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# **COST AND REVENUE COMPARISONS FOR A SAMPLE OF CONTRACTED AND NON-CONTRACTED HEALTH CENTERS**

MINISTRY OF HEALTH  
ROYAL GOVERNMENT OF CAMBODIA



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The authors of the report are David Collins, Zina Jarrah and Prateek Gupta. David Collins is Director of Finance and Accounting for Management Sciences for Health (a partner under BASICS) in Cambridge, Massachusetts, USA. At the time the study was carried out Zina Jarrah was an intern with Management Sciences for Health and an MPH student at Boston University, and Prateek Gupta was the BASICS Country Coordinator in Cambodia.

The photograph on the cover of this report was taken by David Collins.

## Executive Summary

In order to develop and test a model used for estimating the cost of the Minimum Package of Activities (MPA), data were collected and analyzed for a sample of 18 Ministry of Health health centers. Of these health centers, 11 were from contracted districts, 4 were not contracted but were supported by international and local organizations, and the other 3 were neither contracted nor supported.

The figures were compared across the three types of health center – non-supported, supported and contracted – using the average figure for each type. All the figures are for the year 2007. The comparisons were done in several ways:

- A comparison of actual utilization figures across the 3 health center types, with the average for the country as a whole and with the utilization required by a standard health center providing 90% of the services needed to its catchment population.
- A comparison of actual health center costs across the health center types and with the normative costs for the same numbers of services.
- A comparison of the actual costs across the health center types with the normative cost of providing 90% of the services needed by the catchment population.
- A comparison of actual and normative revenue for the three types of health center.

The two principle measures for the cost comparisons are cost per capita and cost per service. Cost per capita is the average cost per person in the catchment population and is an equity measure, since, all things being equal, one would expect the resources to be allocated equitably (fairly). However, these costs can vary with the different types of location, access and population density and with the mix of services. Cost per service is a measure of allocation efficiency and is affected by the mix of services.

It is worth noting that quality of care is not taken into account in making these comparisons. One health center may be providing more services than another but the quality of care may be worse.

Because of location and service mix variations both of these measures provide indicative rather than exact comparisons across individual health centers, and so the study focused on averages for the three types of health center. While these average figures for a number are informative, in this case the samples were small and only well-performing health centers were selected. Thus, while we can draw some conclusions for the health centers selected, we cannot extrapolate these to generalize about the three types of health center.

Bearing that in mind, the findings of the analysis are as follows.

### *Which health centers provided the most services?*

The contracted health centers provided the most services in total, with 1.72 per capita, and the most curative and other services (0.88 and 0.02). The supported health centers provided the next highest number of services, with 1.31 per capita, and had the most preventive services (0.83), although the contracted health centers only provided slightly

fewer with 0.82. Both the contracted and supported health centers provided more services than the national average of 1.16. Not surprisingly, the non-supported health centers provided the least total number of services (1.01) and were less than the national average in total and in terms of preventive services (0.42).

*How close are the utilization rates to the 90% coverage targets?*

All three types of health center have a long way to go to reach the 90% coverage targets of 2.49 services per capita. The contracted health centers were closest since they provided 68% of the needed services, the supported health centers provided 52% and the non-supported health centers only provided 40% of the needed services. The non-supported health centers need to triple the number of preventive services to achieve 90% coverage, as well as increase the numbers of curative services.

*Which health centers provided the most appropriate mix of services?*

The contracted health centers' mix of 51.4% curative, 47.6% preventive and 1% other services was closest to the ideal of 46.5%, 52.5% and 1%. The ratio of curative to preventive services was too low at the supported health centers and too high at the non-supported health centers.

*Was there any influence of the type of health center on utilization levels?*

The analysis indicates a possibility that the contracts may have resulted in a much higher use of curative services at the contracted health centers and that the support from NGOs had a positive impact on the numbers of preventive services at the supported health centers. The average number of curative services is lower at the supported health centers than at the non-supported health centers, which may indicate that staff spent more time on preventive services and less time on curative services at the supported health centers.

*How equitably were resources allocated?*

There was a significant difference in the levels of spending per capita across the three types of health center, with the contracted health centers spending \$2.05 compared with \$1.63 at the non-supported health centers and \$1.47 at the supported health centers. It is understandable that the contracted health centers spent most since they had access to the additional funds put into the contracting programmes. However, it appears strange that the non-supported health centers spent more than the supported health centers, when the latter had access to NGO support. This may be more related to differences in spending across the districts in which these health centers are located.

*How efficiently were resources allocated?*

To measure how efficiently resources were allocated we used the average cost per service. Since the mix of services was quite different across the three types of health center, we could not compare the average cost directly across the three types so we compared each cost with the cost that should have been incurred. The supported health centers received the least total resources for the services that they provided (59% of the resources needed), the contracted health centers received the second least with 66%, and the non-supported health centers received the most with 71%. The supported health centers were especially under-resourced in terms of staff (number of staff and pay

levels) and other fixed costs<sup>1</sup>. However in terms of numbers of staff the contracted health centers had the least compared with their need.

*How well-resourced were they in terms of the needs for 90% coverage?*

All three types of health center had much less funding than the \$4.43 per capita that they need to achieve 90% coverage. The supported health centers only received 33% of the amount that they would need, the non-supported health centers received 37%, and the contracted health centers received the most with 46%.

*How much did they spend on major programmes?*

The contracted health centers spent the most per capita on preventive and other services, whereas the non-contracted health center spent the most on curative services. In terms of the major programmes, the contracted health centers spent the most on RMNCH services and non-communicable diseases, whereas the non-supported health centers spent the most on communicable diseases. The contracted health centers spent the most, by far, on the child survival scorecard interventions. In all cases, spending was much less than the \$2.10 per capita needed for RMNCH services, the \$1.87 needed for communicable diseases, the \$0.46 needed for non-communicable diseases, and the \$1.11 needed for the child survival scorecard interventions.

*How well have they done in generating revenue?*

The contracted health centers only collected 73% of the user fee revenue that they should have collected, but this was much better than the collection rates of the non-supported and supported health centers, which were only 22% and 33% respectively. Although the figure for the contracted health centers includes health equity funds and health insurance, most of the revenue relates to user fees collected directly from patients. The contracted health centers also collected the most for the service delivery incentive (50%), whereas the non-supported and supported health centers only collected 15% and 9% respectively.

*Who received most government funding?*

The funding for GOC Salary, Overtime, Missions and Operating Costs are almost the same at the non-supported and contracted health centers but less at the supported health centers. This raises questions about the allocation of these resources since the supported health centers have the highest average catchment population and more staff.

*Who received most from Central Medical Stores?*

The non-supported health centers received more drugs per service from CMS than they needed (\$1.00 compared with \$0.94), and the same was true for the supported health centers. However, the contracted health centers received much fewer drugs per service than they needed (\$0.47 compared with \$0.72). While it is possible that some donated drugs were not recorded for the contracted health centers, it is also possible that the CMS allocated fewer drugs in the expectation that the shortfall would be covered from other sources.

*Who received the most donor support?*

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<sup>1</sup> While the contracted health centers appear to be the most under-resourced in terms of drugs, this is partly because of likely under-reporting of drugs received for two of the health centers.



The contracted health centers received the most donor support due to the funds for performance incentives. This amounted to an average of \$0.20 per service (16% of total income). The supported health centers received the second most with an average of \$0.15 per service (12% of total income), and the non-supported health centers received the least with an average of \$0.07 (4% of total income), which was mainly the cost of vaccines.

### ***Recommendations***

The study provides some useful insights into the cost and income across the different types of health center. In particular it provides an understanding of the relationship of costs to the different mixes of services. However, the sample of facilities was small, especially for the non-contracted health centers, and the picture provided is, therefore, somewhat limited.

Each district should conduct this type of analysis for every health center. The results would provide information on service delivery performance and on the equitable and efficient distribution of resources. This would be useful for improving the future planning of services and the allocation of resources. In the contracting districts it would also provide valuable supporting information on performance and, if the study is repeated periodically, of the impact of the contracting on services, income and resource use over time.

## 1. Introduction

The Ministry of Health (MOH) has developed a Minimum Package of Activities (MPA), covering health center and community services, and a Complementary Package of Activities (CPA), covering referral hospital services. At the request of the MOH, BASICS conducted a modeling of the costs of these packages to assist the MOH and donors in estimating the funding required for scaling up key interventions and to assist the MOH in planning and budgeting for these services<sup>23</sup>.

The cost modeling built on work done previously to estimate the cost of implementing the Child Survival Strategy (CSS)<sup>4,5</sup> and was aimed at complementing that work by producing detailed costs of the CSS interventions within the context of the MPA. The costing was done using a model so that the MOH can see how the costs change under different situations. It was intended that this model can be used by national, provincial and operational district MOH managers and eventually by health center managers when capacity increases at that level.

In order to collect and verify additional data for the cost modeling and to test both the functionality of the model and the norms, standards and prices used, we used the model to run costs and revenues for a sample of 18 health centers<sup>6</sup>. Of these health centers, 11 were from contracted districts<sup>7</sup>. This is because data are more easily available for those districts and because those health centers are considered more likely to have greater utilization, efficiency and quality. Of the other 7 health centers, 4 are supported by international and local organizations and the other 3 were selected by the MOH from facilities that have no support. The organizations and districts are listed in Annex 1.

Although the original purpose of collecting the data from the 18 health centers was to develop the cost and revenue projections, it was agreed that the data collected should be compared across the health centers. It is hoped that these comparisons will assist the policy makers and managers involved in service delivery and in providing assistance, especially through the contracting programmes.

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<sup>2</sup> Cost Projections for the Complementary Package of Activities for Referral Hospitals, Ministry of Health, Royal Government of Cambodia. The BASICS Project/USAID. 9 January 2009. David Collins, Prateek Gupta and Em Sovannarith.

<sup>3</sup> Cost and Funding Projections for the Minimum Package of Activities for Health Centers, Ministry of Health, Royal Government of Cambodia. The BASICS Project/USAID. 9 January 2009. David Collins, Zina Jarrah and Prateek Gupta.

<sup>4</sup> Scaling Up Child Survival Interventions in Cambodia: The Cost of National Programme Resource Needs. The BASICS Project (USAID) and WHO. 19 June 2007. David Collins, Elizabeth Lewis and Karin Stenberg.

<sup>5</sup> Scaling Up Child Survival Interventions in Cambodia: Service Delivery Costs. The BASICS Project/USAID. 25 February 2008. David Collins, Chan K. Chhuong and Kun Reth.

<sup>6</sup> The testing involved using the model to calculate the actual cost of the current level of services for each health center and the cost of scaling up utilization at those facilities. More information on the findings from these analyses will be shown in a separate report.

<sup>7</sup> A representative sample of facilities was not used since purpose of the study was to estimate the resources needed for a well-functioning health center.

## **2. The cost and revenue modeling**

### ***a. Model description***

The model used in this study analyzes and estimates costs and revenues using a bottom-up, or micro-costing, approach. The model determines the standard costs associated with the delivery of a particular health service, taking into account the staff time, drugs, medical supplies and tests required. Operating costs and indirect staff costs are distributed proportionally across the health services in accordance with the direct staff costs. The model determines the unit cost for each service, which is used to allocate actual costs across services or to project costs under different scenarios. Standard fees for service and other types of funding are also included in the model, which then uses those figures to assess actual revenues and funds received and to estimate income under the different scenarios.

The model contains five different scenarios:

- Scenario A: actual services and actual costs;
- Scenario B: actual services and standard costs;
- Scenario C: needed services and standard costs;
- Scenario D: projected services and standard costs; and
- Scenario E: projected services and standard costs using shared or part time staff.

For the purposes of comparing the costs and income in Cambodia, Scenarios A, B and D are the most relevant. Scenario C assumes 100% coverage and Scenario E is used where staff can be shared across facilities or where part time staff can be used. Neither of these scenarios is generally feasible for the MOH health centers.

In order to estimate the cost of needed or projected numbers of services, the model uses incidence and prevalence rates together with catchment population figures to estimate the number of each type of service needed for full coverage of the community. The model can then be set to a percentage of the total need figures so that projections or targets can be used.

The standard costs are estimated by determining the quantities of resources (staff type and time, drugs and supplies, and tests) required to provide a good quality service. These quantities are then multiplied by the price of each resource to produce a total standard cost for each service. The portion of staff time related to the each service is treated as a direct cost and the balance of staff time used for non-patient tasks, such as health center management, is treated as an indirect staff cost. A separate cost is determined for the fixed facility operating costs (e.g. electricity) and that cost, together with the indirect staff cost, is allocated across the services in proportion with direct staff cost.

Standard costs are determined according to the standard resources required and standard prices for those resources. The actual costs may be quite different from the standards because the actual resources used and/or prices paid can be quite different from the standards. Actual costs may be lower because fewer resources were available (e.g. insufficient staff or drugs) or lower prices were paid, or they may be higher because excessive resources were allocated or higher prices were paid. Where there are fewer resources available than those required according to the standards, the quality of the services may not be adequate and where resources are greater there may be waste.

Revenues that relate to numbers of services provided (such as user fees) are calculated by multiplying the standard fee for a service by the number of services. Other sources of funds, such as MOH salaries and Central Medical Stores (CMS) supplies, are tied to the related cost item. Fixed sources of funding can be entered directly into the model. Funding for performance incentives is also included.

All the major assumptions used in the model can be changed easily by the user. These include the catchment population size, need norms, overall utilization rate, standard quantities and prices of drugs and supplies, standard staff times, staff pay levels and standard operating costs. Any new services added to the MPA can also be included in the model.

## ***b. Modeling tool***

The Cost and Revenue Plus (CORE Plus) analysis tool was used to develop the model<sup>8</sup>. CORE Plus and an earlier version called CORE are flexible tools that have been used in many countries<sup>9</sup>. CORE Plus has been reviewed by international donor agencies, including the World Health Organization (WHO), and details of the review can be found on the web site of the Partnership for Maternal, Neonatal and Child Health<sup>10</sup>.

The tool was adapted to fit the MOH's specific modeling needs, which include producing total cost figures by programme, allowing for rapid adjustments to standard staff times, and handling more revenue and funding information.

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<sup>8</sup> CORE Plus was developed by Management Sciences for Health (MSH) and a generic version and user's manual can be found on MSH's web site at <http://erc.msh.org/mainpage.cfm?file=5.11.htm&module=toolkit&language=English>

<sup>9</sup> For example, CORE Plus was used in a recent study in Rwanda to do an in-depth analysis of the unit costs and revenues for HIV/AIDS services under its Performance-Based Financing Programme ("Cost and Revenue Analysis in Six Rwandan Health Centres: 2005 costs and revenues").

<sup>10</sup> [http://www.who.int/pmnch/topics/economics/costing\\_tools/en/index.html](http://www.who.int/pmnch/topics/economics/costing_tools/en/index.html)

CORE Plus is a Microsoft Excel-based workbook<sup>11</sup> that contains different types of worksheets including: service practice worksheets, assumptions and data entry worksheets, calculation pages, and data report pages.

The service practice worksheets are the backbone of CORE Plus as they are used to determine the standard staff time needed for each service, as well as the standard quantities and types of drugs, medical consumables and laboratory tests required. Prices of drugs, clinical supplies, and tests are also entered into the service practice worksheets via a Look-Up sheet. In addition to the service practice details, CORE Plus requires general facility data, personnel information, number of services, and income and expenditure figures for each health center. Prevalence or incidence norms are also necessary for each service, in order to estimate the numbers of services needed.

CORE Plus has an accompanying User's Manual and assistance can also be obtained from MSH.

### ***c. Data and assumptions***

The model covers MPA activities carried out by, or through, the health center, including outreach activities. It does not include some preventive activities carried out primarily by national programmes, such as the distribution of Insecticide Treated Nets (ITNs) and vector control for dengue fever.

The model only includes expenditures made by, or on behalf of, the health center and does not include the opportunity cost of volunteer activities; for example, the time of Village Health Support Group (VHSG) members. It does not include any Non-Governmental Organization (NGO) or donor agency costs other than those paid to, or on behalf of, the health center. It does include expenditures paid by donors or district office on behalf of the health centers, such as performance incentive payments and donated drugs and vaccines.

Management costs have been included at the level of the cost center where they are budgeted and incurred. For example, the cost of supervising and supporting the VHSGs is included in the health center costs since the staff that perform that function are under the health center budget. Similarly, the cost of district office supervision of the health centers is not included in this study because it is under the district office budget.

The cost to the health center of outreach services has been included in the study since they are part of the health center activities. VHSG services are not included in the HIS, but are assumed to be in support of outreach services. Activities and costs of health posts, of which only a few exist, are included under the health center.

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<sup>11</sup> The use of Microsoft Excel requires a license from Microsoft Corporation. This tool is not a product of Microsoft Corporation and is not guaranteed by that company.

Neither capital expenditures nor depreciation costs are included in the costing since these are not part of the recurrent budgets of the MOH. In addition, the cost of training staff, either pre-service or in-service, has not been included. The cost of related services sometimes used by a health center such as blood, ambulance and external laboratory tests are also not included.

The data collection and modeling was done in Riels and the results converted into US\$ using an exchange rate of 4,100 Riels to 1 US\$. Inflation has not been taken into account.

#### ***d. Costing a sample of actual facilities***

In order to collect and verify additional data for the costing and to test both the functionality of the model and the norms, standards and prices used, we used the model to run costs and revenues for a sample of health centers.

Of the 18 health centers in the sample, 11 were from contracting districts<sup>12</sup>. This is because data are more easily available for those districts and because those health centers are considered more likely to have greater utilization, efficiency and quality. Of the other 7 health centers, 4 are supported by international and local organizations and the other 3 were selected by the MOH from facilities that have no support. Data from contracted districts were collected from 6 health centers supported by the Swiss Red Cross in the Takeo Province; 3 health centers supported by Belgian Technical Cooperation (BTC) in Kampong Cham Province; and 2 health centers supported by HealthNet in the Prey Veng Province. The organizations and districts are listed in Annex 1.

These contracted health centers are part of a programme that started in 1999, under which the Government contracted the management of government health services to NGOs in five districts. The health centers are government run and have government staff, drugs and budgets. Management support, performance incentives and additional staff and supplies, where needed, are provided through the NGOs. The contracts covered all the preventive, promotional, and simple curative health care services included in the MPA and had specified targets for maternal and child health service improvement.

Data from non-contracted, supported districts were collected from 3 health centers supported by RACHA in the Pursat Province, and 1 health center supported by UNICEF in the Prey Veng Province. Data from non-contracted, non-supported districts were collected from 3 government-run health centers in Kampong Cham.

We requested that the health centers be selected based on good performance and so they were not representative of the type of health center in general.

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<sup>12</sup> A representative sample of facilities was not used since purpose of the study is to estimate the resources needed for a well-functioning health center.

The contracted health centers in Takeo Province were a main source of data for the study because the OD managers routinely compile the cost and revenue information for the health centers and this is reviewed and used by SRC. Also SRC has conducted several studies of cost, revenue and performance. The six health centers comprise urban, rural and remote rural facilities and were selected as being well-performing (according to a recent evaluation report, they generally met most of their performance targets<sup>13</sup>).

It is important to note that the actual costs obtained for the sample of health centers represent the expenditures made and are, therefore, reflections of the resources made available to the health centers.

#### ***e. List of services***

The services included in the modeling are those set out in the MPA. Using a translated version of the MPA Guidelines, a list of services was compiled, with each service classified as preventive or curative and also identified as under one of three major programs as defined by HSP2: Reproductive, Maternal, Newborn, and Child Health Services (RMNCH), Communicable Diseases Control Services (CDC), and Non-communicable Diseases Services (NCD)<sup>14</sup>. The information reported in the Cambodian Health Information System (HIS), which contains data from monthly health center reports, was also taken into account, since it is important that the numbers of the services modeled are reported in the HIS.

Whereas the MPA and HIS include a large number of services, we limited the number of services in the model to make it more manageable. Services that were high priority or were high volume or require expensive treatments were listed individually, while other services were bundled together. For example, services specific to child survival interventions, such as Vitamin A supplementation and measles vaccination, remained as individual services. On the other hand, the numbers of diphtheria, pertussis, and typhoid treatments were small and these services were therefore bundled together under “Other”.

The “Other” service category also includes treatment for minor ailments (general aches and pains) that make up a large number of contacts at health centers. According to the 2007 HIS survey, “Other” was consistently the single highest-volume service throughout health centers in Cambodia. However, since the HIS does not require breakdown of “Other” services, an assumption was made, based on anecdotal evidence, that treatments are mostly for gastritis or general pain.

With the above bundling of services, we arrived at a total of 49 services (see the previous MPA costing study for details). One of these is dental health, but since most

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<sup>13</sup> See Contracting of Health Services: Ang Roka and Kirivong Operational Districts, Takeo Province, Cambodia – Final Evaluation Report.

<sup>14</sup> A list of the services under each programme is provided in Table 10 of HSP 2.

health centers are not equipped or staffed for this service we set the incidence rate at zero. As a result, the model shows the complete package as having 48 utilized services. The CORE Plus tool has a limit of 60 services and having 49 services pre-entered allows the MOH to add another 11 services<sup>15</sup>.

We were advised that drugs for hypertension and diabetes, which are included in the MPA, are not provided to the health centers. These services were, therefore, only included in the model as counseling.

#### ***f. Need Norms***

The prevalence and incidence rates that are used to estimate the numbers of services needed (need norms) were obtained from a variety of sources, including the Health Strategic Plan 2008-2015 (HSP2), the national program plans and the Cambodian Demographic Health Survey (DHS). Details of the norms can be found in the previous MPA costing study<sup>16</sup>.

Important sources of information for norms came from three previous studies: the two costings of the child survival strategy mentioned earlier, and the costing of the reproductive health strategy<sup>17</sup>. The prevalence rates for certain services such as TB, HIV/AIDS, and malaria were found on the WHO website.

Where norms could not be identified for some curative services, rates were calculated by dividing the actual total number of services in 2007 for each service per the HIS by the relevant population. We either used the Ang Roka OD or national figures, whichever were the highest. We chose Ang Roka since the numbers of many curative services there are much higher than the national average and we assumed that this is reasonable because the facilities are better resourced because of the contracting programme. We then increased these figures so that the 90% targets would be the same as the actual numbers of services. We assumed that these figures do not represent the incidence of these illnesses on the grounds that a significant proportion of the population does not seek care at the health centers. These norms, therefore, represent services that should be provided at the health centers and not need norms per se. To illustrate, we take the example of Adult Simple Diarrhea, one of the services listed in the MPA. To calculate the national rate, we divided the total number of adult simple diarrhea cases in 2007 by the national population over the age of five, resulting in a rate of 1.61%. We then performed the same calculation using total cases in Ang Roka over its adult population, resulting in a rate of 1.57%. Since the national rate is higher for this service, we then set this rate to

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<sup>15</sup> The number of services can be increased beyond 60, but this requires changes in formatting and copying formulas, and should only be done by a person who is very experienced in working with spreadsheets.

<sup>16</sup> Cost and Funding Projections for the Minimum Package of Activities for Health Centers, Ministry of Health, Royal Government of Cambodia. The BASICS Project/USAID. 9 January 2009. David Collins, Zina Jarrah and Prateek Gupta.

<sup>17</sup> Scaling Up Child Survival Interventions in Cambodia: The Cost of National Programme Resource Needs; Scaling Up Child Survival Interventions in Cambodia: Service Delivery Costs; and the National Strategy for Reproductive and Sexual Health in Cambodia, 2006-2010



equal 90% of the norm. As a result, we calculated the normative rate for 100% utilization to be 1.79%, and input this figure into the Need spreadsheet of CORE Plus.

Because the prevalence of both malaria and dengue fever can vary greatly between endemic and non-endemic areas, two different need norms were established for these services. The Cambodia version of CORE Plus allows the user to input whether or not a particular health center is located in an endemic malaria or dengue fever area; as a result, the appropriate prevalence is applied to each situation.

#### ***g. Service Standards***

The service delivery standards were determined by a small team of local experts and were based where possible on Government of Cambodia official guidelines and standards of treatment. This team of physicians provided detailed information on the staff time and activities, drugs and supplies, and laboratory tests required for each service.

The standards were entered into the CORE Plus service practice worksheets and these were distributed to a MOH costing task team for feedback. Where possible, national program staff were also consulted to confirm or correct the service delivery standards. In addition, they were compared with the standards used in previous costing exercises in Rwanda and South Africa. (See the MPA costing study for a list of sources and assumptions for each service).

It should be noted that time for IMCI consultation has been included under each curative child service and time for counseling has been included under antenatal, postnatal and each immunization service.<sup>18</sup>

#### ***h. Service statistics***

Since the costing is based on numbers of services provided to patients, we only took into account services where a single patient or client has contact with a health center employee<sup>19</sup>.

The numbers of services used in this study were extracted from the HIS database for 2007. Only figures that represent services provided were used. We therefore excluded some figures, for example:

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<sup>18</sup> For certain services, the team of local experts suggested consultation times that greatly exceeded previous estimations from the Child Survival Costing and other CORE Plus studies. In such cases, we used an average of the consultation times suggested by the local experts and previous studies.

<sup>19</sup> For example, health talks given to groups of people are not included.

- We excluded the figures for “Referred to” in the HIS on the assumption that they represent patients that were either already included in the numbers of patients treated or they did not receive any treatment.
- We excluded lab tests on the assumption that those tests formed part of the services provided to patients that were already recorded elsewhere in the HIS.
- We excluded de-worming services for pregnant women and lactating mothers since we assumed that they were part of ante-natal and post-partum visits which were recorded elsewhere.
- We excluded staff time for de-worming for school-children, since these services are reportedly provided by teachers. However, the numbers and costs of mebendazole pills were included in the model.
- For family planning services we only included services that reflected contacts made during the year.
- In the case of birth control pills, we deducted 10% of the client numbers based on an estimate provided in Takeo that 10% of the services are provided by Community Based Distributors (CBDs)<sup>20</sup>.

The HIS has a section for repeat visits which are not identified in terms of the specific services. We therefore allocated these figures across the services in proportion to the numbers of services recorded.

The HIS does not include utilization figures for TB, HIV/AIDS, VCCT, Avian Influenza and diabetes. These figures should, however, be available from the OD managers.

Each service was identified in the model as curative or preventive and also categorized under one of the three major programmes: RMNCH, CDC or NCD. The model also identifies each of the services under the Child Survival Scorecard. This enabled the model to automatically calculate the total numbers of services and costs for each programme.

### ***i. Drugs and medical supplies***

Prices for drugs and medical supplies were obtained from a database<sup>21</sup> of quarterly Central Medical Stores (CMS) invoices issued for each Operating District (OD). A list of all the requisite drugs and supplies was compiled from the service practice worksheets and they were matched with CMS invoices from two different quarters in 2007 to determine the prices. In the case of price fluctuations, an average drug price was calculated. To avoid fluctuating prices for anti-retroviral drugs, the WHO Global Price Reporting Mechanism was used, with standard prices specific to Cambodia<sup>22</sup>.

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<sup>20</sup> We assumed that the cost related to those CBDs and the commodities are not part of the health center budget.

<sup>21</sup> This database is maintained by the Reproductive and Child Health Alliance (RACHA).

<sup>22</sup> <http://www.who.int/hiv/amds/gprm/en/>

Vaccines were not included in the CMS invoices and so we modified CORE Plus to show these as donations using the standard cost and the number of services provided<sup>23</sup>. The MSH International Drug Price Indicator Guide was used for the prices<sup>24</sup>.

We did not include certain common low-cost supplies used in small quantities (such as cotton, gauze and alcohol) under individual services, but treated them as bulk supplies instead. An average bulk supply cost per service was determined by dividing the total estimated bulk supply costs by the total number of services<sup>25</sup>. Based on the CMS invoice information from the Ang Roka and Kirivong ODs in Takeo province, a bulk supply cost of \$0.06 (259 Riels) per service was calculated. The bulk supply costs were then added to the normative drug and supply costs, as determined by the service practice worksheets.

It should be noted that the quantities of vaccines used in the model are understated to some degree since wastage has not been taken into account. This may also apply to some other drugs and supplies that are particularly subject to wastage.

#### ***j. Staffing***

We used information from the sample of health centers in Takeo Province to estimate staff time used for vacation, sickness and training. This was then used to estimate the average staff time available for each center. We also obtained estimates of how much time each type of staff member spends in meetings of different types and also, where applicable, in travelling to provide outreach services. The average meeting and travel time per staff person was deducted from the average number of days worked in order to estimate the time available to provide patient care services.

The team of local experts decided whether a nurse or midwife should be the key provider for each service. Based on the number of each kind of services and the standard times, the model determines how many nurses and midwives are required in total for each health center. No differentiation was made between primary and secondary level staff in terms of ability to provide services.

The figures for payments to staff were based on the actual amounts paid in contracting districts. Due to a complex system of fixed salaries, performance incentives, delivery

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<sup>23</sup> We were also unable to identify HIV/AIDS drugs on the CMS supply invoices. If they are not included in the CMS invoices they should be added to the donated figures on the revenue side.

<sup>24</sup> <http://erc.msh.org/mainpage.cfm?file=1.0.htm&module=DMP&language=English>

<sup>25</sup> To estimate total bulk supply costs per year, we first multiplied the quarterly CMS invoices for bulk supplies by four. Next, we divided this yearly figure by the total number of health services provided by the OD in 2007 to approximate bulk supply cost per service. We performed this calculation for two ODs and averaged the two figures to get a final cost of 259 Riels per service. This figure can be updated easily in CORE Plus.

incentives, and user fees, a new staff assumptions worksheet was created in CORE Plus. Each element of the staff pay was calculated differently:

- The GOC salary, overtime, and mission payments were treated as fixed amounts per employee costs and for these we assumed annual rates of \$417 (1,710,520 Riels), \$228 (936,618 Riels) and \$133 (544,398 Riels) respectively. The rates were based on averages for 2007 from 6 contracting health centers in Takeo and the 3 contracting health centers in Kampong Cham. A review of that actual data indicated that there was no difference in general between the pay of nurses and that of midwives, only between secondary and primary levels of staff. Since we did not differentiate between services provided by secondary and primary staff we used an average for pay across the two categories.
- The amounts paid to staff from user fees, health equity fund and health insurance revenues were linked to the revenue earned which are driven by the user fee rates and the numbers of services. It was assumed that 60% of those fees are shared among the staff and the amount per staff member varies with the number of staff.
- The amounts paid to staff from the GOC delivery incentives are linked to the revenue earned for those incentives, which is based on the numbers of deliveries and the incentive payment rates. The rates used were \$15 (60,000 Riels) and \$10 (40,000 Riels) for every birth at the health center or at home attended by a health center midwife. Based on the distribution of this revenue in Takeo, we assumed that 70% of the revenue received is retained by health center staff<sup>26</sup>, of which the nurses get 20% and the midwives 80%.
- We set a minimum total annual pay of \$1,931 (7,917,495 Riels), again based on figures from contracting health centers in Takeo and Kampong Cham. The assumption was made that this amount constitutes a minimum needed to provide the incentive for employees to work well. Where the total of the pay elements stated above comes to less than the minimum, the model shows the difference as a performance incentive.

Because revenue from user fees and delivery incentives is not related directly to the number of staff, the amount distributed to each employee varies with the number of staff (i.e. if it is distributed to more employees the amount per employee is reduced).

We set the number of staff at a minimum of 5 for each health center. The model was, therefore, modified so that when Scenarios B, C or D are used, if the model calculates that less than 5 staff are required, the number of 5 is used by default. The number of 5 was based on information provided by Operational District managers in Ang Roka and Kirivong, where many health centers reportedly achieve good results with 5 staff<sup>27</sup>. The 5 staff are assumed to comprise 3 nurses and 2 midwives.

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<sup>26</sup> The other 30% of the delivery incentives are, reportedly, paid to members of the community, such as traditional birth attendants.

<sup>27</sup> According to the MPA the minimum staff for a health center is 10. However, this does not agree with the figures in the Health Workforce Development Plan 2006-2015, which projects a total of 6 staff for a health center with 10,000 population (see details later in this study).

### ***k. Operating and other fixed costs***

A standard figure of \$2,268 (9,328,233 Riels) per year was used for operating costs (such as electricity and water), which was based on actual expenditures for 2007 from the sample of health centers in Takeo. This figure was used for all the scenarios. We also included the salary costs related to meetings and travel time to provide outreach services. This was assumed to be 17.7% of staff time for health centers with outreach and 8.8% for health centers with no outreach (using a sample of health centers from Takeo province). We also included the 30% of the GOC delivery incentives that is paid to persons not on the health center staff (e.g. Traditional Birth Attendants) and which varies with the number of deliveries.

It is recognized that certain operating costs, such as transport, may be higher for facilities in remote areas. No additional cost has been included for this but one can be added where applicable on the basis of circumstances at particular facilities<sup>28</sup>.

### ***l. Revenue modeling***

Revenue that varies with the numbers of services comes from user fees and service delivery incentives. Health Equity Funds (HEF) and health insurance revenue are received in place of user fees and are, therefore, treated as part of user fees. The fee revenue was based on the Takeo fee structure and the numbers of services. The percentage of user fees represented by HEF and health insurance are based on the actual figures in Ang Roka and Kirivong. For the GOC delivery incentive, we used the current incentive rate and the numbers of deliveries attended by health center staff.

Drugs and medical supplies from CMS are included under CMS and are based on the cost figure which varies with the number and mix of services. The amount of 39% of the user fees that is allocated for purchasing drugs and supplies is deducted from the CMS figure on the assumption that CMS would only provide the balance. The cost of vaccines also varies with the number of services and is treated as a donation under revenue.

Revenue that does not vary with the numbers of services includes GOC salaries, mission, overtime, and PAP (operating costs). Since we assumed a minimum pay level for staff that means that a portion of it is likely to come from performance incentives, and we showed the funding for these incentives as donor assistance. These should also vary with performance but we did not take that into account in the model<sup>29</sup>.

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<sup>28</sup> At one remote rural health center in Takeo the operating costs for 2007 were R1.2 million (\$300) higher than average – reportedly due to the higher transport cost of having to use boats for outreach.

<sup>29</sup> The modeling of performance incentives on both the revenue and cost side is likely to be complex but can be done once the performance factors and relationships are determined.

### 3. Methodology

The figures are compared across the three types of health center – non-supported, supported and contracted – using the average figure for each type. All the figures are for the year 2007. The comparisons are done in several ways:

- A comparison of actual utilization figures (Scenario A) across the 3 health center types, with the average for the country as a whole and with the utilization required by a standard health center providing 90% of the services needed to its catchment population (Scenario D)<sup>30</sup>.
- A comparison of actual health center costs across the health center types and with the normative costs for the same numbers of services (Scenario B).
- A comparison of the actual costs across the health center types with the normative cost of providing 90% of the services needed by the catchment population.
- A comparison of actual and normative revenue for the three types of health center.

The two principle measures for the cost comparisons are cost per capita and cost per service. Cost per capita is the average cost per person in the catchment population and is an equity measure, since, all things being equal, one would expect the resources to be allocated equitably (fairly). However, these costs can vary with the different types of location, access and population density.

Cost per service is an efficiency measure since if two health centers provide the same numbers of services and one has more resources than the other, there is some inefficiency, either because one has less than it needs or because one has more than it needs. This comparison is, however, affected by the mix of services. If one health center provided the same total number of services as another but as part of that total there were more services that have a higher cost, then the average cost per service for that health center should be higher.

Because of location and service mix variations both of these measures provide indicative rather than exact comparisons across individual health centers and are better for comparisons across many health centers.

It is worth noting that quality of care is not taken into account in making these comparisons. One health center may be providing more services than another but the quality of care may be worse.

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<sup>30</sup> The Health Strategic Plan, 2008-2015 (HSP2) has set targets for services at the health center level to be reached. For practical reasons, this report uses 90% of the HSP2 targets as the ideal because it is considered unlikely that any health center can reach 100% coverage.

#### 4. Utilization comparisons

Table 1 below shows a comparison of the average utilization figures across the three health center types. The figures in the first row are the catchment populations (the population in the communities served by the facility). The figures in the second row are the numbers of types of service provided. The figures in the remaining rows are the number of services provided broken down into curative, preventive, and other (mostly deliveries).

**Table 1: Comparison of Average Utilization figures across the 3 Health Center types**

	Actual for 3 Non-Supported HCs in 2007	Actual for 4 Supported HCs in 2007	Actual for 11 Contracted HCs in 2007
Catchment Population	12,512	15,268	11,894
Total Types of Services Provided in Scenario	35.7	33.5	33.6
Total Curative Services	7,274	7,084	10,503
Total Preventive Services	5,225	12,712	9,717
Total Other (Delivery, etc) Services	112	134	214
<b>Total Services</b>	<b>12,611</b>	<b>19,930</b>	<b>20,434</b>

The average catchment population varied significantly across the 3 types of health center, with the lowest for the contracted facilities (11,894) and the highest for the supported health centers (15,268). The non-supported health centers provide 2 more types of service (35.7) on average than the other two types of health center (33.6). The contracted health centers provided the most curative services and other services (10,503 and 214), and the supported health centers provided the most preventive services (12,712).

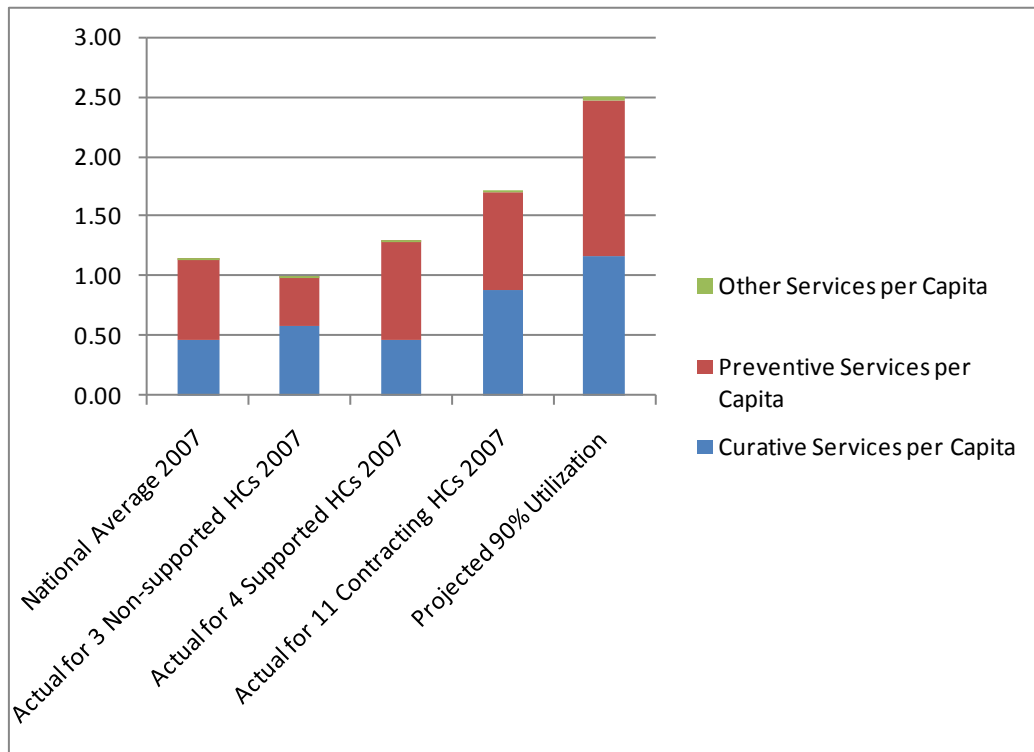
The numbers of services are better compared on a per capita basis (Table 2). The per capita rate is determined by dividing the number of services by the catchment population, and is the rate at which, on average, each person in the catchment area uses the facility. These figures can be misleading for individual health centers since people sometimes use a facility that is different from the designated one. While average figures for a number of facilities can be informative, in this case the samples were small and only well-performing health centers were selected. Thus, while we can draw some conclusions for the health centers selected we cannot extrapolate these to generalize about the three types of health center. This table also includes a column for the national average rates for all health centers in Cambodia and the rates for 90% utilization (using the model).

**Table 2: Comparison of Average Utilization Rates across the 3 Health Center types and with the national average and 90% norms**

	National Average 2007	3 Non- Supported HCs in 2007	4 Supported HCs in 2007	11 Contracted HCs in 2007	Projected 90% Utilization
Curative Services per Capita	0.47	0.58	0.46	0.88	1.16
Preventive Services per Capita	0.68	0.42	0.83	0.82	1.31
Other Services per Capita	0.01	0.01	0.01	0.02	0.03
<b>Total Services per Capita</b>	<b>1.16</b>	<b>1.01</b>	<b>1.31</b>	<b>1.72</b>	<b>2.49</b>

The figures from Table 2 are also shown graphically in Figure 1.

**Figure 1: Comparison of Average Utilization Rates across the 3 Health Center types and with the national average and 90% norms**



In terms of actual total services per capita, the contracted health centers provided the most services per capita (1.72) and the non-supported health centers provided the least (1.01). Both the contracted and supported health centers provided more services than the national average of 1.16, whereas the non-supported health centers provided fewer.

The contracted health centers provided the most curative services per capita (0.88) and the supported health centers provided the least (0.46). All the figures for curative services per capita were close to, or higher than, the national average, which is probably because only well-performing health centers were selected. The supported health centers provided the most preventive services per capita (0.83), although the contracted health centers were close with 0.82 services. The non-supported health centers



provided the least with 0.42 services per capita (around half the rates provided by the other two types of health center). In terms of other services (mostly deliveries) the contracted health centers provided the most services per capita (0.02), which is roughly double the rate at the other two types of health center.

The service mix is shown as percentages in Table 3. The supported health centers have the highest percentage of preventive services (63.8%) and the non-supported health centers have the lowest (41.4%). The mix at the contracted facilities is closest to the ideal mix shown for the 90% utilization.

**Table 3: Breakdown of average Utilization Rates across Health Center Types, National Average and 90% Coverage as percentages**

	National Average 2007	3 Non- Supported HCs in 2007	4 Supported HCs in 2007	11 Contracted HCs in 2007	Projected 90% Utilization
Curative Services	40.8%	57.5%	35.5%	51.4%	46.5%
Preventive Services	58.4%	41.6%	63.8%	47.6%	52.5%
Other Services	0.8%	0.9%	0.7%	1.0%	1.0%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

The analysis indicates a possibility that the contracts may have resulted in a much higher use of curative services at the contracted health centers and that the support from NGOs may have had a positive impact on the numbers of preventive services at the supported health centers. The average number of curative services is lower at the supported health centers than at the non-supported health centers, which may indicate that staff may have been spending more time on preventive services and less time on curative services at the supported health centers.

For a health center to be meeting 90% of the need it would have to provide 1.16 curative services per capita, 1.31 preventive services per capita and 0.025 other services per capita, making a total of 2.49 services per capita (Table 2). From the comparisons with the projected numbers of services based on 90% of need, it is clear that all 3 types of health center would have to do significantly more to reach those goals. This is most clear in the case of the unsupported health centers, who would have to double the number of curative services (from 0.58 to 1.16), to triple the number of other services (from 0.01 to 0.03), and to triple the number of preventive services (from 0.42 to 1.31). While the numbers of services provided by contracted health centers are the closest to the normative targets, they still have a long way to go, especially with preventive services.

There was significant variation among the individual health centers of each type, despite the fact that only well-performing health centers were reportedly selected. Among the contracted facilities, Health Center K had the lowest number of overall services per capita with 1.19 and Health Center A had the highest with 2.33 (Annex 2). Among the non-supported facilities, Health Center I had the lowest with 0.76 and Health Center H had the highest with 1.55. Among the supported facilities, Health Center R had the lowest with 0.98 and Health Center P with 1.70. There is significant variation even among the contracted health centers in the same province. For example, among the

facilities in Takeo the number of services per capita ranges from 1.43 to 2.33. These variations relate partly to the different types of location and population density.

Among the contracted health centers, Health Center K provided the lowest number of curative services per capita with 0.58 and Health Center A the highest with 1.35. Among the non-supported and supported facilities the numbers ranged from 0.23 to 0.97. In terms of preventive services per capita, there were also significant differences among the contracted facilities: Health Center N provided the lowest with 0.57 and Health Center B the highest with 1.09. Among the non-supported and supported facilities the numbers ranged from 0.35 to 1.08.

## 5. Cost by input type

Tables 4 compare the costs for the three types of health center, broken down by type of input (staff, drugs and other fixed costs). The first three columns of figures are the actual costs for 2007<sup>31</sup>. The second three columns are the costs that should have been incurred for the services that were provided in 2007. The seventh column is the normative cost for providing 90% of the services needed by the catchment population. The first group of four rows in the table show the total cost, broken down by type of input (staff, drugs etc. and other fixed costs). The second group of four rows shows the average cost per capita broken down in the same way. The third group of four rows shows the average cost per service broken down in the same way (the average cost per service is the total cost divided by the total number of services). The fourth group of four rows shows the cost by type of input as a % of the total cost.

**Table 4: Comparison of Input Costs (US \$)**

	Actual for 3 Non-Supported HCs in 2007	Actual for 4 Supported HCs in 2007	Actual for 11 Contracted HCs in 2007	Needed for 3 Non-Supported HCs in 2007	Needed for 4 Supported HCs in 2007	Needed for 11 Contracted HCs in 2007	Projected 90% Utilization
Staff Costs	4,862	6,179	10,208	11,587	18,345	15,800	17,380
Drugs, Clinical Supplies, Lab Tests	13,538	14,907	11,329	14,091	16,290	17,648	23,902
Other Fixed Costs	1,977	1,378	2,815	2,944	3,209	3,180	2,981
<b>Total Cost</b>	<b>20,377</b>	<b>22,465</b>	<b>24,352</b>	<b>28,621</b>	<b>37,845</b>	<b>36,628</b>	<b>44,263</b>
Staff costs per capita	0.39	0.40	0.86	0.93	1.20	1.33	1.74
Drug costs per capita	1.08	0.98	0.95	1.13	1.07	1.48	2.39
Other fixed costs per capita	0.16	0.09	0.24	0.24	0.21	0.27	0.30
<b>Total Cost Per Capita</b>	<b>1.63</b>	<b>1.47</b>	<b>2.05</b>	<b>2.29</b>	<b>2.48</b>	<b>3.08</b>	<b>4.43</b>
Staff costs per service	0.39	0.31	0.50	0.92	0.92	0.77	0.70
Drug costs per service	1.07	0.75	0.55	1.12	0.82	0.86	0.96
Other fixed costs per service	0.16	0.07	0.14	0.23	0.16	0.16	0.12
<b>Total Cost Per Service</b>	<b>1.62</b>	<b>1.13</b>	<b>1.19</b>	<b>2.27</b>	<b>1.90</b>	<b>1.79</b>	<b>1.78</b>
Staff costs as % of total cost	24%	28%	43%	41%	50%	43%	39%
Drug costs as % of total cost	66%	66%	44%	49%	41%	47%	54%
Other fixed costs as % of total cost	10%	6%	13%	11%	9%	10%	7%
<b>Total costs</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

As can be seen from the first three columns in Table 4, the contracted health centers spent the most in total with \$24,352 on average; the supported health centers spent \$22,465 and non-supported health centers spent \$20,377. The contracted health centers had by far the highest total staff costs (\$10,208) and other fixed costs (\$2,815), whereas the supported health centers spent the most on drugs (\$14,907).

One important way to compare the costs is on a per capita basis. This is an equity measure, since, all things being equal, one would expect the resources to be allocated equitably (fairly). The contracted health centers had the highest average per capita cost of \$2.05. The non-supported health centers had the second highest average per capita cost of \$1.63 and the supported health centers had the lowest cost per capita at \$1.47.

<sup>31</sup> Again note that the actual costs represent the expenditures made and are reflections of the resources made available to the health centers.

While salary and other fixed costs per capita remained highest in the contracted health centers, drug costs per capita were highest in the non-supported health centers. Interestingly, the supported health centers had the least resources, although as stated before the sample sizes for the non-supported and supported facilities were small.

Staff costs per capita were highest in the contracted health centers (\$0.86), and lowest in the non-supported health centers (\$0.39), with the supported health centers similar at \$0.40. Staff costs vary with both the numbers of staff and average remuneration levels and these are best compared separately. As Table 5 shows, the average number of staff at the non-supported health centers and the contracted health centers was the same with 5.7 staff per health center, but was much higher at the supported health centers with 8.5. As the table also shows, the average annual pay per employee is lowest at the supported health centers (\$729), slightly higher at the non-supported health centers (\$849) and more than double at the contracted health centers (\$1,815). The average number of services per day per employee is about the same at the non-supported and supported health centers (14.0 and 14.5), and 50% higher at the contracted health centers (21.4). So the reason for the higher staff cost per service at the contracted health centers is the much higher pay level, offset to some degree by the higher productivity<sup>32</sup>.

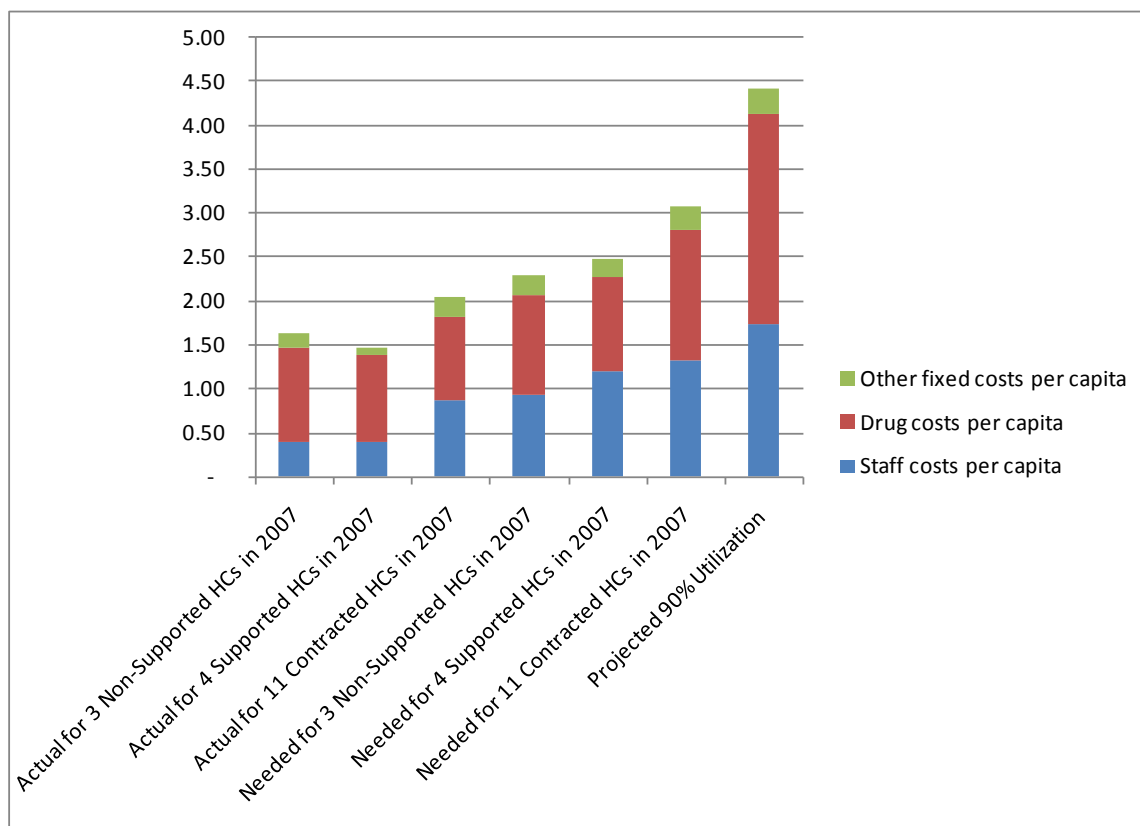
**Table 5: Staffing comparisons (US\$)**

	Actual for 3 Non- Supported HCs in 2007	Actual for 4 Supported HCs in 2007	Actual for 11 Contracted HCs in 2007	Needed for 3 Non- Supported HCs in 2007	Needed for 4 Supported HCs in 2007	Needed for 11 Contracted HCs in 2007	Projected 90% Utilization
Number of Staff used in Scenario	5.7	8.5	5.7	6.0	9.5	8.2	9.0
Average number of services per employee per day	14.0	14.5	21.4	13.3	12.6	14.7	17.1
Average annual pay per employee	849	729	1,815	1,931	1,931	1,931	1,931

<sup>32</sup> Productivity refers only to the number of services per employee and does not take into account the quality of those services.

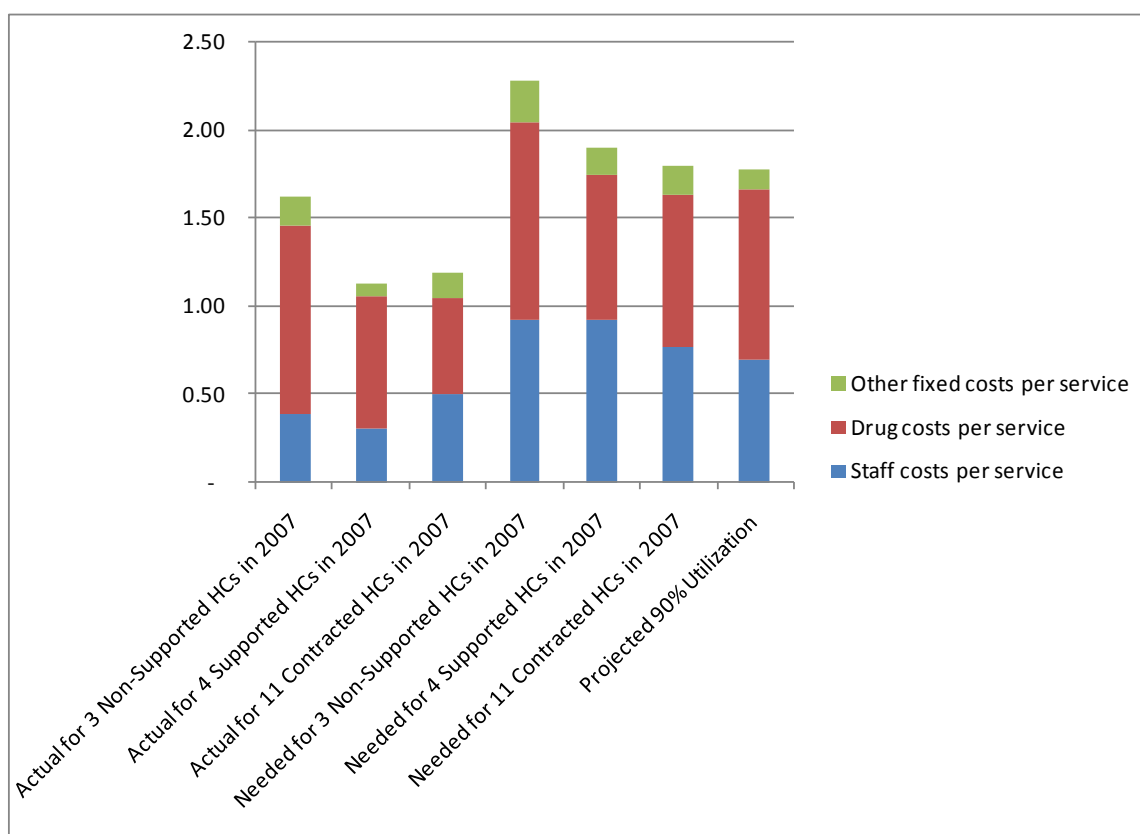
The average cost per capita is also shown in graphic form in Figure 2.

**Figure 2: Actual and needed cost per capita for 2007 services and needed cost for 90% coverage (US\$)**



The average cost per service is also shown in graphic form in Figure 3.

**Figure 3: Actual and needed cost per service for 2007 services and needed cost for 90% coverage (US\$)**



The average cost per capita varied significantly among the individual health centers of each type despite the fact that only well-performing health centers were reportedly selected. These ranged from \$1.28 (Health Center N) to \$3.53 (Health Center F) across the contracted health centers, from \$1.43 (Health Center I) to \$2.03 (Health Center H) across the non-supported health centers and from \$1.23 (Health Center R) to \$1.57 (Health Center P) across the supported health centers (Annex 2). There is significant variation even among the contracted health centers managed by the same NGO. For example, among the facilities in Takeo the number of services per capita ranges from 1.91 to 3.53. These variations relate to some degree to the different types of location, access and population density.

To measure how efficiently resources were allocated we used the average cost per service. Since the mix of services was quite different across the three types of health center, we could not compare the average cost directly across the three types so we compared each cost with the cost that should have been incurred.

These normative or needed costs are shown in the second group of 3 columns in Table 4 and are calculated by multiplying the actual 2007 utilization rates by the standard costs of salaries, drugs, and other fixed costs. These figures represent what the health centers should have spent on average for the services that they provided in 2007. The non

supported health centers should have spent \$28,621, the supported ones should have spent \$37,845 and the contracted ones \$36,628. On a per capita basis, these needed costs range from \$2.29 to \$3.08, the differences being due to the variations in service mix (since using a per capita basis removes the catchment population variable). The needed costs per service range from \$1.79 to \$2.27, and again the differences relate to the variations in service mix (since using the per service basis removes the variable that relates to the total number of services).

Using these figures we can see that the supported health centers only received 59% of the total resources (e.g., user fees, government funding and drugs) that they needed for the services that they provided in 2007<sup>33</sup>. This can be compared with the contracted health centers which received 66%, and the non-supported health centers which received 71%. The supported health centers were especially under-resourced in terms of staff (number of staff and pay levels) and other fixed costs<sup>34</sup>.

The increases in cost needed for the non-supported health centers relate mainly to staffing (\$0.92 compared with \$0.39), with a slight increase in other fixed costs. These health centers only need a small increase in the average number of staff from 5.7 to 6.0 (Table 5) so the increase in staff costs is mostly due to increased pay levels. The picture at the supported health centers is similar except that the increase in staff costs is partly due to an increase in staff from 8.5 to 9.5 employees and partly due to the increase in pay levels.

The increases in cost for the contracted health centers relates partly to staff costs and drug costs<sup>35</sup>. The staff cost increase is due to an increase in the number of staff from 5.7 to 8.2 employees (Table 5) (the actual and standard pay levels are similar).

The increases in average staffing would reduce the average number of service per employee slightly for the non-supported (14.0 to 13.3) and supported health centers (14.5 to 12.6), and much more for the contracted health centers (21.4 to 14.7). The need to increase the numbers of staff and the spending on drugs suggests that the quality of services provided at the health centers may be lower than desirable.

The figures in the last column of Table 4 reflect the standard costs of providing the need numbers of services. They represent what it should cost to provide 90% of the services needed by the catchment population, which as was shown in Table 2 translates to an average of 2.49 services per capita. These figures apply to any type of health center. The total costs of 90% coverage are based on a catchment population of 10,000 and so are not comparable with the total costs in the other columns. Comparisons are, therefore, made using the cost per capita and cost per service figures. The total per capita cost of \$4.43 for 90% coverage is much higher than the actual per capita cost at the three types of health center. To reach this level of expenditure, the supported health

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<sup>33</sup> \$1.47 per capita as a percentage of \$2.48 per capita (Table 4).

<sup>34</sup> While the contracted health centers appear to be the most under-resourced in terms of drugs, this is partly because of likely under-reporting of drugs received for two of the health centers.

<sup>35</sup> The authors do not know the basis used for ordering or issuing drugs to the health centers, and there is always a possibility that it is not related to needs.

centers would need to increase from \$1.47 per capita (around 200% more), the non-supported health centers would need to increase from \$1.63 per capita (around 172% more), and the contracted health centers would need to increase from \$2.05 per capita (around 100% more). Large increases in both staff and drugs expenditures would be required.

The normative cost per service of \$1.78 would not represent a major increase from the actual cost per service of \$1.62 at the non-supported health centers, indicating that the extra expenditures would relate mostly to the additional numbers of services needed and to changes in the mix of services. In the case of the supported and contracted health centers greater increases would be needed.

The comparison of staffing requirements (Table 5) shows that facilities under the 90% scenario would need to employ an average of 9 staff per health center, and that those staff would provide an average of 17.1 services per employee per day. Both the non-supported and contracted health centers would need to increase their staffing numbers from the average 5.7, and the supported ones from the actual average of 8.5. The number of 17.1 services per employee per day represents the ideal for the normative number and mix of services. Some variation around that is acceptable since the number and/or mix of services will never be exact and because part time employees are not a possibility. Therefore, ideally a health center would have 9.0 staff, even if the number of services is slightly under or over the norm. However, a figure significantly less than 17.1 may mean that staff are under-utilized and a figure significantly higher than 17.1 may mean that staff are over-worked (and quality of care may suffer).



## 6. Costs by programme

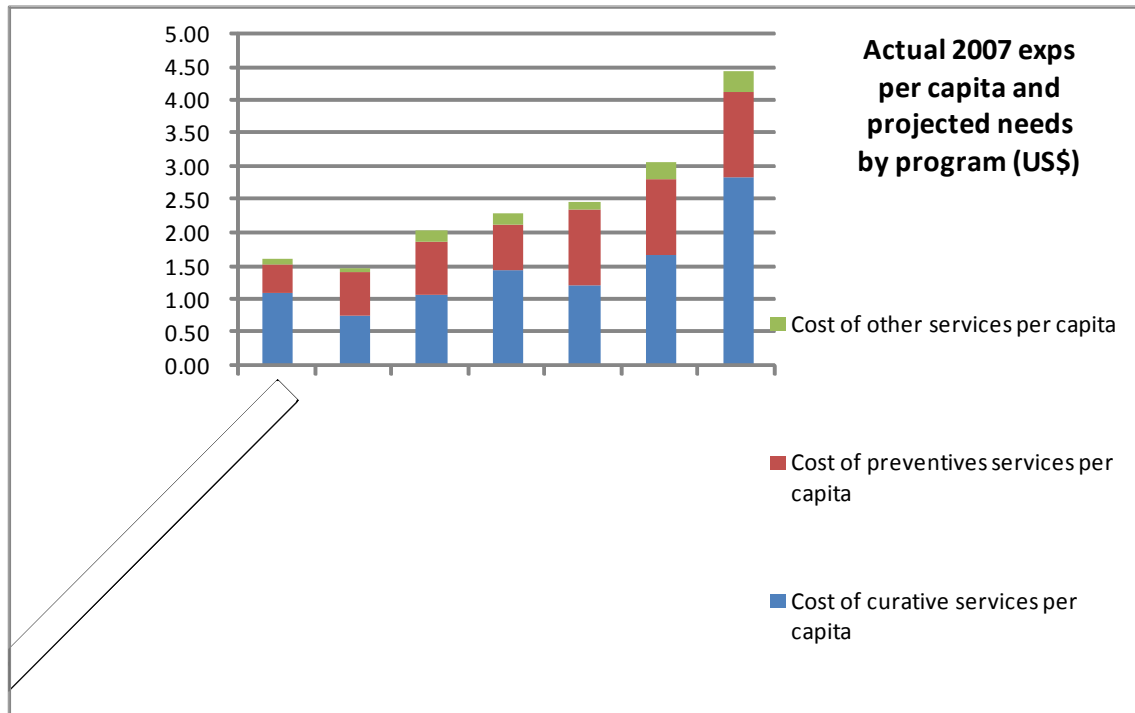
In Table 6, the first group of four rows in the table show the total cost, broken down by type of service (curative, preventive and other). The second group of four rows shows the average cost per capita broken down in the same way. The third group of four rows shows the average cost per service broken down in the same way. The fourth group of four rows shows the cost by major programme (Reproductive, Maternal, Newborn and Child Health (RMNCH), Communicable Disease Control (CDC) and Non-Communicable Diseases (NCD). The next row shows the cost for the child survival scorecard activities included in the RMNCH Programme. The fifth group of four rows and the final row show the same programme costs but on a per capita basis.

**Table 6: Comparisons by type of programme (US\$)**

	Actual for 3 Non-Supported HCs in 2007	Actual for 4 Supported HCs in 2007	Actual for 11 Contracted HCs in 2007	Needed for 3 Non-Supported HCs in 2007	Needed for 4 Supported HCs in 2007	Needed for 11 Contracted HCs in 2007	Projected 90% Utilization
<b>COST PER TYPE OF SERVICE</b>							
Total cost of curative services	13,946	11,880	12,801	18,021	18,455	20,070	28,465
Total cost of preventive services	4,370	9,673	9,332	8,461	17,360	13,428	12,592
Total cost of other services (delivery, etc)	1,061	912	2,218	2,138	2,030	3,130	3,206
<b>Total cost of all services</b>	<b>20,377</b>	<b>22,465</b>	<b>24,352</b>	<b>28,621</b>	<b>37,845</b>	<b>36,628</b>	<b>44,263</b>
Cost of curative services per capita	1.11	0.78	1.08	1.44	1.21	1.69	2.85
Cost of preventive services per capita	0.43	0.63	0.78	0.68	1.14	1.13	1.26
Cost of other services per capita	0.08	0.06	0.19	0.17	0.13	0.26	0.32
<b>Total cost per capita</b>	<b>1.63</b>	<b>1.47</b>	<b>2.05</b>	<b>2.29</b>	<b>2.48</b>	<b>3.08</b>	<b>4.43</b>
Average cost per curative service	2.05	1.84	1.40	2.51	3.00	1.97	2.46
Average cost per preventive service	1.05	0.82	1.04	1.63	1.45	1.43	0.96
Average cost per other service	9.56	7.42	11.56	19.60	15.49	15.44	12.72
Average cost for all services	1.62	1.13	1.19	2.27	1.90	1.79	1.78
<b>COST BY MAJOR PROGRAMME</b>							
Reproductive, Maternal, Newborn and Child Health	7,650	11,481	13,345	12,326	21,108	19,510	20,977
Communicable Diseases	10,945	9,381	8,110	13,613	13,632	12,695	18,686
Non-Communicable Disease	1,782	1,603	2,898	2,682	3,105	4,423	4,600
<b>Total cost of all programmes</b>	<b>20,377</b>	<b>22,465</b>	<b>24,352</b>	<b>28,621</b>	<b>37,845</b>	<b>36,628</b>	<b>44,263</b>
<b>COST OF SELECTED PRIORITIES</b>							
Child Survival Scorecard (Included in RMNCH)	3,270	4,367	5,405	5,115	8,452	8,157	11,105
<b>COST PER CAPITA BY MAJOR PROGRAMME</b>							
Reproductive, Maternal, Newborn and Child Health per capita	0.61	0.75	1.12	0.99	1.38	1.64	2.10
Communicable Diseases per capita	0.87	0.61	0.68	1.09	0.89	1.07	1.87
Non-Communicable Disease per capita	0.14	0.11	0.24	0.21	0.20	0.37	0.46
<b>Total cost per capita</b>	<b>1.63</b>	<b>1.47</b>	<b>2.05</b>	<b>2.29</b>	<b>2.48</b>	<b>3.08</b>	<b>4.43</b>
<b>COST PER CAPITA BY SELECTED PRIORITIES</b>							
Child Survival Scorecard per capita	0.26	0.29	0.45	0.41	0.55	0.69	1.11

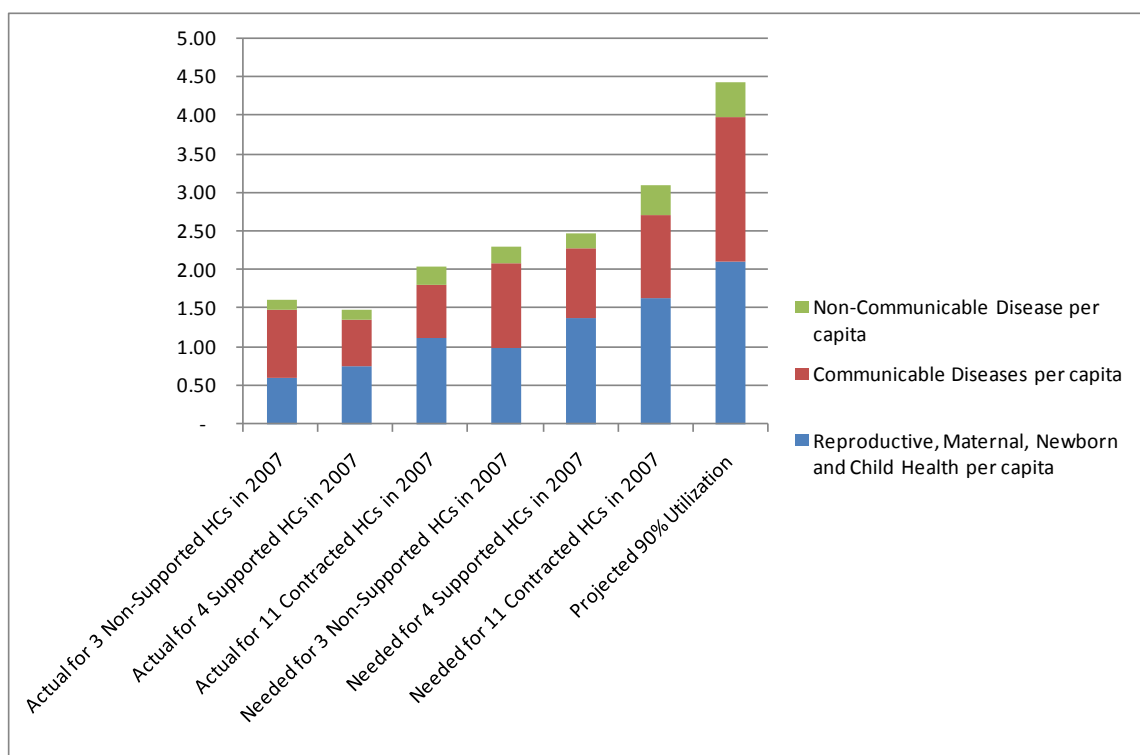
The average cost per capita by type of service (curative, preventive and other) is shown in graphic form in Figure 4.

**Figure 4: Cost per capita for curative, preventive and other services (US\$)**



The average cost per capita by major programme is shown in graphic form in Figure 5.

**Figure 5: Cost per capita by major programme (US\$)**



When compared by type of service, the non-supported and contracted health centers spend much more per capita on curative services (\$1.11 and \$1.08) than the supported health centers (\$0.78). Since the numbers of curative services per capita are much lower at the non-supported health centers (0.58) than at the contracted health centers (0.88), the very similar cost per capita must be because the non-supported health centers provided a greater proportion of higher-cost services. The non-supported health centers spent the least per capita on preventive services (\$0.43). The contracted health centers spent much more per capita on other services (\$0.19), which is because they provided many more deliveries (Table 1). These figures relate directly to the numbers of each type of service provided.

The cost per capita by type of service varied significantly across the individual health centers (Annex 3). For example the cost per capita of preventive services ranged from \$0.49 to \$1.28 among the contracted health centers, from \$0.40 to \$0.47 among the non-supported health centers, and from \$0.53 to \$0.68 among the supported health centers.

In terms of major programmes, the contracted health centers spent most per capita on RMNCH (\$1.12) and Non-communicable diseases (\$0.24), but the non-supported health center spent the most on Communicable Diseases (\$0.87). The relatively low spending per capita of the contracted facilities on Communicable Diseases (\$0.68) raises a question as to whether the performance incentives encourage RMNCH services over those services. The contracted health centers spent the most per capita on child

survival scorecard interventions (\$0.45). Again it should be noted that these figures are a reflection of the number of each type of service provided.

Each type of health center should have spent more on all types of service and on the key programmes. It is notable that the supported health centers should have spent almost twice the amount per capita (\$0.55) on child survival interventions than they actually spent (\$0.29).

Under the 90% scenario, the costs per service should be \$2.85 per curative service, \$1.26 per preventive service, and \$0.32 per other service. Notably, the non-supported health centers would need to triple their per capita spending on preventive services (from \$0.43 to \$1.26), and the supported health centers would need to spend four times as much on other services (deliveries) (from \$0.08 to \$0.32). All types of health center would also have to greatly increase spending to reach 90% coverage. Notably, the non-supported health centers would have to more than triple their per capita expenditure on RMNCH interventions (from 0.61 to \$2.10), the supported health centers would have to quadruple their spending on other services (deliveries) (from \$0.11 to \$0.46), and the contracted health centers would have to triple their expenditure on Communicable Diseases (from 0.68 to \$1.87). The non-supported health centers would have to more than quadruple their expenditure on child survival scorecard interventions (from (\$0.26 to \$1.11).

## 7. Income comparisons

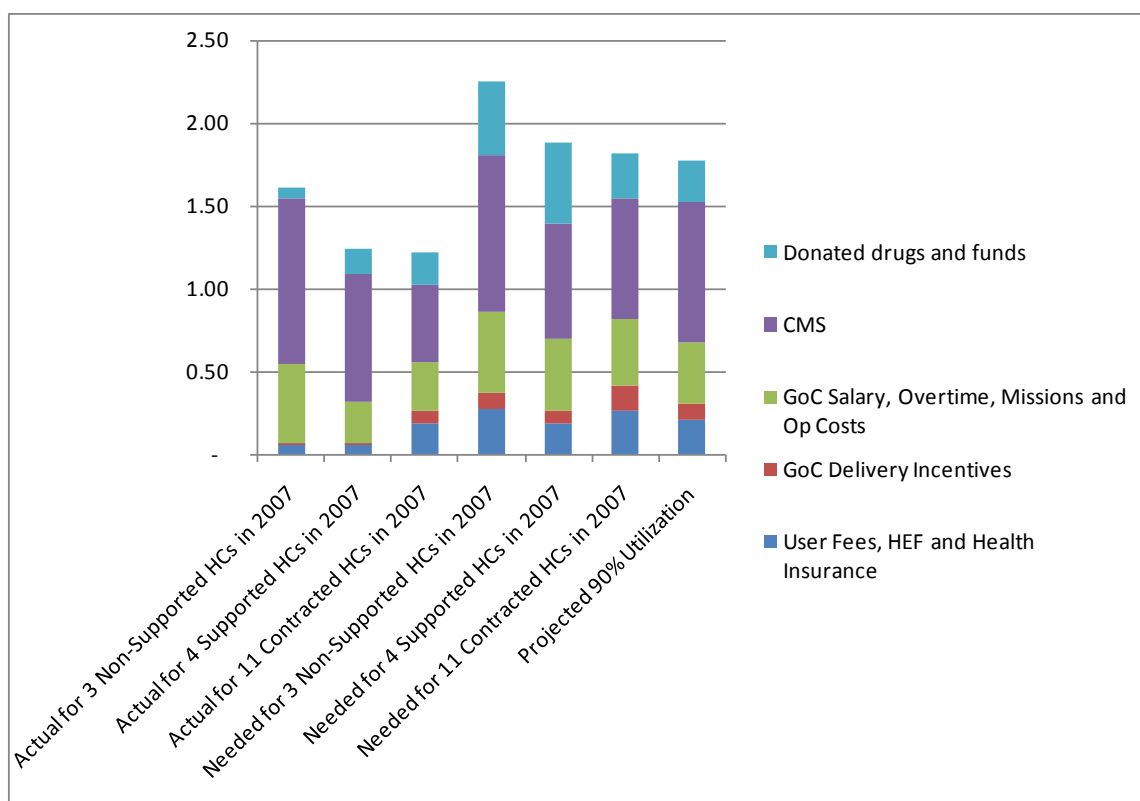
Table 7 shows the income by source in total and on average per service. The figures in the first 3 columns represent the actual income received in 2007. The figures in the next 3 columns represent the income that should have been received in 2007 to cover the normative cost of the services provided. The figures in the last column represent the income that would be needed to cover the cost of 90% coverage.

**Table 7: Income comparisons**

	Actual for 3 Non- Supported HCs in 2007	Actual for 4 Supported HCs in 2007	Actual for 11 Contracted HCs in 2007	Needed for 3 Non- Supported HCs in 2007	Needed for 4 Supported HCs in 2007	Needed for 11 Contracted HCs in 2007	Projected 90% Utilization
<b>INCOME</b>							
User Fees, HEF and Health Insurance	768	1,288	3,835	3,358	3,656	5,239	5,193
GoC Delivery Incentives	185	138	1,499	1,229	1,532	3,017	2,354
GoC Salary, Overtime, Missions and Op Costs	5,893	4,898	5,873	6,213	8,754	8,344	9,281
CMS	12,631	15,330	9,531	11,873	13,725	14,659	21,167
Donated drugs and funds	908	2,951	4,028	5,681	9,741	5,421	6,320
<b>TOTAL INCOME</b>	<b>20,385</b>	<b>24,605</b>	<b>24,767</b>	<b>28,355</b>	<b>37,407</b>	<b>36,680</b>	<b>44,315</b>
User Fees, HEF and Health Insurance	4%	5%	15%	12%	10%	14%	12%
GoC Delivery Incentives	1%	1%	6%	4%	4%	8%	5%
GoC Salary, Overtime, Missions and Op Costs	29%	20%	24%	22%	23%	23%	21%
CMS	62%	62%	38%	42%	37%	40%	48%
Donated drugs and funds	4%	12%	16%	20%	26%	15%	14%
<b>TOTAL INCOME</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
User Fees, HEF and Health Insurance	0.06	0.06	0.19	0.27	0.18	0.26	0.21
GoC Delivery Incentives	0.01	0.01	0.07	0.10	0.08	0.15	0.09
GoC Salary, Overtime, Missions and Op Costs	0.47	0.25	0.29	0.49	0.44	0.41	0.37
CMS	1.00	0.77	0.47	0.94	0.69	0.72	0.85
Donated drugs and funds	0.07	0.15	0.20	0.45	0.49	0.27	0.25
<b>TOTAL INCOME PER SERVICE</b>	<b>1.62</b>	<b>1.23</b>	<b>1.21</b>	<b>2.25</b>	<b>1.88</b>	<b>1.80</b>	<b>1.78</b>

The figures for income per service are also shown in graphic form in Figure 6.

**Figure 6: Average income per service (US\$)**



The revenue from user fees, health equity funds and health insurance is based on the user fee schedule in Takeo Province, with the assumption that all user fees will be paid either directly by the patients, or through the health equity funds and insurance schemes. The GOC delivery incentives are the incentives paid to midwives for deliveries attended by a GOC midwife – the figures are based on the numbers of deliveries and the incentive rate.

The salary, overtime and mission payments from the GOC element of staff pay and these figures are based on the estimated staff costs. The figures for GOC PAP represent the funding received from the Government for general operating costs (e.g. maintenance and utilities), and here we used a standard figure of \$2,275 to match these costs. The figures for CMS represent the drugs and medical supplies provided by the Central Medical Stores and, together with the donated drugs figures, match the drugs cost. The figures for donor assistance for the contracted health centers include the performance-based incentives that form part of staff pay.

The figures for total income have a very close relationship to the total costs<sup>36</sup>. They should generally be slightly higher because a small percentage of the user fees are not retained by the health centers.

As can be seen from Table 7, the average supported and contracted health centers received similar amounts of income in 2007, with \$24,605 and \$24,767, respectively; the non-supported health centers, on the other hand, received much less, with \$20,385. They should have received much more income for the services that they provided; \$37,407 in the case of the supported health centers. And for 90% coverage, they would need \$44,315.

It is notable that the contracted health centers received by far the highest amount in user fees, HEF and health insurance (\$3,835 compared with \$1,288 and \$768 in the other health centers). Again, it is best to compare the figures per service with the “needed” figures which show that the contracted health centers received an average of \$0.19 per services but should have received \$0.26 (a collection rate of 73%). In contrast the non-supported and supported health centers only received \$0.06 per service each, but should have received \$0.27 and \$0.18 respectively (collection rates of 22% and 33% respectively). Thus, it appears that the contracted health centers perform much better in terms of collecting fees. It should be noted that the bulk of this income relates to user fees, and not to health equity funds or health insurance.

The contracted health centers collected the most for delivery incentives, with \$1,499, compared with \$185 and \$138. Nevertheless, they should have collected \$3,017 based on the number of services provided, and thus only achieved a collection rate of 50%. The non-supported and supported health centers should have collected \$1,229 and \$1,532, respectively, but only collected \$185 and \$138, collection rates of 15% and 9%.

The funding for GOC Salary, Overtime, Missions and Operating Costs are almost the same at the non-supported and contracted health centers (\$5,893 and \$5,873) but less at the supported health centers (\$4,898). This raises questions about the allocation of these resources since the supported health centers have the highest average catchment population (Table 1) and more staff (Table 6).

The largest single type of funding was CMS drugs, and the supported health centers were the largest recipient with \$15,330, while the contracted health centers received the least (\$9,531). However, when we use the average figure per services, the non-supported health centers received the most, with \$1.00 per service, compared with \$0.47 at the contracted health centers. Since the mix of services was different, the best way to compare these figures is with the “needed revenue”. This comparison indicates that the non-supported health centers received more drugs per service from CMS than they needed (\$1.00 compared with \$0.94), and the same was true for the supported health centers. However, the contracted health centers received much fewer drugs per service than they needed (\$0.47 compared with \$0.72). While it is possible that some donated drugs were not recorded for the contracted health centers, it is also possible

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<sup>36</sup> As stated earlier, the cost figures represent largely the health center expenditures and are driven by the income received. In other words, if the income is lower, the expenditure (and “cost”) is lower, and vice versa if the income is higher.

that the CMS allocated fewer drugs in the expectation that the shortfall would be covered from other sources.

The non-supported health centers received only a small figure for donated drugs and funds (\$908), compared with \$2,951 for the supported health centers and \$4,028 for the contracted health centers. These figures include vaccines which are received by all health centers.

Significant additional income would be needed to achieve 90% coverage. For example, the income for the non-supported health would need to increase from \$20,385 to \$44,315. For the non-supported health centers large increases would be needed in all types of income, especially user fees and delivery incentives, CMS drugs and donor assistance<sup>37</sup>.

Performance in the collection of user fees varied significantly across the contracted facilities (Annex 4). Notably, Health Centers K and L collected much less than they should. Income from health equity funds and health insurance were only reported for a few of the contracted health centers and were not reported for any of the non-supported and supported health centers except for Health Center P.

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<sup>37</sup> This figure mainly comprises the performance incentives paid to staff.



## 8. Conclusions

The samples of health centers used in this study were small and only well-performing health centers were selected. Therefore, while we can draw some conclusions for the health centers selected, we cannot extrapolate these to generalize about these types of health center.

Bearing that in mind, the findings of the analysis are as follows.

### *Which health centers provided the most services?*

The contracted health centers provided the most services in total, with 1.72 per capita, and the most curative and other services (0.88 and 0.02). The supported health centers provided the next highest number of services, with 1.31 per capita, and had the most preventive services (0.83), although the contracted health centers only provided slightly fewer with 0.82. Both the contracted and supported health centers provided more services than the national average of 1.16. Not surprisingly, the non-supported health centers provided the least total number of services (1.01) and were less than the national average in total and in terms of preventive services (0.42).

### *How close are the utilization rates to the 90% coverage targets?*

All three types of health center have a long way to go to reach the 90% coverage targets of 2.49 services per capita. The contracted health centers were closest since they provided 68% of the needed services, the supported health centers provided 52% and the non-supported health centers only provided 40% of the needed services. The non-supported health centers need to triple the number of preventive services to achieve 90% coverage, in addition to increasing the number of curative services.

### *Which health centers provided the most appropriate mix of services?*

The contracted health centers' mix of 51.4% curative, 47.6% preventive and 1% other services was closest to the ideal of 46.5%, 52.5% and 1%. The ratio of curative to preventive services was too low at the supported health centers and too high at the non-supported health centers.

### *Was there any influence of the type of health center on utilization levels?*

The analysis indicates a possibility that the contracts may have resulted in a much higher use of curative services at the contracted health centers and that the support from NGOs had a positive impact on the numbers of preventive services at the supported health centers. The average number of curative services is lower at the supported health centers than at the non-supported health centers, which may indicate that staff spent more time on preventive services and less time on curative services at the supported health centers.

### *How equitably were resources allocated?*

There was a significant difference in the levels of spending per capita across the three types of health center, with the contracted health centers spending \$2.05 compared with \$163 at the non-supported health centers and \$1.47 at the supported health centers. It is understandable that the contracted health centers spent most since they had access to the additional funds put into the contracting programmes. However, it appears

strange that the non-supported health centers spent more than the supported health centers, when the latter had access to NGO support. This may be more related to differences in spending across the districts in which these health centers are located.

*How efficiently were resources allocated?*

To measure how efficiently resources were allocated we used the average cost per service. Since the mix of services was quite different across the three types of health center, we could not compare the average cost directly across the three types so we compared each cost with the cost that should have been incurred. The supported health centers received the least total resources for the services that they provided (59% of the resources needed), the contracted health centers received the second least with 66%, and the non-supported health centers received the most with 71%. The supported health centers were especially under-resourced in terms of staff (number of staff and pay levels) and other fixed costs<sup>38</sup>. However in terms of numbers of staff the contracted health centers had the least compared with their need.

*How well-resourced were they in terms of the needs for 90% coverage?*

All three types of health center had much less funding than the \$4.43 per capita that they need to achieve 90% coverage. The supported health centers only received 33% of the amount that they would need, the non-supported health centers received 37%, and the contracted health centers received the most with 46%.

*How much did they spend on major programmes?*

The contracted health centers spent the most per capita on preventive and other services, whereas the non-contracted health center spent the most on curative services. In terms of the major programmes, the contracted health centers spent the most on RMNCH services and non-communicable diseases, whereas the non-supported health centers spent the most on communicable diseases. The contracted health centers spent the most, by far, on the child survival scorecard interventions. In all cases, spending was much less than the \$2.10 per capita needed for RMNCH services, the \$1.87 needed for communicable diseases, the \$0.46 needed for non-communicable diseases, and the \$1.11 needed for the child survival scorecard interventions.

*How well have they done in generating revenue?*

The contracted health centers only collected 73% of the user fee revenue that they should have collected, but this was much better than the collection rates of the non-supported and supported health centers, which were only 22% and 33% respectively. Although the figure for the contracted health centers includes health equity funds and health insurance, most of the revenue relates to user fees collected directly from patients. The contracted health centers also collected the most for the service delivery incentive (50%), whereas the non-supported and supported health centers only collected 15% and 9% respectively.

*Who received most government funding?*

The funding for GOC Salary, Overtime, Missions and Operating Costs are almost the same at the non-supported and contracted health centers but less at the supported

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<sup>38</sup> While the contracted health centers appear to be the most under-resourced in terms of drugs, this is partly because of likely under-reporting of drugs received for two of the health centers.

health centers. This raises questions about the allocation of these resources since the supported health centers have the highest average catchment population and more staff.

*Who received most from Central Medical Stores?*

The non-supported health centers received more drugs per service from CMS than they needed (\$1.00 compared with \$0.94), and the same was true for the supported health centers. However, the contracted health centers received much fewer drugs per service than they needed (\$0.47 compared with \$0.72). While it is possible that some donated drugs were not recorded for the contracted health centers, it is also possible that the CMS allocated fewer drugs in the expectation that the shortfall would be covered from other sources.

*Who received the most donor support?*

The contracted health centers received the most donor support due to the funds for performance incentives. This amounted to an average of \$0.20 per service (16% of total income). The supported health centers received the second most with an average of \$0.15 per service (12% of total income), and the non-supported health centers received the least with an average of \$0.07 (4% of total income), which was mainly the cost of vaccines.

***Recommendations***

The study provides some useful insights into the cost and income across the different types of health center. In particular it provides an understanding of the relationship of costs to the different mixes of services. However, the sample of facilities was small, especially for the non-contracted health centers, and the picture provided is, therefore, somewhat limited.

Each district should conduct this type of analysis for every health center. The results would provide information on service delivery performance and on the equitable and efficient distribution of resources. This would be useful for improving the future planning of services and the allocation of resources. In the contracting districts it would also provide valuable supporting information on performance and, if the study is repeated periodically, of the impact of the contracting on services, income and resource use over time.

### Annex 1: Sample of health centers

Province	OD	Health Center	Catchment type	Organization Type	Data provider
Takeo	Ang Roka	Ang Tasom Tram Kak Trapeang Andeuk	Urban Rural Remote Rural	Contracted	SRC
Takeo	Kirivong	Ang Knol Phnom Den Prey Yutakha	Rural Urban Remote Rural	Contracted	SRC
Prey Veng	Mesang	Boeung Pras	Rural	Supported	UNICEF
Kampong Cham	O Rang OV	Chak Thnal Kaeng Ampil Ta Pok	Remote Rural Rural Urban	GOC not supported	OD Director
Kampong Cham	Chamkar Leu	Daunthy Ta Ong Mesar Chrey	NA NA NA	Contracted	BTC
Prey Veng	Pearang	Kampong Russey, Chrey Khamum	Urban Rural	Contracted	HealthNet
Pursat	Sampov Meas	Tasas Boeung Kantuot Wat Por	NA NA NA	Supported	RACHA

## Annex 2. Utilization for each health center

Table A. Actual utilization figures for 11 Contracted Health Centers

	Health Centre A	Health Centre B	Health Centre C	Health Centre D	Health Centre E	Health Centre F	Health Centre K	Health Centre L	Health Centre M	Health Centre N	Health Centre O
Location	Urban	Rural	Remote Rural	Urban	Rural	Remote Rural	Rural	Rural	Rural	Urban	Rural
Catchment Population	16,473	14,906	19,276	7,239	10,607	6,095	9,528	10,310	12,585	16,986	6,832
Total Types of Services Offered in Scenario	31	35	34	33	32	32	36	35	37	31	34
Total Curative Services	22,159	14,213	14,974	4,800	7,115	5,815	5,486	9,231	7,738	15,829	8,176
Total Preventive Services	15,758	16,285	17,416	6,862	7,890	4,461	5,739	7,275	10,046	9,625	5,525
Total Other (Delivery, etc) Services	402	351	392	219	186	75	155	59	228	208	83
<b>Total Services</b>	<b>38,319</b>	<b>30,849</b>	<b>32,782</b>	<b>11,881</b>	<b>15,191</b>	<b>10,351</b>	<b>11,380</b>	<b>16,565</b>	<b>18,012</b>	<b>25,662</b>	<b>13,784</b>
Curative Services per Capita	1.35	0.95	0.78	0.66	0.67	0.95	0.58	0.90	0.61	0.93	1.20
Preventive Services per Capita	0.96	1.09	0.90	0.95	0.74	0.73	0.60	0.71	0.80	0.57	0.81
Other Services per Capita	0.024	0.024	0.020	0.030	0.018	0.012	0.016	0.006	0.018	0.012	0.012
<b>Total Services per Capita</b>	<b>2.33</b>	<b>2.07</b>	<b>1.70</b>	<b>1.64</b>	<b>1.43</b>	<b>1.70</b>	<b>1.19</b>	<b>1.61</b>	<b>1.43</b>	<b>1.51</b>	<b>2.02</b>

Table B. Actual utilization figures for 3 Non-Supported and 4 Supported Health Centers

	Health Centre H	Health Centre I	Health Centre J	Health Centre G	Health Centre P	Health Centre Q	Health Centre R
Location	Urban	Rural	Remote Rural	Rural	Rural	Rural	Rural
Catchment Population	11,112	12,247	14,178	13,857	19,779	16,795	10,640
Total Types of Services Offered in Scenario	36	36	35	34	35	33	32
Total Curative Services	10,733	4,944	6,146	9,350	12,075	4,494	2,417
Total Preventive Services	6,347	4,322	5,005	7,652	21,269	14,006	7,920
Total Other (Delivery, etc) Services	135	66	134	123	246	44	122
<b>Total Services</b>	<b>17,215</b>	<b>9,332</b>	<b>11,285</b>	<b>17,125</b>	<b>33,590</b>	<b>18,544</b>	<b>10,459</b>
Curative Services per Capita	0.97	0.40	0.43	0.67	0.61	0.27	0.23
Preventive Services per Capita	0.57	0.35	0.35	0.55	1.08	0.83	0.74
Other Services per Capita	0.012	0.005	0.009	0.009	0.012	0.003	0.011
<b>Total Services per Capita</b>	<b>1.55</b>	<b>0.76</b>	<b>0.80</b>	<b>1.24</b>	<b>1.70</b>	<b>1.10</b>	<b>0.98</b>

Health Centers H, I and J are non-supported

## ANNEX 2. Utilization for each health center

Table C. Utilization figures for 90% coverage at 11 Contracted Health Centers

	Health Centre A	Health Centre B	Health Centre C	Health Centre D	Health Centre E	Health Centre F	Health Centre K	Health Centre L	Health Centre M	Health Centre N
Catchment Population	16,473	14,906	19,276	7,239	10,607	6,095	9,528	10,310	12,585	16,986
Total Types of Services Offered in Scenario	48	48	48	48	48	48	48	48	48	48
% of needed services										
Total Curative Services	19,188	17,363	22,790	8,432	12,355	7,100	11,043	11,950	14,587	19,786
Total Preventive Services	21,541	19,492	25,206	9,466	13,870	7,970	12,459	13,482	16,457	22,212
Total Other (Delivery, etc) Services	415	376	486	182	267	154	240	260	317	428
<b>Total Services</b>	<b>41,144</b>	<b>37,230</b>	<b>48,482</b>	<b>18,081</b>	<b>26,493</b>	<b>15,223</b>	<b>23,743</b>	<b>25,692</b>	<b>31,361</b>	<b>42,425</b>
Curative Services per Capita	1.16	1.16	1.18	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Preventive Services per Capita	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
Other Services per Capita	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
<b>Total Services per Capita</b>	<b>2.50</b>	<b>2.50</b>	<b>2.52</b>	<b>2.50</b>	<b>2.50</b>	<b>2.50</b>	<b>2.49</b>	<b>2.49</b>	<b>2.49</b>	<b>2.50</b>

Table D. Utilization figures for 90% coverage at 3 non-supported and 4 supported health centers

	Health Centre H	Health Centre I	Health Centre J	Health Centre G	Health Centre P	Health Centre Q	Health Centre R
Catchment Population	11,112	12,247	14,178	13,857	19,779	16,795	10,640
Total Types of Services Offered in Scenario	48	48	48	48	48	48	48
% of needed services							
Total Curative Services	12,879	14,195	16,433	16,141	23,039	19,563	12,394
Total Preventive Services	14,531	16,015	18,540	18,120	25,864	21,962	13,913
Total Other (Delivery, etc) Services	280	309	357	349	498	423	268
<b>Total Services</b>	<b>27,690</b>	<b>30,518</b>	<b>35,330</b>	<b>34,610</b>	<b>49,401</b>	<b>41,948</b>	<b>26,575</b>
Curative Services per Capita	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Preventive Services per Capita	1.31	1.31	1.31	1.31	1.31	1.31	1.31
Other Services per Capita	0.025	0.025	0.025	0.025	0.025	0.025	0.025
<b>Total Services per Capita</b>	<b>2.49</b>	<b>2.49</b>	<b>2.49</b>	<b>2.50</b>	<b>2.50</b>	<b>2.50</b>	<b>2.50</b>

Note that the figures for total services per capita vary slightly due to rounding errors.

### Annex 3. Cost for each health center

Table A: Actual Costs for 11 Contracted Health Centers (US\$)

	Health Centre A	Health Centre B	Health Centre C	Health Centre D	Health Centre E	Health Centre F	Health Centre K	Health Centre L	Health Centre M	Health Centre N	Health Centre O
<b>COST PER TYPE OF INPUT</b>											
Staff Costs	13,015	12,862	13,615	9,477	9,260	7,597	8,498	9,528	10,347	12,002	6,085
Drugs, Clinical Supplies, Lab Tests	16,638	16,295	19,558	8,992	11,129	11,187	9,939	10,159	15,061	3,746	1,912
Other Fixed Costs	3,121	3,917	3,570	1,800	2,718	2,704	668	640	974	5,923	4,930
<b>Total Cost</b>	<b>32,775</b>	<b>33,074</b>	<b>36,743</b>	<b>20,269</b>	<b>23,107</b>	<b>21,487</b>	<b>19,106</b>	<b>20,328</b>	<b>26,381</b>	<b>21,670</b>	<b>12,928</b>
Staff costs per capita	0.79	0.86	0.71	1.31	0.87	1.25	0.89	0.92	0.82	0.71	0.89
Drug costs per capita	1.01	1.09	1.01	1.24	1.05	1.84	1.04	0.99	1.20	0.22	0.28
Other fixed costs per capita	0.19	0.26	0.19	0.25	0.26	0.44	0.07	0.06	0.08	0.35	0.72
<b>Total cost per capita</b>	<b>1.99</b>	<b>2.22</b>	<b>1.91</b>	<b>2.80</b>	<b>2.18</b>	<b>3.53</b>	<b>2.01</b>	<b>1.97</b>	<b>2.10</b>	<b>1.28</b>	<b>1.89</b>
Staff costs per service	0.34	0.42	0.42	0.80	0.61	0.73	0.75	0.58	0.57	0.47	0.44
Drug costs per service	0.43	0.53	0.60	0.76	0.73	1.08	0.87	0.61	0.84	0.15	0.14
Other fixed costs per service	0.08	0.13	0.11	0.15	0.18	0.26	0.06	0.04	0.05	0.23	0.36
<b>Total cost per service</b>	<b>0.86</b>	<b>1.07</b>	<b>1.12</b>	<b>1.71</b>	<b>1.52</b>	<b>2.08</b>	<b>1.68</b>	<b>1.23</b>	<b>1.46</b>	<b>0.84</b>	<b>0.94</b>
<b>STAFFING</b>											
Actual Staff	5	6	7	5	5	6	5	5	5	7	7
Number of Staff used in Scenario	5	6	7	5	5	6	5	5	5	7	7
Average number of services per employee per year	43.7	29.1	26.3	14.4	19.3	10.5	14.1	20.5	22.3	22.7	12.2
Average annual pay per employee	2,603	2,144	1,945	1,895	1,852	1,266	1,700	1,906	2,069	1,715	869
<b>COST PER TYPE OF SERVICE</b>											
Cost of curative services per capita	1.15	1.06	0.91	1.12	0.96	2.03	1.21	1.22	1.20	0.68	1.05
Cost of preventive services per capita	0.64	0.94	0.81	1.28	0.99	1.25	0.63	0.66	0.71	0.49	0.72
Cost of other services per capita	0.20	0.22	0.19	0.40	0.22	0.24	0.17	0.09	0.19	0.10	0.12
<b>Total cost per capita</b>	<b>1.99</b>	<b>2.22</b>	<b>1.91</b>	<b>2.80</b>	<b>2.18</b>	<b>3.53</b>	<b>2.01</b>	<b>1.97</b>	<b>2.10</b>	<b>1.28</b>	<b>1.89</b>
Average cost per curative service	0.85	1.11	1.17	1.69	1.43	2.13	2.10	1.36	1.95	0.73	0.88
Average cost per preventive service	0.67	0.86	0.90	1.35	1.34	1.71	1.04	0.94	0.89	0.87	0.89
Average cost per other service	8.09	9.43	9.23	13.16	12.80	19.80	10.40	15.51	10.29	8.52	9.95
<b>Average cost for all services</b>	<b>0.86</b>	<b>1.07</b>	<b>1.12</b>	<b>1.71</b>	<b>1.52</b>	<b>2.08</b>	<b>1.68</b>	<b>1.23</b>	<b>1.46</b>	<b>0.84</b>	<b>0.94</b>

### ANNEX 3. Cost for each health center

Table B: Actual costs for 3 Non-supported and 4 supported health centers (US\$)

	Health Centre H	Health Centre I	Health Centre J	Health Centre G	Health Centre P	Health Centre Q	Health Centre R
<b>COST PER TYPE OF INPUT</b>							
Staff Costs	4,345	3,477	6,764	5,884	8,048	6,704	4,082
Drugs, Clinical Supplies, Lab Tests	16,384	11,613	12,618	16,500	20,686	14,135	8,308
Other Fixed Costs	1,782	2,425	1,724	1,344	2,245	1,194	729
<b>Total Cost</b>	<b>22,512</b>	<b>17,515</b>	<b>21,105</b>	<b>23,729</b>	<b>30,979</b>	<b>22,033</b>	<b>13,119</b>
Staff costs per capita	0.39	0.28	0.48	0.42	0.41	0.40	0.38
Drug costs per capita	1.47	0.95	0.89	1.19	1.05	0.84	0.78
Other fixed costs per capita	0.16	0.20	0.12	0.10	0.11	0.07	0.07
<b>Total cost per capita</b>	<b>2.03</b>	<b>1.43</b>	<b>1.49</b>	<b>1.71</b>	<b>1.57</b>	<b>1.31</b>	<b>1.23</b>
Staff costs per service	0.25	0.37	0.60	0.34	0.24	0.36	0.39
Drug costs per service	0.95	1.24	1.12	0.96	0.62	0.76	0.79
Other fixed costs per service	0.10	0.26	0.15	0.08	0.07	0.06	0.07
<b>Total cost per service</b>	<b>1.31</b>	<b>1.88</b>	<b>1.87</b>	<b>1.39</b>	<b>0.92</b>	<b>1.19</b>	<b>1.25</b>
<b>STAFFING</b>							
Actual Staff	6	5	6	7	9	10	8
Number of Staff used in Scenario	6	5	6	7	9	10	8
Average number of services per employee per year	18.2	11.9	12.0	15.3	23.1	11.5	8.1
Average annual pay per employee	724	695	1,127	841	894	670	510
<b>COST PER TYPE OF SERVICE</b>							
Cost of curative services per capita	1.46	0.98	0.96	1.11	0.86	0.62	0.46
Cost of preventives services per capita	0.47	0.40	0.43	0.53	0.64	0.67	0.68
Cost of other services per capita	0.10	0.05	0.10	0.07	0.07	0.02	0.09
<b>Total cost per capita</b>	<b>2.03</b>	<b>1.43</b>	<b>1.49</b>	<b>1.71</b>	<b>1.57</b>	<b>1.31</b>	<b>1.23</b>
Average cost per curative service	1.51	2.43	2.22	1.64	1.40	2.30	2.02
Average cost per preventive service	0.82	1.13	1.21	0.97	0.60	0.81	0.91
Average cost per other service	8.21	9.82	10.66	7.84	5.37	8.31	8.15
<b>Average cost for all services</b>	<b>1.31</b>	<b>1.88</b>	<b>1.87</b>	<b>1.39</b>	<b>0.92</b>	<b>1.19</b>	<b>1.25</b>

### ANNEX 3. Cost for each health center



Table C: Costs needed for actual 2007 services at 11 Contracted Health Centers (US\$)

	Health Centre A	Health Centre B	Health Centre C	Health Centre D	Health Centre E	Health Centre F	Health Centre K	Health Centre L	Health Centre M	Health Centre N	Health Centre O
<b>COST PER TYPE OF INPUT</b>											
Staff Costs	27,035	23,173	25,104	11,587	11,587	9,655	9,655	11,587	13,518	19,311	11,587
Drugs, Clinical Supplies, Lab Tests	33,521	27,163	28,570	8,580	10,686	9,626	11,844	14,713	15,504	20,751	13,169
Other Fixed Costs	4,031	3,812	3,987	3,197	3,087	2,578	2,836	2,498	3,142	3,187	2,629
<b>Total Cost</b>	<b>64,588</b>	<b>54,148</b>	<b>57,661</b>	<b>23,364</b>	<b>25,360</b>	<b>21,859</b>	<b>24,335</b>	<b>28,798</b>	<b>32,163</b>	<b>43,249</b>	<b>27,385</b>
Staff costs per capita	1.64	1.55	1.30	1.60	1.09	1.58	1.01	1.12	1.07	1.14	1.70
Drug costs per capita	2.03	1.82	1.48	1.19	1.01	1.58	1.24	1.43	1.23	1.22	1.93
Other fixed costs per capita	0.24	0.26	0.21	0.44	0.29	0.42	0.30	0.24	0.25	0.19	0.38
<b>Total cost per capita</b>	<b>3.92</b>	<b>3.63</b>	<b>2.99</b>	<b>3.23</b>	<b>2.39</b>	<b>3.59</b>	<b>2.55</b>	<b>2.79</b>	<b>2.56</b>	<b>2.55</b>	<b>4.01</b>
Staff costs per service	0.71	0.75	0.77	0.98	0.76	0.93	0.85	0.70	0.75	0.75	0.84
Drug costs per service	0.87	0.88	0.87	0.72	0.70	0.93	1.04	0.89	0.86	0.81	0.96
Other fixed costs per service	0.11	0.12	0.12	0.27	0.20	0.25	0.25	0.15	0.17	0.12	0.19
<b>Total cost per service</b>	<b>1.69</b>	<b>1.76</b>	<b>1.76</b>	<b>1.97</b>	<b>1.67</b>	<b>2.11</b>	<b>2.14</b>	<b>1.74</b>	<b>1.79</b>	<b>1.69</b>	<b>1.99</b>
<b>STAFFING</b>											
Actual Staff	5	6	7	5	5	6	5	5	5	7	7
Number of Staff used in Scenario	14	12	13	6	6	5	5	6	7	10	6
Average number of services per employee per year	15.6	14.5	14.2	12.0	16.1	12.6	14.1	17.1	15.9	15.9	14.2
Average annual pay per employee	1,931	1,931	1,931	1,931	1,931	1,931	1,931	1,931	1,931	1,931	1,931
<b>COST PER TYPE OF SERVICE</b>											
Cost of curative services per capita	2.45	1.90	1.46	1.22	1.02	2.11	1.44	1.81	1.34	1.47	2.54
Cost of preventives services per capita	1.16	1.43	1.25	1.50	1.11	1.25	0.85	0.88	0.92	0.91	1.29
Cost of other services per capita	0.32	0.30	0.28	0.50	0.26	0.23	0.27	0.11	0.29	0.17	0.18
<b>Total cost per capita</b>	<b>3.92</b>	<b>3.63</b>	<b>2.99</b>	<b>3.23</b>	<b>2.39</b>	<b>3.59</b>	<b>2.55</b>	<b>2.79</b>	<b>2.56</b>	<b>2.55</b>	<b>4.01</b>
Average cost per curative service	1.82	1.99	1.88	1.84	1.52	2.21	2.50	2.02	2.19	1.58	2.12
Average cost per preventive service	1.21	1.31	1.39	1.59	1.49	1.70	1.41	1.25	1.15	1.60	1.60
Average cost per other service	12.94	12.91	13.84	16.67	15.08	19.05	16.39	18.36	16.24	13.65	14.72
<b>Average cost for all services</b>	<b>1.69</b>	<b>1.76</b>	<b>1.76</b>	<b>1.97</b>	<b>1.67</b>	<b>2.11</b>	<b>2.14</b>	<b>1.74</b>	<b>1.79</b>	<b>1.69</b>	<b>1.99</b>

### ANNEX 3. Cost for each health center

Table D: Costs needed for actual 2007 services at 3 non-supported and 4 supported health centers (US\$)

	Health Centre H	Health Centre I	Health Centre J	Health Centre G	Health Centre P	Health Centre Q	Health Centre R
<b>COST PER TYPE OF INPUT</b>							
Staff Costs	15,449	9,655	9,655	15,449	23,173	19,311	15,449
Drugs, Clinical Supplies, Lab Tests	20,141	10,877	11,254	15,907	28,403	13,491	7,360
Other Fixed Costs	2,967	2,687	3,177	2,619	4,224	3,160	2,834
<b>Total Cost</b>	<b>38,557</b>	<b>23,219</b>	<b>24,086</b>	<b>33,975</b>	<b>55,800</b>	<b>35,963</b>	<b>25,642</b>
Staff costs per capita	1.39	0.79	0.68	1.11	1.17	1.15	1.45
Drug costs per capita	1.81	0.89	0.79	1.15	1.44	0.80	0.69
Other fixed costs per capita	0.27	0.22	0.22	0.19	0.21	0.19	0.27
<b>Total cost per capita</b>	<b>3.47</b>	<b>1.90</b>	<b>1.70</b>	<b>2.45</b>	<b>2.82</b>	<b>2.14</b>	<b>2.41</b>
Staff costs per service	0.90	1.03	0.86	0.90	0.69	1.04	1.48
Drug costs per service	1.17	1.17	1.00	0.93	0.85	0.73	0.70
Other fixed costs per service	0.17	0.29	0.28	0.15	0.13	0.17	0.27
<b>Total cost per service</b>	<b>2.24</b>	<b>2.49</b>	<b>2.13</b>	<b>1.98</b>	<b>1.66</b>	<b>1.94</b>	<b>2.45</b>
<b>STAFFING</b>							
Actual Staff	6	5	6	7	9	10	8
Number of Staff used in Scenario	8	5	5	8	12	10	8
Average number of services per employee per year	13.7	11.9	14.4	13.4	17.3	11.5	8.1
Average annual pay per employee	1,931	1,931	1,931	1,931	1,931	1,931	1,931
<b>COST PER TYPE OF SERVICE</b>							
Cost of curative services per capita	2.35	1.15	0.98	1.50	1.39	0.96	0.89
Cost of preventives services per capita	0.90	0.63	0.54	0.83	1.25	1.14	1.32
Cost of other services per capita	0.23	0.12	0.17	0.12	0.18	0.04	0.21
<b>Total cost per capita</b>	<b>3.47</b>	<b>1.90</b>	<b>1.70</b>	<b>2.45</b>	<b>2.82</b>	<b>2.14</b>	<b>2.41</b>
Average cost per curative service	2.43	2.85	2.26	2.22	2.28	3.59	3.91
Average cost per preventive service	1.57	1.78	1.54	1.51	1.16	1.37	1.77
Average cost per other service	18.63	21.82	18.36	13.65	14.45	15.92	17.93
<b>Average cost for all services</b>	<b>2.24</b>	<b>2.49</b>	<b>2.13</b>	<b>1.98</b>	<b>1.66</b>	<b>1.94</b>	<b>2.45</b>

### ANNEX 3. Cost for each health center

Table E: Costs needed for 90% coverage at 11 Contracted Health Centers (US\$)

	Health Centre A	Health Centre B	Health Centre C	Health Centre D	Health Centre E	Health Centre F	Health Centre K	Health Centre L	Health Centre M	Health Centre N
<b>COST PER TYPE OF INPUT</b>										
Staff Costs	27,035	23,173	30,898	13,518	19,311	11,587	17,380	17,380	23,173	28,966
Drugs, Clinical Supplies, Lab Tests	39,466	35,711	50,010	17,343	25,412	14,602	22,773	24,643	30,080	40,695
Other Fixed Costs	3,438	3,328	3,636	2,786	3,024	2,706	2,948	3,003	3,164	3,475
<b>Total Cost</b>	<b>69,939</b>	<b>62,212</b>	<b>84,544</b>	<b>33,647</b>	<b>47,747</b>	<b>28,894</b>	<b>43,101</b>	<b>45,026</b>	<b>56,417</b>	<b>73,136</b>
Staff costs per capita	1.64	1.55	1.60	1.87	1.82	1.90	1.82	1.69	1.84	1.71
Drug costs per capita	2.40	2.40	2.59	2.40	2.40	2.40	2.39	2.39	2.39	2.40
Other fixed costs per capita	0.21	0.22	0.19	0.38	0.29	0.44	0.31	0.29	0.25	0.20
<b>Total cost per capita</b>	<b>4.25</b>	<b>4.17</b>	<b>4.39</b>	<b>4.65</b>	<b>4.50</b>	<b>4.74</b>	<b>4.52</b>	<b>4.37</b>	<b>4.48</b>	<b>4.31</b>
Staff costs per service	0.66	0.62	0.64	0.75	0.73	0.76	0.73	0.68	0.74	0.68
Drug costs per service	0.96	0.96	1.03	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Other fixed costs per service	0.08	0.09	0.08	0.15	0.11	0.18	0.12	0.12	0.10	0.08
<b>Total cost per service</b>	<b>1.70</b>	<b>1.67</b>	<b>1.74</b>	<b>1.86</b>	<b>1.80</b>	<b>1.90</b>	<b>1.82</b>	<b>1.75</b>	<b>1.80</b>	<b>1.72</b>
<b>STAFFING</b>										
Number of Staff used in Scenario	14	12	16	7	10	6	9	9	12	15
Average number of services per employee per year	16.8	17.5	17.0	15.7	16.9	15.5	16.3	17.6	16.1	17.5
Average annual pay per employee	1,931	1,931	1,931	1,931	1,931	1,931	1,931	1,931	1,931	1,931
<b>COST PER TYPE OF SERVICE</b>										
Cost of curative services per capita	2.72	2.70	2.94	3.04	2.93	3.03	2.90	2.81	2.88	2.78
Cost of preventive services per capita	1.22	1.18	1.16	1.29	1.26	1.36	1.29	1.24	1.28	1.22
Cost of other services per capita	0.31	0.29	0.28	0.32	0.31	0.35	0.33	0.31	0.33	0.31
<b>Total cost per capita</b>	<b>4.25</b>	<b>4.17</b>	<b>4.39</b>	<b>4.65</b>	<b>4.50</b>	<b>4.74</b>	<b>4.52</b>	<b>4.37</b>	<b>4.48</b>	<b>4.31</b>
Average cost per curative service	2.33	2.32	2.49	2.61	2.52	2.60	2.50	2.43	2.48	2.39
Average cost per preventive service	0.93	0.90	0.89	0.99	0.96	1.04	0.99	0.95	0.98	0.93
Average cost per other service	12.39	11.60	11.23	12.65	12.36	14.07	13.15	12.46	12.98	12.17
<b>Average cost for all services</b>	<b>1.70</b>	<b>1.67</b>	<b>1.74</b>	<b>1.86</b>	<b>1.80</b>	<b>1.90</b>	<b>1.82</b>	<b>1.75</b>	<b>1.80</b>	<b>1.72</b>

### ANNEX 3. Cost for each health center

Table F: Costs needed for 90% coverage at 3 non-supported and 4 supported health centers (US\$)

	Health Centre H	Health Centre I	Health Centre J	Health Centre G	Health Centre P	Health Centre Q	Health Centre R
<b>COST PER TYPE OF INPUT</b>							
Staff Costs	21,242	23,173	27,035	23,173	34,760	28,966	17,380
Drugs, Clinical Supplies, Lab Tests	26,559	29,272	33,888	33,198	47,386	40,237	25,491
Other Fixed Costs	3,356	3,334	3,685	3,254	4,621	4,209	3,228
<b>Total Cost</b>	<b>51,158</b>	<b>55,779</b>	<b>64,608</b>	<b>59,625</b>	<b>86,767</b>	<b>73,412</b>	<b>46,099</b>
Staff costs per capita	1.91	1.89	1.91	1.67	1.76	1.72	1.63
Drug costs per capita	2.39	2.39	2.39	2.40	2.40	2.40	2.40
Other fixed costs per capita	0.30	0.27	0.26	0.23	0.23	0.25	0.30
<b>Total cost per capita</b>	<b>4.60</b>	<b>4.55</b>	<b>4.56</b>	<b>4.30</b>	<b>4.39</b>	<b>4.37</b>	<b>4.33</b>
Staff costs per service	0.77	0.76	0.77	0.67	0.70	0.69	0.65
Drug costs per service	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Other fixed costs per service	0.12	0.11	0.10	0.09	0.09	0.10	0.12
<b>Total cost per service</b>	<b>1.85</b>	<b>1.83</b>	<b>1.83</b>	<b>1.72</b>	<b>1.76</b>	<b>1.75</b>	<b>1.73</b>
<b>STAFFING</b>							
Number of Staff used in Scenario	11	12	14	12	18	15	9
Average number of services per employee per year	16.0	16.2	16.1	18.1	17.0	17.3	18.2
Average annual pay per employee	1,931	1,931	1,931	1,931	1,931	1,931	1,931
<b>COST PER TYPE OF SERVICE</b>							
Cost of curative services per capita	2.91	2.92	2.89	2.78	2.87	2.86	2.84
Cost of preventives services per capita	1.34	1.30	1.32	1.22	1.23	1.22	1.21
Cost of other services per capita	0.36	0.33	0.35	0.31	0.29	0.29	0.29
<b>Total cost per capita</b>	<b>4.60</b>	<b>4.55</b>	<b>4.56</b>	<b>4.30</b>	<b>4.39</b>	<b>4.37</b>	<b>4.33</b>
Average cost per curative service	2.51	2.52	2.49	2.39	2.46	2.45	2.44
Average cost per preventive service	1.02	0.99	1.01	0.93	0.94	0.93	0.92
Average cost per other service	14.13	13.29	13.79	12.15	11.64	11.55	11.31
<b>Average cost for all services</b>	<b>1.85</b>	<b>1.83</b>	<b>1.83</b>	<b>1.72</b>	<b>1.76</b>	<b>1.75</b>	<b>1.73</b>

## Annex 4. Income

Table A: Actual income for 11 contracted health centers (US\$)

	Health Centre A	Health Centre B	Health Centre C	Health Centre D	Health Centre E	Health Centre F	Health Centre K	Health Centre L	Health Centre M	Health Centre N	Health Centre O
<b>INCOME</b>											
User Fees	6,504	5,671	5,500	2,804	2,458	1,829	717	1,145	1,528	5,380	2,512
Health Equity Funds	584	60	1,139	311	591	73	-	-	-	-	-
Health Insurance	1,221	1,086	782	233	47	14	-	-	-	-	-
GoC Delivery Incentives	3,995	3,483	3,702	1,083	1,200	468	746	351	1,463	-	-
GoC Salary, Overtime, Missions	3,997	3,495	2,630	2,782	2,978	2,371	4,439	5,739	5,338	2,780	1,815
GoC PAP	1,923	2,872	2,459	1,475	2,358	2,563	668	535	535	5,923	4,930
CMS	12,998	12,975	15,212	8,371	10,474	10,730	9,193	9,163	14,030	1,112	585
Donated drugs and medical supplies - vacc	1,537	1,615	1,849	622	655	457	685	834	826	878	448
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-	-	-	5,993	2,764
Donor Assistance	1,657	2,941	4,090	2,912	2,493	3,171	2,657	2,562	2,661	-	-
<b>Total Income</b>	<b>34,415</b>	<b>34,199</b>	<b>37,363</b>	<b>20,593</b>	<b>23,254</b>	<b>21,677</b>	<b>19,106</b>	<b>20,328</b>	<b>26,381</b>	<b>22,066</b>	<b>13,055</b>
User Fees	0.17	0.18	0.17	0.24	0.16	0.18	0.06	0.07	0.08	0.21	0.18
Health Equity Funds	0.02	0.00	0.03	0.03	0.04	0.01	-	-	-	-	-
Health Insurance	0.03	0.04	0.02	0.02	0.00	0.00	-	-	-	-	-
GoC Delivery Incentives	0.10	0.11	0.11	0.09	0.08	0.05	0.07	0.02	0.08	-	-
GoC Salary, Overtime, Missions	0.10	0.11	0.08	0.23	0.20	0.23	0.39	0.35	0.30	0.11	0.13
GoC PAP	0.05	0.09	0.08	0.12	0.16	0.25	0.06	0.03	0.03	0.23	0.36
CMS	0.34	0.42	0.46	0.70	0.69	1.04	0.81	0.55	0.78	0.04	0.04
Donated drugs and medical supplies - vacc	0.04	0.05	0.06	0.05	0.04	0.04	0.06	0.05	0.05	0.03	0.03
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-	-	-	0.23	0.20
Donor Assistance	0.04	0.10	0.12	0.25	0.16	0.31	0.23	0.15	0.15	-	-
<b>Average Income per Service</b>	<b>0.90</b>	<b>1.11</b>	<b>1.14</b>	<b>1.73</b>	<b>1.53</b>	<b>2.09</b>	<b>1.68</b>	<b>1.23</b>	<b>1.46</b>	<b>0.86</b>	<b>0.95</b>

## Annex 4: Income

Table B: Actual income for 3 non-supported and 4 supported health centers (US\$)

	Health Centre H	Health Centre I	Health Centre J	Health Centre G	Health Centre P	Health Centre Q	Health Centre R
<b>INCOME</b>							
User Fees	760	497	1,049	2,259	835	248	212
Health Equity Funds	-	-	-	-	-	-	-
Health Insurance	-	-	-	-	1,598	-	-
GoC Delivery Incentives	-	-	556	550	-	-	-
GoC Salary, Overtime, Missions	3,890	3,179	5,745	2,794	4,356	5,417	3,358
GoC PAP	1,486	2,231	1,148	1,400	1,296	446	528
CMS	15,225	10,979	11,688	22,074	18,569	12,985	7,691
Donated drugs and medical supplies - vacc	1,159	634	930	1,834	2,118	1,151	616
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-
Donor Assistance	-	-	-	1,350	2,232	1,788	716
<b>Total Income</b>	<b>22,520</b>	<b>17,520</b>	<b>21,116</b>	<b>32,261</b>	<b>31,003</b>	<b>22,035</b>	<b>13,121</b>
User Fees	0.04	0.05	0.09	0.13	0.02	0.01	0.02
Health Equity Funds	-	-	-	-	-	-	-
Health Insurance	-	-	-	-	0.05	-	-
GoC Delivery Incentives	-	-	0.05	0.03	-	-	-
GoC Salary, Overtime, Missions	0.23	0.34	0.51	0.16	0.13	0.29	0.32
GoC PAP	0.09	0.24	0.10	0.08	0.04	0.02	0.05
CMS	0.88	1.18	1.04	1.29	0.55	0.70	0.74
Donated drugs and medical supplies - vacc	0.07	0.07	0.08	0.11	0.06	0.06	0.06
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-
Donor Assistance	-	-	-	0.08	0.07	0.10	0.07
<b>Average Income per Service</b>	<b>1.31</b>	<b>1.88</b>	<b>1.87</b>	<b>1.88</b>	<b>0.92</b>	<b>1.19</b>	<b>1.25</b>

## Annex 4: Income

Table C: Income needed for actual 2007 services at 11 contracted health centers (US\$)

	Health Centre A	Health Centre B	Health Centre C	Health Centre D	Health Centre E	Health Centre F	Health Centre K	Health Centre L	Health Centre M	Health Centre N	Health Centre O
<b>INCOME</b>											
User Fees	8,120	6,251	6,294	2,430	3,025	2,106	2,306	2,948	3,245	5,849	2,952
Health Equity Funds	1,131	870	876	338	421	293	321	410	452	814	411
Health Insurance	1,028	791	797	308	383	267	292	373	411	740	374
GoC Delivery Incentives	5,854	5,122	5,707	3,073	2,707	1,010	1,868	741	2,888	3,039	1,180
GoC Salary, Overtime, Missions	10,898	9,341	10,120	4,671	4,671	3,892	3,281	3,938	5,449	6,563	3,938
GoC PAP	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275
CMS	27,976	22,462	23,614	6,759	8,538	8,129	10,020	12,424	13,076	16,986	11,263
Donated drugs and medical supplies - vacc	1,537	1,615	1,849	622	655	457	685	834	826	878	448
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-	-	-	-	-
Donor Assistance	5,873	5,499	6,209	2,919	2,723	3,457	3,315	4,891	3,583	6,179	4,581
<b>Total Income</b>	<b>64,690</b>	<b>54,227</b>	<b>57,741</b>	<b>23,394</b>	<b>25,398</b>	<b>21,886</b>	<b>24,364</b>	<b>28,835</b>	<b>32,204</b>	<b>43,323</b>	<b>27,422</b>
User Fees	0.21	0.20	0.19	0.20	0.20	0.20	0.20	0.18	0.18	0.23	0.21
Health Equity Funds	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03
Health Insurance	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03
GoC Delivery Incentives	0.15	0.17	0.17	0.26	0.18	0.10	0.16	0.04	0.16	0.12	0.09
GoC Salary, Overtime, Missions	0.28	0.30	0.31	0.39	0.31	0.38	0.29	0.24	0.30	0.26	0.29
GoC PAP	0.06	0.07	0.07	0.19	0.15	0.22	0.20	0.14	0.13	0.09	0.17
CMS	0.73	0.73	0.72	0.57	0.56	0.79	0.88	0.75	0.73	0.66	0.82
Donated drugs and medical supplies - vacc	0.04	0.05	0.06	0.05	0.04	0.04	0.06	0.05	0.05	0.03	0.03
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-	-	-	-	-
Donor Assistance	0.15	0.18	0.19	0.25	0.18	0.33	0.29	0.30	0.20	0.24	0.33
<b>Average Income per Service</b>	<b>1.69</b>	<b>1.76</b>	<b>1.76</b>	<b>1.97</b>	<b>1.67</b>	<b>2.11</b>	<b>2.14</b>	<b>1.74</b>	<b>1.79</b>	<b>1.69</b>	<b>1.99</b>

#### Annex 4: Income

Table D: Income for actual 2007 services at 3 non-supported and 4 supported health centers (US\$)

	Health Centre H	Health Centre I	Health Centre J	Health Centre G	Health Centre P	Health Centre Q	Health Centre R
<b>INCOME</b>							
User Fees	3,874	1,773	2,311	3,348	4,972	1,888	1,344
Health Equity Funds	539	247	322	466	692	263	187
Health Insurance	490	224	292	424	629	239	170
GoC Delivery Incentives	1,317	727	1,644	1,146	3,332	459	1,190
GoC Salary, Overtime, Missions	5,250	3,281	3,281	6,227	7,875	6,563	5,250
GoC PAP	2,275	2,275	2,275	2,275	2,275	2,275	2,275
CMS	17,069	9,367	9,183	13,579	23,831	11,408	6,080
Donated drugs and medical supplies - vacc	1,159	634	930	675	2,118	1,151	616
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-
Donor Assistance	6,334	4,518	3,469	5,876	9,190	10,993	8,344
<b>Total Income</b>	<b>38,310</b>	<b>23,048</b>	<b>23,707</b>	<b>34,017</b>	<b>54,914</b>	<b>35,239</b>	<b>25,458</b>
User Fees	0.23	0.19	0.20	0.20	0.15	0.10	0.13
Health Equity Funds	0.03	0.03	0.03	0.03	0.02	0.01	0.02
Health Insurance	0.03	0.02	0.03	0.02	0.02	0.01	0.02
GoC Delivery Incentives	0.08	0.08	0.15	0.07	0.10	0.02	0.11
GoC Salary, Overtime, Missions	0.30	0.35	0.29	0.36	0.23	0.35	0.50
GoC PAP	0.13	0.24	0.20	0.13	0.07	0.12	0.22
CMS	0.99	1.00	0.81	0.79	0.71	0.62	0.58
Donated drugs and medical supplies - vacc	0.07	0.07	0.08	0.04	0.06	0.06	0.06
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-
Donor Assistance	0.37	0.48	0.31	0.34	0.27	0.59	0.80
<b>Average Income per Service</b>	<b>2.23</b>	<b>2.47</b>	<b>2.10</b>	<b>1.99</b>	<b>1.63</b>	<b>1.90</b>	<b>2.43</b>

#### Annex 4: Income



Table E: Income needed for 90% coverage at 11 contracted health centers (US\$)

	Health Centre A	Health Centre B	Health Centre C	Health Centre D	Health Centre E	Health Centre F	Health Centre K	Health Centre L	Health Centre M	Health Centre N
<b>INCOME</b>										
User Fees	6,776	6,132	8,092	2,978	4,363	2,507	3,909	4,230	5,163	6,987
Health Equity Funds	944	854	1,127	415	608	349	544	589	719	973
Health Insurance	858	776	1,024	377	552	317	495	535	654	884
GoC Delivery Incentives	3,877	3,509	4,537	1,704	2,497	1,435	2,243	2,427	2,962	3,998
GoC Salary, Overtime, Missions	10,898	9,341	12,455	5,449	7,784	4,671	5,906	5,906	9,341	9,844
GoC PAP	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275
CMS	34,951	31,627	44,648	15,359	22,505	12,932	20,168	21,823	26,638	36,040
Donated drugs and medical supplies - vacc	1,169	1,058	1,368	514	753	433	676	732	893	1,205
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-	-	-	-
Donor Assistance	8,277	6,719	9,121	4,614	6,465	4,008	6,935	6,562	7,837	11,017
<b>Total Income</b>	<b>70,025</b>	<b>62,290</b>	<b>84,647</b>	<b>33,685</b>	<b>47,802</b>	<b>28,926</b>	<b>43,151</b>	<b>45,079</b>	<b>56,483</b>	<b>73,224</b>
User Fees	0.16	0.16	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Health Equity Funds	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Health Insurance	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
GoC Delivery Incentives	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
GoC Salary, Overtime, Missions	0.26	0.25	0.26	0.30	0.29	0.31	0.25	0.23	0.30	0.23
GoC PAP	0.06	0.06	0.05	0.13	0.09	0.15	0.10	0.09	0.07	0.05
CMS	0.85	0.85	0.92	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Donated drugs and medical supplies - vacc	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-	-	-	-
Donor Assistance	0.20	0.18	0.19	0.26	0.24	0.26	0.29	0.26	0.25	0.26
<b>Average Income per Service</b>	<b>1.70</b>	<b>1.67</b>	<b>1.75</b>	<b>1.86</b>	<b>1.80</b>	<b>1.90</b>	<b>1.82</b>	<b>1.75</b>	<b>1.80</b>	<b>1.73</b>

#### Annex 4: Income

Table F: Income needed for 90% coverage at 3 non-supported and 4 supported health centers (US\$)

	Health Centre H	Health Centre I	Health Centre J	Health Centre G	Health Centre P	Health Centre Q	Health Centre R
<b>INCOME</b>							
User Fees	4,559	5,024	5,816	5,700	8,136	6,909	4,377
Health Equity Funds	635	700	810	794	1,133	962	609
Health Insurance	577	636	736	722	1,030	875	554
GoC Delivery Incentives	2,616	2,883	3,337	3,262	4,656	3,953	2,504
GoC Salary, Overtime, Missions	7,219	7,875	9,188	9,341	11,813	9,844	5,906
GoC PAP	2,275	2,275	2,275	2,275	2,275	2,275	2,275
CMS	23,520	25,923	30,010	29,401	41,966	35,635	22,575
Donated drugs and medical supplies - vacc	789	869	1,006	983	1,404	1,192	755
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-
Donor Assistance	8,730	9,464	11,094	7,220	13,509	11,108	6,396
<b>Total Income</b>	<b>50,919</b>	<b>55,649</b>	<b>64,273</b>	<b>59,697</b>	<b>85,921</b>	<b>72,752</b>	<b>45,953</b>
User Fees	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Health Equity Funds	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Health Insurance	0.02	0.02	0.02	0.02	0.02	0.02	0.02
GoC Delivery Incentives	0.09	0.09	0.09	0.09	0.09	0.09	0.09
GoC Salary, Overtime, Missions	0.26	0.26	0.26	0.27	0.24	0.23	0.22
GoC PAP	0.08	0.07	0.06	0.07	0.05	0.05	0.09
CMS	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Donated drugs and medical supplies - vacc	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Other (describe) - drugs and mission costs	-	-	-	-	-	-	-
Donor Assistance	0.32	0.31	0.31	0.21	0.27	0.26	0.24
<b>Average Income per Service</b>	<b>1.84</b>	<b>1.82</b>	<b>1.82</b>	<b>1.72</b>	<b>1.74</b>	<b>1.73</b>	<b>1.73</b>

## **Annex 5: People consulted**

### **MINISTRY OF HEALTH**

H.E. Nuth Sokhom, Minister

Dr Hong Rathmony, Vice Director, Communicable Disease Control Department

Dr Ly Khunbunarann, Coordinator for Policy Research, Communicable Disease Control Department

Dr Sok Srun, Deputy Director, Department of Hospital Services

Mrs Khout Thavary, Deputy Head of Department of Budget and Finance

Mr Ork Vichit, National Immunization Programme

Dr Chhorn Veasna, National Programme for ARI/CDD and Cholera Control

Dr Bun Sreng, Communicable Disease Control Department / IMCI

Dr Sok Kanha, Deputy Director, Dept of Planning and Health Information

Dr Tung Rathavy, Deputy Director Maternal and Child Health Programme and Manager National Reproductive Health Programme

Dr Lo Veasnakiry, Director, Department of Planning and Health Information

Mr. Ros Chhun Eang, Department of Planning and Health Information

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Dr Chak Thida, Deputy Director – National Program for Mental Health

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Dr Ou Kevanna, Program Manager, National Nutrition Program

Dr Sun Sammang, Officer, Bureau of Health Economics and Financing

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Dr. Rasoka Thor, Project Officer – Child Survival

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Dr Him Phannary, Senior Public Health Advisor – Kampong Cham

#### DFID

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#### REPRODUCTIVE AND CHILD HEALTH ALLIANCE (RACHA), CAMBODIA

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Mr Srin Seyerith, IT Team Leader

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Dr Khoy Dy, Provincial Coordinator Pursat

#### OXFORD POLICY INSTITUTE

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#### BASICS

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#### **MOH costing task team**

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Mr Ork Vichit	National Immunization Programme
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