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# **Costs of Reproductive Health Services Provided by Four CHAG Hospitals**

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## **Executive Summary**

The Christian Health Association of Ghana (CHAG) is a large faith-based NGO which currently serves an estimated 35 percent of the Ghanaian population, mainly in remote rural areas. CHAG's financial sustainability is threatened due to declining donations from missionary groups and donor agencies, uncertain support from government, and low cost recovery in member facilities. Although knowledge of costs is essential to program management, CHAG members had no information on the costs of the services they provided. Thus, CHAG had no economic benchmarks for evaluating efforts to control costs, no denominator for calculating cost recovery for different services, and no empirical data on service costs that could be used to approach donors and the Ghanaian government with requests for funding.

This study built capacity within the CHAG secretariat to calculate the economic cost and cost recovery levels of selected reproductive health services in four CHAG-affiliated hospitals. Techniques learned in the study are applicable to most costing problems, not just to reproductive health.

Average costs of outpatient consultations across the four hospitals ranged from US\$5 to US\$12. The main sources of variation were costs of personnel, and medical and laboratory supplies. First visits were more costly than revisits because providers spent more time with clients and used more materials and supplies than on subsequent visits. Of the three consultation types, voluntary counseling and testing (VCT) had the highest unit costs and family planning had the lowest. Policies governing use of laboratory tests also influenced cost recovery, since laboratory fees were by far the largest component of consultation revenue.

Information obtained in the study forms the basis for negotiating reimbursement under the Ghana National Health Insurance Scheme (NHIS), and setting cost recovery and containment policies. CHAG senior managers plan to train other association hospitals in the technique.

## **Introduction**

As more African governments pursue health sector reform, Ministries of Health are looking to non-governmental organizations (NGO) to play a larger role in service delivery. The Christian Health Association of Ghana (CHAG) is a faith-based NGO established in 1967 that coordinates activities and programs of member organizations in health service delivery. On behalf of member institutions, CHAG liaises with the Ministry of Health (MOH) to ensure proper coordination with government's efforts to provide for the health needs of all Ghanaians. Currently CHAG's 147 members serve an estimated 35 - 40% of the population, mainly in hard-to-reach rural areas, making CHAG second only to the MOH in provision of health care in Ghana.

CHAG member institutions include 56 hospitals, 83 primary health care facilities and 8 health manpower-training centers nationwide (147 total facilities). These facilities are located predominantly in rural areas and are focused on reaching the poor and marginalized. The few that are located in larger towns either were built when the towns were small and rural, or were meant to serve the health needs of the urban poor.

CHAG member institutions provide a wide range of curative, preventive, and rehabilitative services, including immunization, health education, maternal and child health and a variety of reproductive health (RH) services. RH services include family planning, sexually-transmitted infection (STI) screening and treatment, postabortion care (PAC), HIV/AIDS prevention and home-based care and support to people living with HIV/AIDS (PLWHA). In addition, CHAG recently collaborated with Pathfinder and the African Youth Alliance (AYA) in a two-year program dubbed "the Window of Hope Project", designed to reduce STIs, HIV/AIDS and unwanted pregnancy among youth (aged 10-24 years). Some CHAG facilities also have been designated "centers of good practice" by the government and are sites for training health professionals.

CHAG has a Secretariat based in Accra that is responsible for a range of promotion and support functions, including:

- assurance of holistic, quality and affordable health care based on good ethical and moral standards by professionally competent and motivated staff
- policy analysis, advocacy and lobbying
- capacity building of member institutions
- networking and public relations, and
- translating government policies into operational strategies for members to implement.

## **Statement of the Problem**

The Ghanaian government intends for CHAG to play a leading role in delivery of health services in the private sector. CHAG receives in-kind subsidies from the MOH, principally in the form of seconded physicians. CHAG, however, faces numerous threats and challenges. Demand for services is increasing, while donations from traditional sources (i.e., missionary groups and donor agencies) are declining, and future levels of financial and in-kind support from the MOH are uncertain. Currently, CHAG member

institutions struggle with problems such as shortage of qualified staff, high cost of inputs, low cost recovery and increased competition from other health providers. These problems threaten the sustainability of the member institutions and the CHAG Secretariat itself.

CHAG's vision is that its member institutions become financially sustainable and remain able to continue providing services to their target populations. Financial sustainability is advanced through income generation (i.e., cost recovery, donor and government contributions) and the control of costs. While knowledge of costs is essential to program management, CHAG members currently do not know the costs of the services they provide. Thus, CHAG has no economic benchmarks for evaluating efforts to control costs, no denominator for calculating cost recovery for different services, and no empirical data on service costs that could be used to approach donors and the Ghanaian government with requests for funding.

### Study Objectives

The overall goal of this study was to build capacity within the CHAG secretariat to calculate the economic cost and cost recovery levels of selected reproductive health services in CHAG-affiliated hospitals. Specific objectives included the following:

- To calculate economic costs of selected outpatient reproductive health services – family planning, antenatal care (ANC) and voluntary counseling and testing (VCT) - provided in four CHAG hospitals.
- To train staff from the CHAG secretariat in service costing so that the technique may be replicated in other hospitals and also utilized to estimate the cost of other health services.

### Methods

#### A. Study Sites

We purposively selected four CHAG hospitals for the study. Selection criteria included the following: a) existence of computerized accounting and service statistics systems; b) representation of one of the major church denominations, and c) interest of management staff in knowing the costs of services and in taking appropriate decisions based on the results of the study. The selected institutions, their locations, denomination and outpatient load are presented in Table 1 below:

**Table 1: Study Sites**

<b>Location/Denominational Affiliation</b>	<b>Region</b>	<b>Outpatient Load (2003)</b>
Nalerigu Baptist Hospital	Northern	65,806
Wenchi Methodist Hospital	Brong Ahafo	29,934
Agogo Presbyterian Hospital	Ashanti	66,439
Battor Catholic Hospital	Volta	41,434

## **B. Staff Selected for Training and Training Methodologies Used**

CHAG selected 12 of its staff for a one-week workshop on data collection. The group included eight staff from CHAG-affiliated hospitals and four from the CHAG secretariat in Accra. The former group included four nurses whose role was to observe provider time-use, and four administrators who were in charge of collecting accounting data and information on usage of drugs, laboratory supplies and other materials. Staff from the CHAG secretariat had responsibility for supervising fieldwork as well as data entry and analysis (with assistance from FRONTIERS). The workshop included presentations on costing theory and terminology, elements of costs of reproductive health services, as well as a thorough introduction to all of the forms used in the study. The workshop also included group exercises and in the case of the observational portion of the study, role-playing.

## **C. Calculation of Unit Cost per Service**

The term “unit cost” refers to the sum of all costs that are incurred to produce one unit of output. There are two frameworks that are used to think about costs: these are “financial costs” and “economic costs”. Financial costs are actual expenditures that programs make to purchase inputs, while economic costs include all resources used to produce output, regardless of whether or not the program had to purchase them. For example, economic costs include such resources as donated contraceptives and volunteer labor, whereas financial costs include only resources that programs pay for currently. Economic costs give a more accurate picture of the full resource requirements of the program, and thus, what costs would be if there were no donors.

The process of conducting a cost study from an economic perspective includes four steps:

1. Defining outputs of the program (in this case, clinical consultations of different types);
2. Identifying all resources used to produce outputs, regardless of who bears the cost of the resource;
3. Measuring the amount of each resource that is used to produce one unit of output;
4. Assigning a value to each resource and summing all these costs.

This study focuses on the costs of RH-related outpatient consultations, including antenatal care (ANC), family planning (FP) and voluntary counseling and testing (VCT). Hospitals incur many types of costs in the process of producing outpatient consultations. These include costs associated with clinical labor (providers) and non-clinical labor (e.g., administrators, secretaries), medical and office supplies, physical infrastructure (e.g., clinic rent, electricity, water), equipment and furniture, and miscellaneous expenditures such as insurance and building security. Excel-based spreadsheets were designed to collect information on these costs in the four study sites over a two-week period in September 2005. The following sections discuss how costs of different types of resources were measured, valued and allocated to clinical consultations.

## **D. Definition of Hospital Outputs**

CHAG hospitals produce more outputs than just the outpatient consultations (see above) that were defined as the focus of this study. For example, all of the hospitals provide inpatient care, as well as other outpatient services that are not RH-related, such as pediatrics. But some hospital resources are shared by inpatient and outpatient units (e.g., administration), and in order to allocate the costs of such resources, we need a method for expressing outpatient visits and inpatient stays in the same terms.

For simplicity, we assume that all outpatient consultations consume the same amount of shared resources, regardless of the consultation type. Inpatient capacity and services are recorded in terms of “bed-days”, a measure that refers to one hospital bed occupied by a patient for one 24-hour day. In an effort to make inpatient services comparable to outpatient consultations (for purposes of cost allocation), we assigned a weight of three to each inpatient bed-day, under the assumption that inpatients are consuming shared hospital resources during all three work shifts, while outpatients typically consume such resources only during the day shift. Total hospital output then was defined in terms of a metric called “patient care units”, defined as the sum of all outpatient consultations plus three times the number of inpatient bed-days.

## **E. Costs of Clinical Labor**

Clinical labor is defined as the efforts and activities of providers (physicians, midwives and nurses) who are directly involved in providing various medical services to clients. In CHAG hospitals, outpatient services are delivered by teams that include a lead provider (the person who actually provides the service) and support providers who register clients, take blood pressure and weight, deliver health talks, and generally assist the lead provider. In this study, we define direct clinical labor as the time that the lead provider spends in direct contact with a client. Indirect clinical labor includes two elements: the proportion of lead provider time not spent in direct client contact, and all of the time spent by clinical support providers.

### **1. Cost of lead provider labor**

#### *a. Direct Cost*

Patient Flow Analysis (PFA) was used to document personnel utilization in clinics. Two standard PFA forms (the personnel register and the patient register) were combined and adapted for the purposes of the cost study. We used this form to record the duration and type of all provider contacts with clients during a day of work in the hospital.

The form was used to observe provider activity at each hospital during a one-week period. Two observers (who were nurses themselves) followed selected providers. Types of client contacts observed included ANC first visit, ANC follow-up visit, FP first visit, FP follow-up, VCT pre-test counseling, VCT post-test counseling, other outpatient visit and care provided to inpatients. Participating staff calculated total provider time in the hospital, percent of time spent in client contact, percent of non-contact time and average duration of each type of RH outpatient consultation.



For each visit type the direct cost of lead provider labor was calculated by multiplying the number of minutes of provider – client contact by the cost per minute of provider time. This calculation can be represented by the following formula:

$$\text{Cost/minute} = \text{Annual Salary} / (\text{Normal Work Days} - \text{Paid Days Off}) * \text{Minutes per Day}$$

#### *b. Indirect Cost*

All work time not spent in direct contact with clients was classified as indirect time, and the cost of this time was allocated to the total visit cost in proportion to the direct cost of lead provider labor. The following formula was used to calculate indirect cost:

$$\text{Indirect cost} = (\text{direct cost} / \text{proportion of time spent in client contact}) - \text{direct cost}$$

## **2. Cost of Clinical Support Labor**

Tasks performed by these staff tend to be similar for all clients (i.e., registering the client, measuring weight and BP, health teaching), we assigned the same cost of clinical support labor to each client. An average cost of clinical support labor per consultation was calculated by dividing the annual salary and benefits of the clinical support team by the annual number of clients attended.

## **3. Administration and Support Labor**

Each hospital employs staff in administrative or support functions, including medical directors, accountants, housekeepers and receptionists. The cost per visit of administrative and support labor was calculated by summing the total annual salaries plus benefits of all staff in these categories for 2004, and dividing by the total number of patient care units recorded during 2004.

## **4. Clinical Supplies and Medicines**

Information was collected on the type and quantity of medical supplies (e.g., gloves, cotton, antiseptics) and other disposable resources used during each type of outpatient visit. Accounting staff determined the unit cost of these items, and total cost was calculated by multiplying the unit cost of each item by the quantity used in a visit, and then summing all items used during the visit.

## **5. Capital Costs - Building and Equipment**

Capital costs are associated with resources that have an expected useful life of one year or more. Study personnel all equipment and furniture, obtained the current price of a new item of the same type, and an estimate of the expected useful life of each item. A table of annualization factors was used to calculate the annual cost of each item, assuming a useful life of 30 years and discount rate of 15%<sup>1</sup>. Annualized costs of individual items

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<sup>1</sup> The discount rate reflects the real interest rate (net of inflation) that could have been earned if the organization had invested the funds instead of purchasing the capital item. Higher discount rates result in higher capital costs.

were summed to obtain a cost for each area of the hospital. Costs for shared areas were summed and divided by the number of patient care units to obtain a cost per client. Costs for areas used by only one type of client (e.g., ANC) were divided by the number of client visits. The cost elements were added together to obtain a total cost per client of equipment and furniture for each type of visit.

Building costs were obtained in one of two ways, depending on whether the facility was leased or owned by the organization. If the facility was leased, the annual rental payment was used as the cost of the building. If the facility was owned, either an “equivalent rent” was derived from knowledge of rental values in the same vicinity of the clinic, or the construction cost per square meter was estimated and annualized. Annual building costs were then estimated by multiplying the cost per square meter by the area occupied by the clinic. This cost was then divided by the number of client visits to obtain a cost per client visit.

*Capital Cost per Consultation = (Annualized costs of visit-specific equipment / Total consultations of that type) + (Annualized costs of shared equipment / Total Patient Care Units) + (Annual building cost / Total Patient Care Units)*

## **6. Other Expenditures**

Clinics incur a variety of other operating costs which do not fit into the categories of personnel, disposable supplies or capital items including utilities, office supplies, maintenance, insurance, and others. Study staff obtained a comprehensive listing of annual expenditures for the year 2004, and identified all expenditures not already included. The sum of these expenditures was then divided by the total number of patient care units to obtain the cost per client visit.

## **Results**

### **1. Time-use Patterns of Lead Providers**

Table 2 provides information on the mean number of minutes that lead providers spent in direct contact with clients during the six types of consultations studied. Duration of client-provider contact varied substantially by hospital and type of consultation. First visits were usually longer than revisits because of initial history-taking and baseline tests carried out during first visits. VCT consultations were the longest consultations due to the amount of information that is exchanged, as well as the sensitive nature of the topic. ANC consultations tended to be the shortest, likely because of higher demand and a more standardized service protocol. Average contact times for ANC and FP were highest in Agogo and Nalerigu, and lower in Battor and Wenchi. VCT contact time was highest in Battor, and substantially below the four-hospital average in Nalerigu.

**Table 2: Consultation Duration in Minutes, by Type of Consultation and Hospital (mean is unweighted; number of observations in parentheses)**

Type of visit	Agogo	Battor	Nalerigu	Wenchi	Mean
<b>Antenatal Care (ANC)</b>					
First Visit	10 (35)	4 (55)	11 (34)	4 (33)	7 (157)
Revisit	6 (81)	4 (63)	7 (55)	4 (85)	5 (284)
<b>Family Planning (FP)</b>					
First Visit	13 (14)	n/a (0)	11 (18)	10 (2)	11 (34)
Revisit	6 (42)	9 (12)	9 (49)	5 (7)	7 (110)
<b>Voluntary Counseling &amp; Testing (VCT)</b>					
First Visit	24 (4)	42 (3)	11 (29)	36 (7)	28 (43)
Revisit	18 (5)	19 (15)	6 (17)	6 (2)	12 (39)

Table 3 shows the mean percentage of time that the lead provider spent in direct contact with individual clients during a shift. The number of observations in each hospital-service combination is very small (ranging from two to five) and so the averages for each hospital cannot be considered to be stable. Also, the term “lead provider” refers to a job category, not an individual; thus, averages are based on observation of more than one individual in most cases.

**Table 3: Proportion of Work Time Spent in Direct Client Contact, by Type of Lead Provider and Hospital**

Type of Lead Provider	Agogo	Battor	Nalerigu	Wenchi	Mean
Antenatal Care (ANC)	54%	47%	37%	34%	43%
Family Planning (FP)	34%	16%	47%	34%	33%
Voluntary Counseling & Testing (VCT)	51%	25%	46%	38%	40%

With the possible exception of Battor, the amount of time spent on a given service is similar across hospitals. Although the study did not specifically focus on non-contact time, observers noted that providers spent substantial time on administrative tasks, in transit to outlying communities to conduct outreach, and waiting for clients on days when volume was low.

## 2. Unit Cost per Service

Table 4 presents estimates of unit cost (in Ghanaian Cedis) for outpatient consultations, by type of consultation and hospital. First visits were more costly than revisits for two main reasons: first, lead providers spent more time with clients on first visits; and second, providers ordered more laboratory tests and used more materials and supplies on first

visits than on subsequent visits. Of the three consultation types, VCT had the highest unit costs and FP had the lowest. Three factors explained higher VCT costs: first, the counseling at both visits is lengthy, resulting in higher staff costs; second, all VCT clients receive HIV tests which are expensive; and finally, fixed costs of equipment and physical space associated with VCT are distributed across a much smaller output than in the case of ANC or FP, resulting in higher average costs. See the detail on cost components for each hospital in Appendix 1.

FP costs in Table 4 do not include costs of contraceptive methods because of the difficulty of presenting in one table the costs of each method provided. The costs to CHAG of various contraceptive methods supplied in the four hospitals are shown in Appendix 2.

**Table 4: Cost per Consultation, by Type of Consultation and Hospital (in Ghanaian Cedis, US\$1 = 9000 Cedis)**

	<b>Agogo</b>	<b>Battor</b>	<b>Nalerigu</b>	<b>Wenchi</b>	<b>Average</b>
<b>Antenatal Care (ANC)</b>					
First Visit	92954	69914	89071	91150	85772
Revisit	64832	54050	74328	79898	68277
<b>Family Planning (FP)</b>					
First Visit	52235	54380	39747	44451	46529
Revisit	45210	54380	38277	37046	43728
<b>Voluntary Counseling/Testing (VCT)</b>					
First Visit	101146	126933	102675	109592	110087
Revisit	66082	112922	63756	44826	71897

### 3. Cost Components

Table 5 presents information on the relative influence of different cost components on the total cost of the six services studied. The values in the table were calculated by averaging the cost components from the four hospitals. Personnel costs usually comprise a large portion of costs of medical services, and this is true in the four CHAG hospitals: personnel costs account for 24 – 60% of the unit costs of the six services. The largest component of personnel costs is personnel emoluments, which are extra payments to staff in addition to their regular salaries for a variety of reasons including overtime hours, call allowance, rural allowance, transport and travel, night and lunch allowance and additional duty allowances. Smaller components of personnel costs included direct and indirect costs of lead provider time, and the costs of clinical and non-clinical support staff.

**Table 5: Components of Unit Cost across the Four Hospitals, by Consultation Type (in Ghanaian Cedis, US\$1 = 9000 Cedis)**

Cost Components	ANC		Family Planning		VCT	
	First Visit	Revisit	First Visit	Revisit	First Visit	Revisit
<b>Personnel</b>						
Lead Clinician						
Direct Client Contact	1835	1320	4085	1841	9604	3900
Non-contact time	2533	1883	7015	3683	15859	5910
Clinical Support	2059	2059	2334	2334	0	0
Personnel Emoluments	10867	10867	10867	10867	10867	10867
Non-clinical Support	3528	3528	3528	3528	3528	3528
<b>Total Personnel</b>	<b>20820</b>	<b>19656</b>	<b>27828</b>	<b>22252</b>	<b>39858</b>	<b>24205</b>
<b>Personnel - % of total cost</b>	<b>24%</b>	<b>29%</b>	<b>60%</b>	<b>51%</b>	<b>36%</b>	<b>34%</b>
<b>Capital</b>						
Equipment and Furniture	1539	1539	6027	6027	4091	4091
Physical space	1857	1857	5614	5614	27013	27013
Laboratory Fixed Costs	16396	10930	0	0	5465	0
<b>Total Capital</b>	<b>19792</b>	<b>14327</b>	<b>11641</b>	<b>11641</b>	<b>36569</b>	<b>31104</b>
<b>Capital - % of total cost</b>	<b>23%</b>	<b>21%</b>	<b>25%</b>	<b>27%</b>	<b>33%</b>	<b>43%</b>
<b>Miscellaneous</b>	<b>9836</b>	<b>9836</b>	<b>9836</b>	<b>9836</b>	<b>9836</b>	<b>9836</b>
<b>Misc - % of total cost</b>	<b>11%</b>	<b>14%</b>	<b>21%</b>	<b>22%</b>	<b>9%</b>	<b>14%</b>
<b>Subtotal without Mater/Suppl</b>	<b>50448</b>	<b>43819</b>	<b>46529</b>	<b>43728</b>	<b>86263</b>	<b>65144</b>
<b>Materials/Supplies</b>	<b>35324</b>	<b>24458</b>	<b>0</b>	<b>0</b>	<b>23824</b>	<b>6753</b>
<b>M&amp;S % of total cost</b>	<b>41%</b>	<b>36%</b>	<b>0%</b>	<b>0%</b>	<b>22%</b>	<b>9%</b>
<b>Total Cost per Visit</b>	<b>85772</b>	<b>68277</b>	<b>46529</b>	<b>43728</b>	<b>110087</b>	<b>71897</b>

Capital costs also accounted for an important share of total costs, but varied by type of the reasons for high capital costs differed by type of consultation (e.g., FP did not require use of lab equipment, while ANC visits required substantial use of laboratories). ANC clients routinely receive a battery of tests that may include (depending on the hospital) stool, urine, HB, sickling and blood grouping, in addition to vitamins and a tetanus injection. First-time VCT visits have high materials costs because of the cost of the HIV test.

#### 4. Cost Recovery

Table 6 shows the prices charged by study facilities, net revenues by type of consultation and the amount the four facilities charge for different consultations and percent cost recovery. Cost recovery was highest for ANC services, mainly because of charges for laboratory tests. Overall, the four hospitals recovered 93% of the costs of ANC first visits and 74% of the costs of ANC revisits. Cost recovery varied substantially between hospitals, with Agogo recovering 142% of the cost of an ANC first consultation, while Nalerigu recovered 31.9%. Family planning consultations had the lowest levels of cost recovery because of the absence of laboratory fees and lower service fees.

If the cost and revenue associated with contraceptives were added, cost recovery percentages would increase slightly, since the tariffs for most methods cover the commodity cost.

**Table 6: Cost Recovery by Consultation Type and Hospital (in Ghanaian Cedis, US\$1 = 9000 Cedis)**

<b>Consultation Type</b>	<b>Agogo</b>	<b>Battor</b>	<b>Nalerigu</b>	<b>Wenchi</b>	<b>Average</b>
<b>Antenatal Care (ANC)</b>					
<b>Cost of First Visit</b>	92954	69914	89071	91150	85772
Consultation Tariff	40000	30000	20400	35000	31350
Laboratory Test Tariff	92000	47000	8000	44000	47750
Net Revenue - First Visit	39046	7086	-60671	-12150	-6672
Percent Cost Recovery	142.0%	110.1%	31.9%	86.7%	92.7%
<b>Cost of Revisit</b>	64832	54050	74328	79898	68277
Consultation Tariff	10000	17000	18400	10000	13850
Laboratory Test Tariff	75000	27000	8000	27000	34250
Net Revenue - Revisit	20168	-10050	-47928	-42898	-20177
Percent Cost Recovery	131.1%	81.4%	35.5%	46.3%	73.6%
<b>Family Planning (FP)</b>					
<b>Cost of First Visit</b>	52235	54380	39747	44451	47703
Consultation Tariff	0	1000	2000	6000	2250
Laboratory Test Tariff	0	0	0	0	0
Net Revenue - First Visit	-52235	-53380	-37747	-38451	-45453
Percent Cost Recovery	0.0%	1.8%	5.0%	13.5%	5.1%
<b>Cost of Revisit</b>	45210	54380	38277	37046	43728
Consultation Tariff	0	0	0	0	0
Laboratory Test Tariff	0	0	0	0	0
Net Revenue - Revisit	-45210	-54380	-38277	-37046	-43728
Percent Cost Recovery	0.0%	0.0%	0.0%	0.0%	0.0%
<b>Vol Counseling/Testing (VCT)</b>					
<b>Cost of First Visit</b>	101146	126933	102675	109592	110087
Consultation Tariff	15000	15000	15000	40000	21250
Laboratory Test Tariff	28000	25000	5000	5000	15750
Net Revenue - First Visit	-58146	-86933	-82675	-64592	-73087
Percent Cost Recovery	42.5%	31.5%	19.5%	41.1%	33.6%
<b>Cost of Revisit</b>	66082	112922	63756	44826	71897
Consultation Tariff	5000	5000	5000	10000	6250
Laboratory Test Tariff	22000	0	5000	5000	8000
Net Revenue - Revisit	-39082	-107922	-53756	-29826	-57647
Percent Cost Recovery	40.9%	4.4%	15.7%	33.5%	23.6%

## 5. Skills acquired during study

This study provided staff of the CHAG secretariat with the opportunity to develop new skills in observation of work patterns of clinical providers, measurement of different types of resources used in delivery of clinical outpatient services, and calculation of costs. Presentation skills also were improved through the process of developing and polishing materials for the dissemination seminar.

## Conclusions

This study sought to build capacity within the CHAG secretariat to calculate economic cost and cost recovery levels of selected reproductive health services in four CHAG-affiliated hospitals. This goal was largely achieved, with CHAG staff taking primary responsibility for fieldwork and dissemination, and developing experience in data analysis through close collaboration with FRONTIERS staff. Although the costing approach used in this study is relatively simple there will likely be a need for some continued FRONTIERS technical assistance, although at a lower level than in this study.

## Recommendations

1. *Use cost data to negotiate reimbursement under the National Health Insurance Scheme (NHIS)*

The government currently is implementing the NHIS throughout the country's 123 health districts. The NHIS will provide coverage for maternal and child health services, nutrition, and treatment for conditions such as malaria and diabetes. Participation in the scheme could provide CHAG with significant revenue. Empirical cost estimates such as those presented in this report give CHAG a basis for negotiating reimbursement. But average costs presented in this report are based on only four hospitals, and CHAG should expand the sample of hospitals to ensure that the estimates are representative of costs throughout the network.

CHAG must decide which components of the full economic cost of a service should be reimbursed by NHIS. Two adjustments to full economic cost should be considered. These changes would reduce the reimbursable cost, but would give a more realistic picture of the unit cost from the perspective of a third-party payer such as the government or insurance company. Reimbursable costs include direct personnel costs, materials and supplies, and administration. Reimbursement for capital cost items is not quite as clear-cut. For example, equipment and furniture wears out and must be replaced (usually within 5 to 10 years) and the argument can be made that reimbursement should include an allowance for replacing these items. Building costs could be excluded, though, because of the longer useful life of buildings and also because of the distortions in unit costs of physical space for certain services (VCT, for example).

Cost estimates should be adjusted to account for overall productivity of the hospital. Hospitals with excess service capacity will have higher unit costs than those in which resources are used more intensively, *ceteris paribus*. Third-party payers do not subsidize

excess capacity, and to be acceptable, per unit costs should be adjusted downwards by increasing the number of clients used in cost calculations to estimated capacity levels.

## *2. Use cost data to set an institutional policy for cost recovery*

Knowledge of the unit cost of a service provides useful information to guide decisions about pricing that service. Overall, fees charged in the four CHAG facilities do not appear to be related to costs. CHAG has several price setting options. It can continue with an ad-hoc approach, but this is unlikely to be a successful strategy for recovering costs. Another approach would be to use knowledge of unit costs to seek to recover a percentage of the underlying total cost of the service. For example, prices could be set to recover direct costs of labor and supplies, which would then leave the facility to cover all indirect costs through reimbursement from the MOH and contributions from mission groups and international donors. A different strategy would be to measure the extent to which fees would be tolerated by clients, and then set fees in order to balance revenue needs and utilization. This approach requires information on client ability to pay, willingness to pay, or both; moreover, it requires a “safety net” for the poorest clients, since serving these clients is an important element of CHAG’s social mission. CHAG would benefit from building capacity in carrying out small-scale surveys of client economic characteristics and attitudes toward fees.

## *3. Identify costs of replicating the unit cost study procedures in other CHAG facilities*

The current study measured unit costs of RH-related outpatient services in a handful of CHAG hospitals. But the CHAG network includes 147 facilities, and each facility produces many more types of services than those included in the study. Ultimately, the goal is for CHAG to institutionalize the costing technique and conduct ongoing routine costing. To plan for scaling up the CHAG Secretariat needs to understand the resource requirements for this effort, and the costs of these resources.

Local costs of the pilot study were approximately US\$28,000, or US\$7,000 per facility. These costs included development and testing of the data collection forms, training of the CHAG Secretariat and data collection teams, travel and per-diem for data collection and supervision, follow-up visits to the facilities, and a dissemination seminar. If the costing technique were scaled up, only some of these costs would be incurred again. Costs that would recur would be those for training the data collectors, travel and per-diem for data collection, and supervision/follow-up costs.

Duration and complexity of data collection also could be reduced if CHAG affiliates assembled databases that could be updated periodically. These databases would also serve as sources of information for routine management. Some examples include:

- Inventories of equipment and furniture, categorized by location within the facility
- Usage of medicines and disposable materials, categorized by the type of consultation or service
- Measurement of the physical space of the hospital, categorized by use
- Listing of staff names, salaries and benefits organized by functional area
- Listing of miscellaneous expenditures



If the above information were available and up to date, the process of estimating unit costs could be completed rapidly. Information listed above could be fed directly into analysis spreadsheets, along with data on number of outputs (consultations and bed-days) produced during the reporting period. If this information were available, the only missing piece would be the time-use data for calculating direct and indirect costs of staff time. A decision would be needed on whether to rely on the averages calculated in the pilot study, or to conduct the time-use study in a larger sample of facilities.

## Appendix 1: Cost Components of Agogo, Battor, Nalerigu and Wenchi Hospitals

**Table A1: Components of Unit Cost at Agogo Presbyterian Hospital, by Consultation Type (in Ghanaian Cedis, US\$1 = 9000 Cedis)**

Agogo Presbyterian Hospital	ANC		Family Planning		VCT	
	First Visit	Revisit	First Visit	Revisit	First Visit	Revisit
<b>Personnel</b>						
Lead Clinician						
Direct Client Contact	2878	1745	4596	2176	9479	7104
Non-contact time	2424	1469	8746	4140	9230	6918
Clinical Support	3866	3866	5249	5249	0	0
Personnel Emoluments	15489	15489	15489	15489	15489	15489
Non-clinical Support	3534	3534	3534	3534	3534	3534
<b>Total Personnel</b>	<b>28192</b>	<b>26104</b>	<b>37614</b>	<b>30589</b>	<b>37732</b>	<b>33045</b>
<b>Personnel - % of total cost</b>	<b>30%</b>	<b>40%</b>	<b>72%</b>	<b>68%</b>	<b>37%</b>	<b>50%</b>
<b>Materials/Supplies</b>	<b>40483</b>	<b>18456</b>	<b>0</b>	<b>0</b>	<b>29870</b>	<b>3500</b>
<b>M&amp;S % of total cost</b>	<b>44%</b>	<b>28%</b>	<b>0%</b>	<b>0%</b>	<b>30%</b>	<b>5%</b>
<b>Capital</b>						
Equipment and Furniture	306	306	1089	1089	5940	5940
Physical space	1756	1756	3337	3337	13401	13401
Laboratory Fixed Costs	12022	8014	0	0	4007	0
<b>Total Capital</b>	<b>14084</b>	<b>10076</b>	<b>4425</b>	<b>4425</b>	<b>23348</b>	<b>19341</b>
<b>Capital - % of total cost</b>	<b>15%</b>	<b>16%</b>	<b>8%</b>	<b>10%</b>	<b>23%</b>	<b>29%</b>
<b>Miscellaneous</b>	<b>10196</b>	<b>10196</b>	<b>10196</b>	<b>10196</b>	<b>10196</b>	<b>10196</b>
<b>Misc - % of total cost</b>	<b>11%</b>	<b>16%</b>	<b>20%</b>	<b>23%</b>	<b>10%</b>	<b>15%</b>
<b>Total Cost per Visit</b>	<b>92954</b>	<b>64832</b>	<b>52235</b>	<b>45210</b>	<b>101146</b>	<b>66082</b>

Notes: Personnel costs comprise a large portion of costs of services, accounting for 30 – 72% of the unit costs of the six services. The largest component of personnel costs is personnel emoluments, which are extra payments to staff in addition to their regular salaries. Smaller components of personnel costs included direct and indirect costs of lead provider time, and the costs of clinical and non-clinical support staff.

Other important cost components included visit-related materials and supplies, which included the cost of laboratory tests routinely ordered for ANC and VCT clients. ANC clients receive a stool, urine, HB, sickling and blood group test, in addition to vitamins and a tetanus injection. In the case of first VCT visits, these costs are high because of inclusion of an HIV test (Determine Kit). Unit costs of VCT also were influenced strongly by the cost of equipment and physical space. The area used for VCT is similar to rest of the hospital infrastructure, but it is used much less intensively, which results in higher average costs per VCT client. The final major category is miscellaneous costs which comprised from 10 - 23% of total consultation cost.

**Table A2: Cost Components in Battor Catholic Hospital, in Ghanaian Cedis  
(US\$1 = 9000 Cedis)**

<b>Battor Catholic Hospital</b>	<b>ANC</b>		<b>Family Planning</b>		<b>VCT</b>	
	<b>First Visit</b>	<b>Revisit</b>	<b>First Visit</b>	<b>Revisit</b>	<b>First Visit</b>	<b>Revisit</b>
<b>Personnel</b>						
Lead Clinician						
Direct Client Contact	614	637	n/a	763	6893	3072
Non-contact time (indirect)	701	727	n/a	3934	20416	9099
Clinical Support	663	663	0	0	0	0
Personnel Emoluments	19819	19819	19819	19819	19819	19819
Non-clinical Support	2480	2480	2480	2480	2480	2480
Total Personnel	24277	24325	22299	26996	49609	34470
<b>Personnel - % of total cost</b>	<b>35%</b>	<b>45%</b>	<b>45%</b>	<b>50%</b>	<b>39%</b>	<b>31%</b>
<b>Materials and Supplies</b>	16318	5613	0	0	15166	21500
<b>M&amp;S % of total cost</b>	<b>23%</b>	<b>10%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>19%</b>
<b>Capital</b>						
Equipment and Furniture	1115	1115	2465	2465	4472	4472
Physical space	3399	3399	15733	15733	43294	43294
Laboratory Fixed Costs	15620	10413	0	0	5207	0
Total Capital	20134	14927	18199	18199	52973	47766
<b>Capital - % of total cost</b>	<b>29%</b>	<b>28%</b>	<b>37%</b>	<b>33%</b>	<b>42%</b>	<b>42%</b>
<b>Miscellaneous</b>	<b>9185</b>	<b>9185</b>	<b>9185</b>	<b>9185</b>	<b>9185</b>	<b>9185</b>
<b>Misc - % of total cost</b>	<b>13%</b>	<b>17%</b>	<b>18%</b>	<b>17%</b>	<b>7%</b>	<b>8%</b>
<b>Total Cost per Visit</b>	<b>69914</b>	<b>54050</b>	<b>49683</b>	<b>54380</b>	<b>126933</b>	<b>112922</b>

Notes: As in Agogo, personnel emoluments make up a large part of personnel costs for all services. Direct personnel costs of ANC and FP services are low because salaries in Battor are lower than in the other three hospitals, although part of the differential is made up in the form of higher personnel emoluments. No estimate is available for FP first visits because none were observed during the data collection period. VCT direct personnel costs reflect the length of the consultation, and indirect costs reflect the relatively low percent of time that VCT providers spend in contact with clients.

Materials and supplies costs are lower in Battor for ANC clients, mainly because fewer tests are routinely ordered (no routine HIV test), and the reagents used have lower unit costs. Supplies costs for VCT follow-up visits are dominated by the costs of four pamphlets on living with HIV that are provided to HIV-positive clients.

Capital costs for the VCT area in Battor are very high, for the same reasons as in Agogo: the area where VCT consultations are provided has high costs per square meter, and the number of VCT consultations is very low. VCT is a fairly new service, and so the volume of clients may increase over time, which would reduce the average cost of physical space for VCT.

**Table A3: Cost Components in Nalerigu Baptist Hospital, in Ghanaian Cedis  
(US\$1 = 9000 Cedis)**

Nalerigu Baptist Hospital	ANC		Family Planning		VCT	
	First Visit	Revisit	First Visit	Revisit	First Visit	Revisit
<b>Personnel</b>						
Lead Clinician						
Direct Client Contact	1744	1064	2984	2289	5052	2818
Non-contact time (indirect)	2974	1814	3333	2558	6035	3366
Clinical Support	2326	2326	2705	2705	0	0
Personnel Emoluments	4762	4762	4762	4762	4762	4762
Non-clinical Support	3229	3229	3229	3229	3229	3229
<b>Total Personnel</b>	<b>15035</b>	<b>13194</b>	<b>17013</b>	<b>15543</b>	<b>19077</b>	<b>14174</b>
<b>Personnel - % of total cost</b>	<b>17%</b>	<b>18%</b>	<b>43%</b>	<b>41%</b>	<b>19%</b>	<b>22%</b>
<b>Materials and Supplies</b>						
<b>M&amp;S % of total cost</b>	<b>49%</b>	<b>51%</b>	<b>0%</b>	<b>0%</b>	<b>28%</b>	<b>3%</b>
<b>Capital</b>						
Equipment and Furniture	3709	3709	16413	16413	4352	4352
Physical space	1021	1021	1086	1086	38331	38331
Laboratory Fixed Costs	20313	13542	0	0	6771	0
<b>Total Capital</b>	<b>25043</b>	<b>18272</b>	<b>17500</b>	<b>17500</b>	<b>49454</b>	<b>42683</b>
<b>Capital - % of total cost</b>	<b>28%</b>	<b>25%</b>	<b>44%</b>	<b>46%</b>	<b>48%</b>	<b>67%</b>
<b>Miscellaneous</b>						
<b>Misc - % of total cost</b>	<b>6%</b>	<b>7%</b>	<b>13%</b>	<b>14%</b>	<b>5%</b>	<b>8%</b>
<b>Total Cost per Visit</b>	<b>89071</b>	<b>74328</b>	<b>39747</b>	<b>38277</b>	<b>102675</b>	<b>63756</b>

Notes: Personnel costs in Nalerigu are relatively low compared to other hospitals, primarily because of the lower “personnel emoluments” item.

Materials and supplies account for a substantial portion of the overall cost of ANC and VCT visits, for the same reasons as in Agogo. A wide range of tests including (HIV) is routinely provided to new ANC clients, along with a tetanus injection and vitamins. Nalerigu staff also routinely test follow-up ANC clients for HIV.

Capital costs for the VCT area in Nalerigu are very high, for the same reasons as in Agogo and Battor: most of the buildings at the Nalerigu Hospital have high replacement costs because of their stone construction. Also, the number of VCT consultations is very low. VCT in Nalerigu is also a fairly new service, and so the volume of clients may increase over time, which would reduce the average cost of physical space for VCT. Finally, miscellaneous costs are the lowest in Nalerigu of any of the four hospitals.

**Table A4: Cost Components in Wenchi Methodist Hospital, in Ghanaian Cedis  
(US\$1 = 9000 Cedis)**

Wenchi Methodist Hospital	ANC		Family Planning		VCT	
	First Visit	Revisit	First Visit	Revisit	First Visit	Revisit
<b>Personnel</b>						
Lead Clinician						
Direct Client Contact	2102	1836	4675	2137	16994	2607
Non-contact time (indirect)	4032	3522	8966	4099	27757	4258
Clinical Support	1380	1380	1380	1380	0	0
Personnel Emoluments	3396	3396	3396	3396	3396	3396
Non-clinical Support	4868	4868	4868	4868	4868	4868
<b>Total Personnel</b>	<b>15778</b>	<b>15002</b>	<b>23285</b>	<b>15880</b>	<b>53015</b>	<b>15128</b>
<b>Personnel - % of total cost</b>	<b>17%</b>	<b>19%</b>	<b>52%</b>	<b>43%</b>	<b>48%</b>	<b>34%</b>
<b>Materials and Supplies</b>	40735	36135	0	0	21350	347
<b>M&amp;S - % of total cost</b>	<b>45%</b>	<b>45%</b>	<b>0%</b>	<b>0%</b>	<b>19%</b>	<b>1%</b>
<b>Capital</b>						
Equipment and Furniture	1028	1028	4140	4140	1599	1599
Physical space	1254	1254	2299	2299	13025	13025
Laboratory Fixed Costs	17628	11752	0	0	5876	0
<b>Total Capital</b>	<b>19910</b>	<b>14034</b>	<b>6439</b>	<b>6439</b>	<b>20500</b>	<b>14624</b>
<b>Capital - % of total cost</b>	<b>22%</b>	<b>18%</b>	<b>14%</b>	<b>17%</b>	<b>19%</b>	<b>33%</b>
<b>Miscellaneous</b>	14727	14727	14727	14727	14727	14727
<b>Misc - % of total cost</b>	<b>16%</b>	<b>18%</b>	<b>33%</b>	<b>40%</b>	<b>13%</b>	<b>33%</b>
<b>Total Cost per Visit</b>	<b>91150</b>	<b>79898</b>	<b>44451</b>	<b>37046</b>	<b>109592</b>	<b>44826</b>

Notes: Personnel costs for VCT and FP first visits are high, reflecting the fact the visits are longer than most others. Also, indirect costs are high because nearly two-thirds of lead provider staff time is spent on activities other than direct client contact.

Materials and supplies costs are approximately the same in Wenchi as in Agogo. A wide range of tests including (HIV) is routinely provided to new ANC clients, along with a tetanus injection and vitamins. Wenchi staff also routinely test follow-up ANC clients for HIV.

Miscellaneous costs per client are higher than in other hospitals, and this is related to the fact that Wenchi is a smaller hospital and has lower output relative to the other three hospitals. Thus, miscellaneous costs are spread across a smaller output, leading to higher average costs per client.

**Appendix 2: Costs of Family Planning Methods and Supplies in Ghanaian Cedis  
(US\$1 = 9000 Cedis)**

<b>Family Planning Supplies</b>	<b>Agogo</b>	<b>Battor</b>	<b>Nalerigu</b>	<b>Wenchi</b>
Oral Contraceptives (cycle)	150	150	450	150
Injection (including syringe)	1475	1775	2450	1800
IUD Kit	1000	n/a	1000	n/a
Other IUD Insertion Supplies	1405	n/a	1715	n/a
Male Condom (piece)	35	50	34	35
Female Condom (piece)	300	330	300	250
Norplant Insertion Kit	2000	n/a	2000	n/a
Other Norplant Insertion Supplies	6055	n/a	5155	n/a