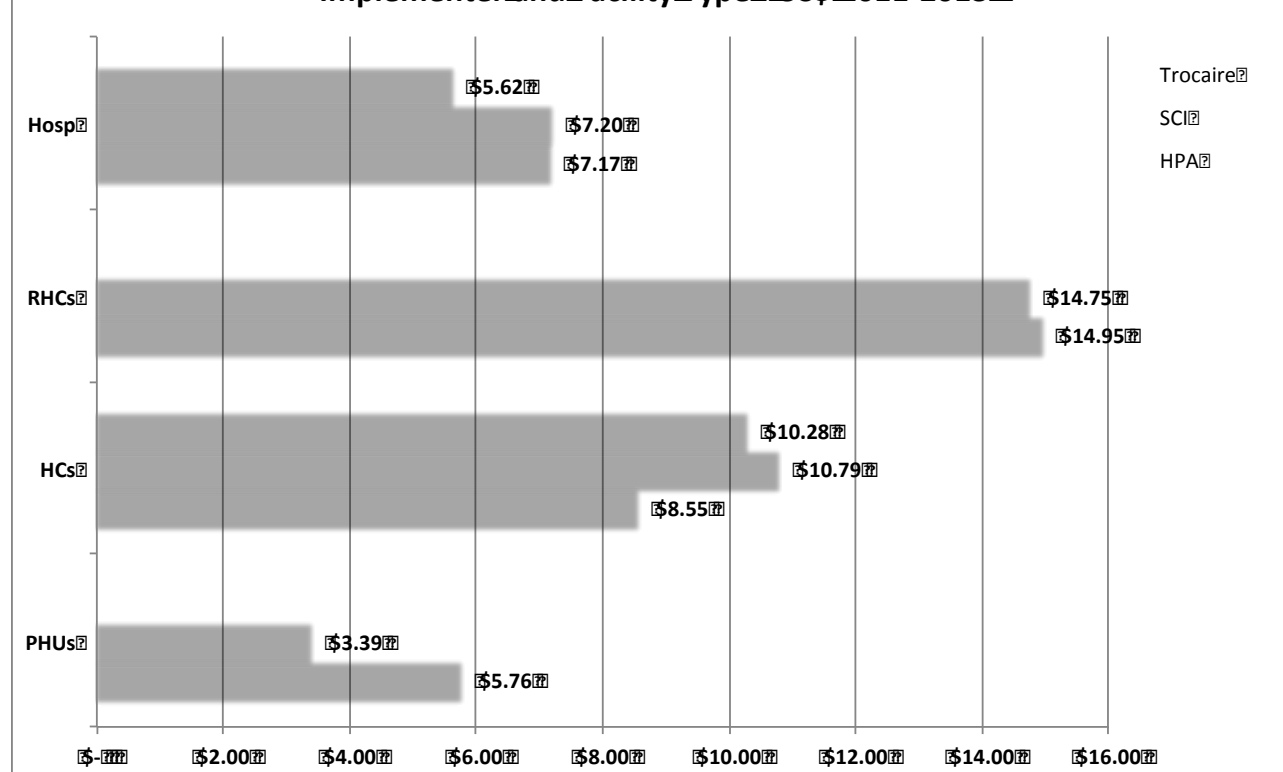
# of Facilities	PHUs 15	HCs 6	RHCs 4	Hospitals 1	1 Year All	3 Years All
Resource Category						
Capacity Building/Training	\$54,448	\$54,448	\$54,448	\$54,448	\$257,790	\$73,371
Infrastructure	\$74,068	\$63,795	\$248,040	\$271,683	\$209,919	\$2,129,758
Medical Equipment	\$50,909	\$50,909	\$50,909	\$50,909	\$203,637	\$610,912
Human Resources	\$26,130	\$109,368	\$55,616	\$109,620	\$200,734	\$1,202,202
Drug and Medicines	\$5,000	\$72,000	\$72,000	\$36,000	\$225,000	\$75,000
Recurrent Costs	\$2,146	\$26,860	\$6,767	\$20,644	\$16,417	\$49,251
Total Costs	\$72,701	\$187,380	\$27,780	\$73,304	\$961,165	\$5,740,494
Average per Year per Facility	\$18,180	\$31,230	\$5,645	\$73,304		
Catchment Pop. Average	18,156	19,500	10,500	10,000	220,000	
Annual Per Capita	\$5.76	\$8.55	\$4.95	\$7.17	\$8.91	

# of Facilities	PHUs 30	HCs 5	RHCs 4	Hospitals 1	1 Year All	3 Years All
Resource Category						
Capacity Building/Training	\$4,850	\$4,850	\$4,850	\$4,850	\$9,399	\$178,198
Infrastructure	\$5,620	\$9,406	\$28,042	\$16,931	\$100,000	\$2,200,000
Equipment	\$1,607	\$74,361	\$95,782	\$87,470	\$299,219	\$97,658
Human Resources	\$11,600	\$49,400	\$81,920	\$201,960	\$644,880	\$1,934,640
Drug and Medicines	\$7,385	\$70,816	\$70,816	\$3,908	\$36,924	\$1,010,772
Recurrent Costs	\$30,077	\$66,513	\$1,045	\$100,646	\$288,282	\$64,845
Total Costs	\$21,139	\$12,346	\$19,455	\$75,765	\$2,028,704	\$5,086,113
Average per Year per Facility	\$7,046.62	\$2,469	\$5,864	\$75,765		
Catchment Pop. Average	18,156	19,500	10,500	10,000	220,000	
Annual Per Capita	\$3.39	\$1.07	\$4.75	\$7.20	\$10.14	

Table 3. Trocaire Average Annual Spending By Facility Type (all facilities) and Resource Category – USD 2011-2013

# of Facilities	HCs 5	Hospitals 2	1 Year All	3 Years All
Resource Category				
Capacity Building/Training	\$39,305	\$39,305	\$78,610	\$235,831
Infrastructure	\$101,554	\$42,315	\$243,869	\$731,606
Equipment	\$95,048	\$71,286	\$166,333	\$499,000
Human Resources	\$16,099	\$28,647	\$44,746	\$1,334,238
Drug and Medicines	\$263,538	\$263,538	\$527,075	\$1,581,225
Recurrent Costs	\$39,413	\$54,612	\$94,025	\$282,076
Total Costs	\$54,956	\$399,702	\$1,554,659	\$4,663,976
Average per Year Per Facility	\$30,991	\$49,851		
Catchment Pop. Average	9,500	80,000	211,872	
Annual Per Capita	\$3.79	\$5.62	\$7.34	

A.2 Per capita cost analyses by EPHS implementer (HPA, SCI and Trocaire)

Figure A1. Average Annual Per Capita Total Spending by EPHS Implementer and Facility Type – US\$ 2011-2013

A.3 Questions related to variation in input costs

Infrastructure

1. What is the cost per square metre and how does it differ by new health post vs. rehabilitation, distance (remoteness)?
2. Are there any associated transport costs that increase costs for infrastructure delivery?
3. Are there differences in prices for bags of cement and other building inputs?

Equipment

1. Are there unit pricing differences for major equipment purchases (i.e. to support comprehensive emergency obstetric care), which RHCs and hospitals are now purchasing?
2. Are there any associated transport costs that increase costs for equipment delivery?
3. Are there differences in maintenance costs and unit prices?

Human resources

1. What are the salary top-ups being provided to staff for various staffing cadres?
2. Are there any associated taxes that reduce salaries/proportions by location?
3. Are there any other types of allowances made to staff? Any differences?

Drugs and medicines

1. Which suppliers are used most often and what are their associated unit prices for drugs and medicines and any mark-ups (for transport, security, cold-chain, etc.)?
2. Are there any associated transport costs that increase costs for drugs and medicines for delivery? For example, SCI's drugs and medicines come from Denmark, Trocaire's from Nairobi, and HPA's from Hargeisa.
3. Other commodity unit price differences?

Recurrent costs and capacity building

1. Are there unit cost/price differences for per diems paid in the field? Consultancy fees? Rates of pay for local travel and transport?
2. What is the daily cost of vehicle rental?
3. What are the local prices for fuel, water, and other recurrent expenditures?

Annex B Terms of reference

Terms of Reference for a cost analysis of EPHS in Somalia

Background

The Essential Package of Health Services (EPHS) was designed in 2008 to provide a common framework and minimum standard for the delivery of health services in Somalia. It consists of 10 services, of which the first 6 are 'core':

1. Maternal, reproductive and neonatal health
2. Child health
3. Communicable disease surveillance and control including watsan promotion.
4. First aid and care of critically ill and injured
5. Treatment of common illness
6. HIV, STIs and TB
7. Management of chronic disease and other diseases, care of the elderly and palliative care
8. Mental health and disability
9. Dental health
10. Eye health

Since 2010 DFID has been funding the Health Consortium for the Somali People (HCS) to pilot the EPHS in the three regions across the three zones of Somalia (South Central, Somaliland and Puntland). This consists of PSI in Hargeisa and HPA in Sahil region of Somaliland, Save the Children in the Karkar region of Puntland and Trocaire in Gedo region of South Central. Although the original focus of the HCS pilot was on delivering only services 1 and 2, in practice many elements of the remaining 4 core services are often covered by the Consortium.

In 2012/13 the Ministry of Health in Somaliland, Puntland and the FGS each developed a regional Health Sector Strategic Plan which sets out the national priorities. One element of the wider strategy is to support the EPHS roll out and expand its coverage.

However, there is a lack of costing analysis to facilitate planning for expansion. This includes a lack of reliable information on the actual costs of delivery and what factors (such as security) affect the costs. The three zones have started to roll out the EPHS in a further nine regions through the Joint Health and Nutrition Programme, which is a joint donor funded programme managed by UNICEF, WHO and UNFPA.

A recent review of EPHS implementation²³ in the three regions supported by HCS found that despite being donor funded, there have been other inputs from local sources, that have been highly innovative and impressive. Health authorities are encouraged to identify and strengthen channels for non-donor funding to ensure financial sustainability. Future planning of EPHS expansion should take this into account.

²³ Nigel Pearson and Saba Khan (Nov 2013) *Review of EPHS implementation in Sahil Region of Somaliland, Kaarkar Region of Puntland and Gedo Region of South Central Somalia*. Will be termed 'EPHS review'.

The EPHS was costed in late 2009 by UNICEF,²⁴ but this was only based on estimates. The EPHS review therefore recommends that actual costs from the pilots be used to update these estimates, and if possible be compared with results/impacts. These ToRs aim to analyse a selection of HCS facilities both urban and rural and in areas with different security levels to measure the input costs borne by the facilities, the input and output costs for the major services provided by the facilities, and determine the cost per visit and the per capita cost (within the catchment area). The costs will be compared across the regions to determine the range of costs needed to implement specific services within the EPHS and to determine the impact of security and location on cost.

Objectives

- 1) To identify drivers of costs in operating health services in the different regions of Somalia to guide the further rollout of EPHS
- 2) To compare actual costs vs projected costs as per UNICEF's original EPHS costing model.
- 3) To determine ways to improve the value for money in the Health Consortium for EPHS delivery, building on the existing Consortium value for money model and analysis.

Scope

The analysis should look at a selection of facilities in the HCS regions to include different levels of facilities, urban, rural, more secure, less secure and analyse the following costs:

- 1) Total cost per facility – capital and recurring costs as defined by the UNICEF costing model, including costs for refurbishment and infrastructure
- 2) Average total cost per service provided:
 - Maternal and newborn health – (ANC, PNC, delivery by SBAs, newborn care)
 - Child health and immunisations – (Penta 3, Nutrition, Pneumonia, diarrhoea)
 - Chronic, mental and trauma
- 3) Total and average cost per visit per service.
- 4) Cost per child reached
- 5) Cost per child life saved (if possible to measure with available data)
- 6) Per capita cost of health facilities (by catchment area)
- 7) Average cost per facility and per capita cost by each capital and recurrent cost category as outlined by the UNICEF costing model.

Methodology

To be proposed by the consultant but likely to include:

- 1) Desk-based review of literature on costing the EPHS in Somalia and internationally.
- 2) Desk-based data collection: the HCS partners would provide their costing and service delivery data to the consultant who would conduct initial analysis of it and formulate questions for stage 3. The locations for field visits to health centres would be finalised.

²⁴UNICEF (2009) *Costing the essential package of health services*.

3) Visit to Nairobi and Somalia:

- **Nairobi:** the consultant will interview UNICEF around the initial costing of the EPHS. They will also meet with Nairobi-based HCS partners to resolve issues identified in Stage 2 and discuss initial estimates. With both groups they will discuss potential options for scale up including geographical and service coverage.
- **South Central, Somaliland and Puntland:** the consultant(s) will meet with the HCS partners and the health authorities for each zone to discuss the costing model and potential options for future EPHS expansion. Visits to health facilities will be conducted as decided previously.
- **Nairobi:** initial findings will be presented to all stakeholders.

4) Report writeup and finalisation:

The final report to be completed, submitted to DFID, for sharing with HCS partners, JHNP and the Health Authorities.

Outputs

The following outputs will be provided:

1) Inception report

- Will outline detailed methodology and workplan one week after contract start date.

2) Presentation of initial findings

- In a workshop in Nairobi with all Nairobi-based stakeholders four weeks after contract start date. Initial findings to be shared with all stakeholders.

3) Final report: should be maximum 30 pages, covering:

- Analysis of actual costs per health centre for different levels of service coverage and other key variables such as location, as outlined in the scope above.
- Recommendations for expanding EPHS in terms of geographical and service coverage based on the various costing analysis.
- Recommendations including: a) preferred option for expansion; b) ways to improve the value for money of EPHS; and c) ways to improve monitoring and evaluation of financing, costs and cost effectiveness.
- Recommendations for revising original UNICEF EPHS costing tool.

Reporting

The analysis is commissioned by DFID Somalia and the consultants will report to the HCS Health Adviser, with technical assistance from a DFID Economic Adviser.

Timing

X days work is anticipated for this assignment, including travel to Nairobi (3 days at start), Hargeisa (3 days), Garowe (3 days) Mogadishu (2 days), Nairobi (2 days).

It should be conducted over a maximum of two months starting in April 2014.

Expertise required

A health economist who is:

- Experienced in the costing, financing and analysis of cost effectiveness of primary health services;
- Has previous experience working in fragile and conflict-affected states.
- Strong report writing and presentation skills
- Previous experience of working in Somalia is an advantage
- Be willing to travel to SL and PL, possibly SC.