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MINISTRY OF HEALTH

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HEALTH SERVICE COSTING
HEALTH CENTER ANALYSIS

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IHSSP

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Abstract

The Rwandan Ministry of Health, in collaboration with the USAID-funded Integrated Health Systems Strengthening Project (IHSSP), carried out a study to determine the costs of providing health centre services. The results of the costing were intended for use in re-designing insurance reimbursement mechanisms and levels. The results can also be used for other purposes, such as resource allocation, budgeting and comparisons of efficiency.

Actual expenditure data were collected for a sample of seven well-performing health centres. Averages of these data, together with standard costs, utilization, and catchment population were entered into a stand-alone version of the costing tool, which was named the Health Centre Cost Model. The MOH will be able to use this model to update and modify the costs as necessary.

Using the model, it is estimated that a health centre serving a standard population of 20,000 people should have a total annual recurrent cost of 120 million RWF, with approximately 47 million RWF spent on salaries (technical and admin staff), 55 million RWF spent on drugs, and 19 million RWF on operating costs. Sixty-one individual services were costed, ranging from immunizations to short inpatient stays, such as for normal deliveries.

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Key Words

Rwanda, health centre, health center, clinic, cost..

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Executive Summary

The Rwandan Ministry of Health (MOH), in collaboration with the USAID-funded Integrated Health Systems Strengthening Project (IHSSP), has undertaken a costing exercise to determine the costs of providing the *Paquet Minimum d'Activités* (PMA) and the *Paquet Complémentaire d'Activités* (PCA). The results of the costing will be used for improving insurance reimbursement mechanisms and levels. The costing can also be used for other purposes, such as resource allocation, budgeting and comparisons of efficiency.

The goal was to determine the actual cost of services at the health centre (including community services), district hospital, and referral hospital levels. At the health centre level the objective was to estimate the cost of each service included in the PMA.

An internationally-recognized costing tool called CORE Plus was used to determine the costs. This is a spreadsheet-based tool that uses standard treatment costs (derived from protocols) to estimate the direct costs of each service and then to allocate indirect costs across the services. It also uses the same standard costs to estimate the additional costs that are needed when numbers of services increase.

The methodology used comprised two elements – the determination of the standard treatment protocols and related costs and the collection of actual service and cost data for the year 2009 from a sample of health centres. The standard treatment protocols were developed by an expert team of Rwandan health providers.

Actual expenditure data were collected for a sample of seven well-performing health centres. These data were entered in the costing tool and a model was developed for each health centre. A comparison of the results showed that there were significant variations across the health centres for all the major types of expenditure: technical staffing, administrative and support staffing, drugs and medical supplies, and operating costs. These variations existed in the total expenditure figures and also when they were compared as unit costs per individual service. Significant variations in total costs may be justifiable because the health centres provided different quantities and mixes of services. Significant variations in the unit cost for a service are not, however, normally justifiable because they indicate different levels of efficiency and/or quality.

The same cost models were also used to produce standard costs and these were compared with the actual costs for each health centre. This analysis showed that the actual numbers and costs of technical staff did not only vary compared with the standards but were all less than the numbers required to provide good quality care according to the standards. A comparison of drug and medical and laboratory supplies also indicated that costs were too low, but in this case it was judged that probably not all drug expenditure data was captured. In the case of administrative and support staff numbers and costs, we had no standards other than an average of the figures for the health centres. However, we noted that the figures were significantly higher than the MOH norms. In the case of non-staff operating costs we had no standards or MOH norms with which to compare the figures.

The differences between the actual and standard costs are significant. Using the standards, technical staffing costs are 33% more on average and drug and medical and laboratory supplies are 36% more on average. In the case of a particular service the difference is also significant – for example the standard cost of an IAVRS (infections aiguës des voies respiratoires supérieures) service was RWF 2,149, which is 30% more than the average of RWF 1,651 that was actually spent. Despite the size of the differences we recommend, however, using the standard costs as the basis for setting reimbursement rates because they represent the resources needed to provide good quality services. It is important, however, that the additional funds are actually used to provide the resources needed.

We also conducted some analysis of the sources of funds for the sampled health centres since the MOH may wish to take that into account when setting reimbursement rates. The income of the sampled health centres comes from a mixture of government funding, insurance and fee revenue and donor assistance and the amounts varied significantly across the health centres. The MOH may need to take these revenue sources into account when determining new reimbursement mechanisms and levels, in particular the fact that a substantial part of the costs of the services are funded by donors.

The average numbers of services and the standard costs were entered into a stand-alone version of the costing tool, which was named the Health Centre Cost Model. The MOH will be able to use this model to update and modify the costs as necessary. The model can be used for the restructuring of reimbursement rates, as intended, and for comparing efficiency across health centres and improving the planning and budgeting of resources. A series of training courses have been provided to the MOH and supporting organizations so that they are able to update the Health Centre Service Model as needed.

There are generally challenges when conducting this type of costing exercise and this was no exception. We had difficulty in obtaining accurate service delivery data, data on drug and medical supply expenditure, and data on donor contributions. To respond to these challenges, a data validation workshop was held in which key staff from the sampled health centres reviewed the data that had been input into the model: staff and salaries, catchment populations, service delivery data, expenditures, and funding. The health centres updated the information where necessary, and the changes were reflected in the data entered into the final models. However, health centre staff did not have complete information on drugs and medical supplies and we were unable to ensure that all that information was captured. It will be important to improve the quality of these data above so that updating the model and conducting future costing exercises will be easier and the results will be more accurate. It will also be worthwhile conducting some research into what levels of administrative and support staff and non-staff operating costs are needed to run a health centre.

Introduction

The Ministry of Health in Rwanda (MOH), in collaboration with the USAID-funded Integrated Health Systems Strengthening Project (IHSSP), has undertaken a costing exercise to determine the costs of providing the *Paquet Minimum d'Activités* (PMA) and the *Paquet Complémentaire d'Activités* (PCA). The results of the costing will be used for improving insurance reimbursement mechanisms and levels. The costing can also be used for other purposes, such as resource allocation, budgeting and comparisons of efficiency.

The goal was to determine the actual cost of services at the health center (including community services), district hospital, and referral hospital levels. At the health centre level the objective was to estimate the cost of each service included in the PMA. At the hospital levels, the objective was to estimate the cost of each case treated and then to group them into Diagnosis Related Groups (DRGs). The classification of cases was based on the World Health Organization (WHO) codes and norms and standards for Rwanda as identified by the MOH.

This report presents the results of the cost analysis at the health centre level. The next section of this report (Section II) describes briefly the methodology used to estimate the costs. Section III describes the tool used to develop the model. Section IV presents a comparative analysis of the data collected from a sample of Rwandan health centers and standard costs derived by an expert group. Section V presents the cost for each service derived from a mixture of average and standard costs.

I. Costing tool

To estimate the actual or historical cost of individual services in a health centre requires a top-down approach which involves allocating the total costs of the health centre to the different services provided. Since the same group of clinical staff provide many different services it is necessary to use weights to allocate shared costs across those services¹. The best way to establish the weights is to use an activity-based costing approach which involves determining the standard provision protocol for each service and estimating the cost of each protocol. These relative standard costs serve as the weights. This method, therefore, uses an activity-based costing approach to determine the relative cost-weight of each service and then uses those weights to allocate the total costs using a top-down approach.

The cost calculations are best done in a spreadsheet-based tool that allows for key elements to be changed by the user, such as catchment populations, numbers of services, drug prices and salary levels. Using a spreadsheet-based tool also allows a user to see the formulas and this facilitates training and the ability to institutionalize the tool.

¹ The alternative of having staff keep records of the time spent on each service is not generally feasible.

The tool selected for this analysis was the Cost and Revenue Plus (CORE Plus) analysis tool.² CORE Plus has been used in many countries and has been reviewed by international donor agencies, including the WHO. Details of the review can be found on the web site of the Partnership for Maternal, Neonatal and Child Health.³ CORE Plus was adapted somewhat to serve the needs of this study and MOH staff will be trained in its use so the model can be updated as necessary.

The weights used in the model are determined by estimating the direct standard costs required for each 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 tool also uses the standard costs to estimate what the costs of providing services should be, and in this case it works purely as an activity-based⁴ costing tool. This is used to estimate what the costs of providing the actual or historical numbers of services should have been or to estimate what the costs would be if the numbers of services are increased.

To estimate future numbers of services the numbers of services, the tool uses catchment populations together with the incidence and prevalence rates for each illness etc. to estimate the need for each service. These need figures are then used to estimate the actual coverage rate and to predict or set targets for increases in the numbers of services.

II. Methodology

Overview

The objective of this exercise is to determine a single, actual cost for each service. This cost can then be used to set a reimbursement rate that would be used for all health centres. To determine this single cost requires the use of an average actual cost across a number of health centres or the use of a standard cost based on a service delivery protocol. For this exercise we used both methods, partly so that the MOH would be able to choose which figures to use and partly because the two can be used to validate each other.

Average actual costs

It was not feasible to cost all the health centres in Rwanda and it was, therefore, decided to use a small but representative sample. The sample included health centres of different sizes and in different parts of

² CORE Plus was developed by Management Sciences for Health (MSH); for more information see <http://erc.msh.org/mainpage.cfm?file=5.11.htm&module=toolkit&language=English>

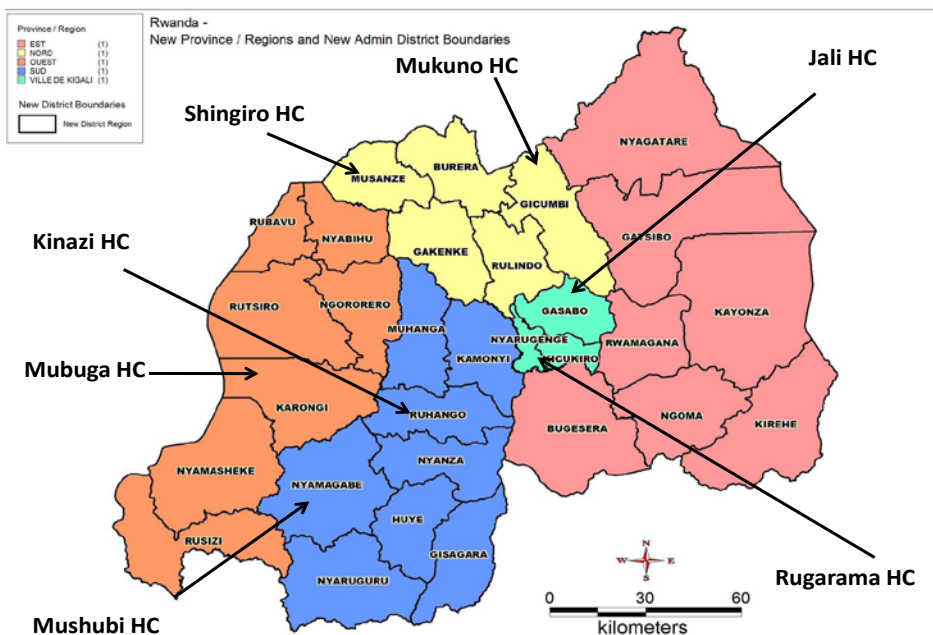
³ The Partnership for Maternal and Child Health;
http://www.who.int/pmnch/topics/economics/costing_tools/en/index.html

⁴ Otherwise known as bottom-up costing or micro-costing.

the country. However, only well-performing facilities⁵ were chosen on the grounds that they are more likely to be adequately resourced. The cost of these health centres may, therefore, be somewhat higher than the average cost for health centres across whole country, but it was felt that it was more important that the cost reflect the resources needed to provide good quality health services. And if the reimbursement rate is slightly higher than the actual cost at a particular health centre it should provide some additional resources that can be used to improve quality of care.

A sample of nine health centres was chosen. It was not possible, however, to get complete data for two facilities,⁶ and so the sample was reduced to seven, each one from a different district (see Map 1).⁷ Expenditure, staffing, and utilization data were collected for the seven health centers for calendar year 2009. These seven health centers are shown in Table 1. Each health center provided detailed expenditure information, broken down by type of input (salaries, drugs and medical supplies, and operating costs). Utilization data were taken from the national Rwandan HMIS database and catchment population data were taken from the Rwandan MOH District Health System Strengthening Tool (DHSST).

Map 1. Sample of Health Centres across Rwanda Districts



After the data had been entered in the model the data and results were presented to health center staff in a validation workshop and the figures were subsequently adjusted where necessary.

Norms and Standards

⁵ Well-performing health centers were defined as those with high PBF quality scores, and also which ranked highly in the MOH District Health System Strengthening Tool (DHSST).

⁶ The two health centres excluded from the sample were Gahanga HC in Kicukiro and Rukomo HC in Nyagatare.

⁷ This is a smaller sample than the 25 health centres used in two previous health centre costing studies conducted in Rwanda (Kagubare, 2004; Beaston Blaakman, 2008). However, as part of this costing we also developed standard costs for services and the actual and standard costs were compared for validation.

The standard costs were based on service delivery protocols determined by a small team of local experts and were based where possible on existing MOH official guidelines and standards of treatment (TB protocol, HIV protocol, etc). This team of clinicians provided detailed information on the staff time and activities, drugs and supplies, and laboratory tests required for each service. The resource prices used to calculate the standard costs were also used to allocate the actual costs to the services.

The list of services that were costed was derived from the *Paquet Minimum d'Activités* (PMA), in conjunction with the services listed in the HMIS. In certain cases, services were 'bundled' or grouped together. This was mainly in the case of diseases that were less frequently seen and which had similar treatments (or were all referred to a higher level), and which therefore did not require to be broken out into separate services. In addition, a bundled category of 'Autres Maladies Rares' services was created, since the list in the HMIS is not exhaustive. Also the Health Centers reported 'Other' services, but do not specify what these services were. On average, "Other" outpatient services were less than 2% of the total number of outpatient services, but "Other causes of hospitalization" were around 25% of the total admissions⁸.

Drug prices were obtained from the Centrale d'Achats des Médicaments Essentiels du Rwanda (CAMERWA), which were inclusive of a 15% mark-up charged to supplying the health centers. In certain cases where specific drug costs were not available, the Electronic Resource Center (ERC) International Drug Price Indicator Guide⁹ was consulted. These drug costs are based on international averages and did not include a mark-up¹⁰. Salary costs were obtained from the individual health centres, which were based on national Rwandan MOH pay structures. Operating costs were provided by health centres in the standard monthly Health Management Information System (HMIS) reporting format. During the health centre data validation workshop, facilities were asked to provide a more detailed breakdown of the operating costs by source (health centre, government, or NGO).

Normative coverage and utilization rates were estimated using prevalence and incidence rates. These can be used by the MOH to set targets for service coverage and estimate the total and incremental costs. The figures used to calculate the rates were obtained from a variety of sources, including the Rwandan Demographic Health Survey (DHS), WHO, United Nations Programme on HIV/AIDS (UNAIDS), and actual national HMIS information (for curative services that have no existing prevalence or incidence norms).

Income

CORE Plus also has a section for recording and modeling revenues and other forms of income. This section was completed for the sample of seven health centres and is available for a later source of funds analysis. The MOH may need to take these revenue sources into account when determining new

⁸ There will be a need for more accurate recording and reporting of diagnoses if a case-based reimbursement system is introduced.

⁹ ERC International Drug Price Indicator Guide, available at http://erc.msh.org/dmpguide/index.cfm?search_cat=yes&display=yes&module=dmp

¹⁰ For specific services that include the provision of these drugs the costs may need to be increased to put them on the same cost basis as those provided by CAMERWA.

reimbursement mechanisms and levels, in particular the fact that a substantial part of the costs of the services are funded by donors.

Health Centre Cost Model

A separate 'standard' Health Centre Cost Model was developed using the same CORE Plus format that was used for the individual health centres. The standard catchment area of 20,000 people was used for this Health Center model. We input a target utilization level of 66% of the full met need. This was determined based on the actual utilization numbers from the 7 health centers, which on average were equal to 66% of the total number of services required to fully meet the needs of their populations. This model was populated with a mixture of average actual costs and standard costs, which were derived as follows:

- **Staff.** The model was populated with averages of the actual number of each type of staff and their salary levels (see Annex 1). The model also determines the needed numbers of staff based on the standards and uses the average actual salary levels to calculate standard staffing costs.
- **Drugs, medical supplies and lab reagents.** When the actual health centre expenditure on these elements was compared with the standard costs it was apparent that some expenditures were not captured or insufficient quantities were purchased. We, therefore, used the standard costs for these inputs.
- **Operating costs.** It was considered more appropriate to use the average of the operating costs across the seven health centres instead of trying to calculate standard costs (see Annex 2).

The model is used to produce costs per service. A service is defined as a 'contact' for a single intervention whereas a case would cover the entirety of diagnosis and treatment for that intervention. A service may include interactions with more than one provider – for example, a diarrhea service could include the curative consultation with a nurse, plus a demonstration to prepare ORS by a pharmacist. A service is different from a visit to a facility since that visit can comprise more than one service, e.g., where a woman visits for an ante-natal check-up but is also treated for malaria. For our modeling purposes, the definition of a case also relates to the period of analysis. For Depo-provera, for example, we assume that one service is equal to one visit for one injection; whereas the case would be a total of four visits since the injections are required every 3 months. CORE Plus also includes a standard number of visits per case (ie. 4 individual ANC visits correspond to one full ANC "case"), which can then be multiplied by the cost per service to determine the cost per case. In the case of an inpatient stay at a health centre, such as for a delivery, the figures shown represent the cost of the whole stay. The definition of each case used in the costing is shown in Table 10.

Limitations

This study was limited to recurrent costs incurred at the health center level. Capital expenditures on buildings, major equipment and vehicles were not included. Depreciation was also not included, partly

because it is difficult and time-consuming to calculate and partly because it is not likely that depreciation costs would be included in insurance reimbursement rates.

The costs also exclude the costs of supervision and support from the district and/or NGOs and they exclude the costs of district-based doctors who sometimes run clinics at the health centres.

It is also important to note that we try to avoid being too detailed in some areas of the tool if the impact on the cost is not likely to be significant. Even though modeling the costs of a health centre is fairly complex we try to keep the tool as simple as possible so that it can be easily understood and modified by local counterparts. The costs of community services are presently included in the health centre costs but they can be separated in the future if necessary.

It should also be noted that the CORE Plus costing methodology does not involve the calculation of a 'true' actual cost per service. Rather, the standard cost for each service is determined through the standard treatment guidelines, and the actual total costs are distributed across the services using the same standard proportions.

III. Results: Details of the Sample of Actual Health Centres

The costing methodology included two ways of determining the costs – using average actual figures and standard figures. In this section we look at the actual figures for the seven sampled health centres to see if the actual figures are reliable enough to be used to determine the averages.

Utilization

The overall actual coverage levels and the mixes of services do not affect the cost of each service¹¹. Nevertheless it is useful to look at the coverage levels and the mix of services across the sample of health centres to see if there are any major differences.

Table 1 below shows a comparison of the average catchment and utilization figures across the seven health centres. 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 total number of services provided in 2009 for each health center. This includes preventive services, curative consultations, hospitalizations, and curative community services (see Annex 3 for full service list). The figures in the remaining rows are the number of services provided broken down into curative, preventive, and deliveries.

¹¹ The mix does affect the overall average cost per service which is why that figure is not used in the costing.

Table 1. Comparison of total utilization figures across the sampled health centres in 2009

Health centre	Jali	Kinazi	Mubuga	Mukono	Mushubi	Rugarama	Shingiro	Average
District	Gasabo	Ruhango	Karongi	Gicumbi	Nyamagabe	Nyarugenge	Musanze	
Catchment population	49,196	20,250	8,477	18,307	16,869	32,439	29,197	24,962
Total services provided	72,280	51,792	35,359	46,662	33,735	57,381	52,378	49,941
Total curative services provided	33,631	16,026	16,511	17,576	12,932	28,199	16,015	20,127
Total preventive services provided	38,449	35,348	18,570	28,603	20,437	28,643	35,711	29,394
Total deliveries	200	418	278	483	366	539	652	419

As can be seen from Table 1, the catchment populations vary from 8,477 in Mubuga to 49,196 in Jali. This degree of variation does not affect the costs but indicates the degree of disparity in terms of populations served¹². For a better comparison across the health centers, the utilization per capita is shown in Figure 1 below. 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.

The table also shows that there was significant variation in the numbers of services provided. For example the total number of services ranged from 33,735 at Mushubi to 72,280 at Jali. And the total number of curative services ranged from 12,932 at Mushubi to 33,631 at Jali. These variances should represent differing levels of absorption of indirect costs and should provide some robustness to the development of average costs.

It is also useful to compare coverage (utilization) rates (Figure 1). The figures show wide ranges in coverage, with the total number of services per capita varying from 1.47 at Jali to 4.17 at Mubuga. These can be compared with the normative figure for 100% coverage which was 2.98. Jali appears, therefore, to have been under-utilized¹³, whereas Mubuga appears to have been over-utilized¹⁴. The number of preventive, curative and delivery services per capita also showed significant variation, ranging from 0.78 preventive services in Jali to 2.19 in Mubuga; from 0.55 curative services in Shingiro to 1.95 in Mubuga;

¹² Variations in catchment population would only affect the cost if resources are allocated using a population basis.

¹³ The low per capital utilization rate at Jali in 2009 was perhaps because of geographical access issues since it was intended to cover such a large population. The rate should have increased significantly in 2010 with the creation of the two new health centres.

¹⁴ This probably indicates that the catchment population figure was incorrect.

and from 0.004 deliveries in Jali to 0.03 in Muguba and Mukono. The figures can also be compared with the norms for 100% annual coverage of preventive, curative and delivery services, which were 1.77, 1.22 and 0.05 per capita, respectively.

Figure 1. Comparison of utilization per capita figures across the sampled health centers in 2009

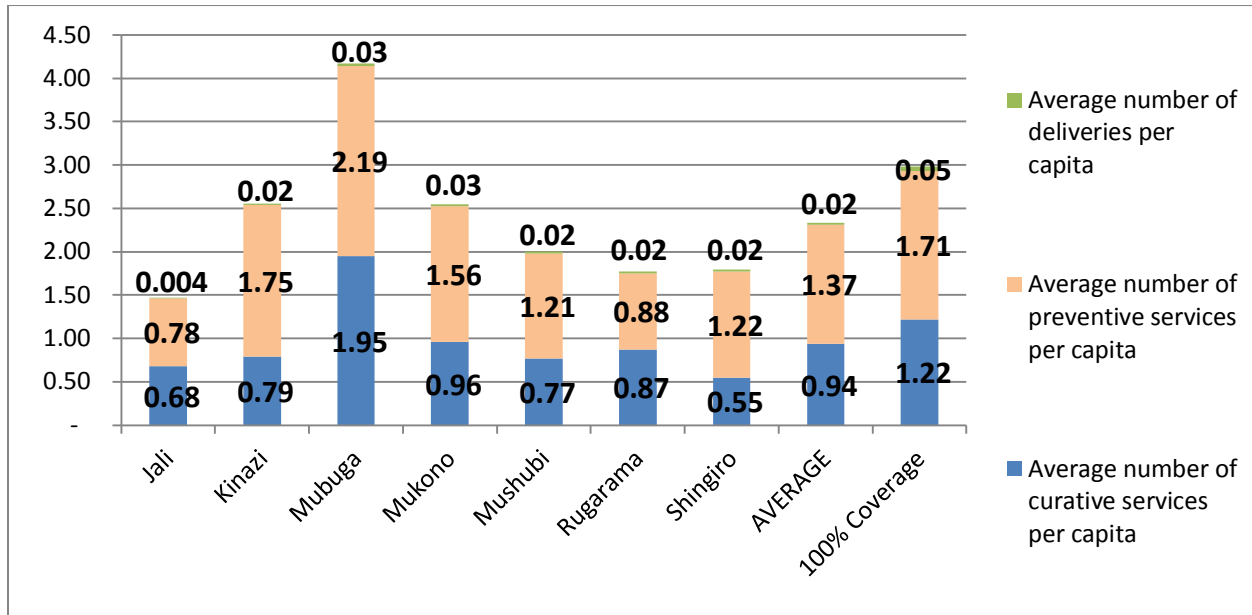


Table 2 below shows the mix of services for each health centre and the normative mix. Again there is significant variation across the health centres. Rugarama, for example, has the lowest proportion of preventive services at 49.9% whereas Shingiro has the highest at 68.2%. Compared with the norms, the mixes at the seven health centres are evenly spread with 3 below the norm of 57.5% for preventive services and 4 above it. It is worth repeating that variations in the mix should not affect the cost of an individual service unless they result in inefficiencies in the use of specialist staff (such as midwives). Variations in mix do, however, affect the average cost across all services, which is why we do not use those figures¹⁵.

¹⁵ A higher proportion of curative services, which are generally more costly than preventive services, will tend to make the average cost across all services higher.

Table 2. Comparison of utilization figures, broken down by type of service, across the sampled health centres in 2009

	Jali	Kinazi	Mubuga	Mukono	Mushubi	Rugarama	Shingiro	100% Coverage Norm
% of curative services	46.5%	30.9%	46.7%	37.7%	38.3%	49.1%	30.6%	40.8%
% of preventive services	53.2%	68.2%	52.5%	61.3%	60.6%	49.9%	68.2%	57.5%
% of deliveries	0.3%	0.8%	0.8%	1.0%	1.1%	0.9%	1.2%	1.7%
Total in %	100%	100%	100%	100%	100%	100%	100%	100%

Costs

There was also a lot of variation in actual expenditures, which ranged in total from 66 million RWF at Mushubi to 112 million RWF at Mukono (Table 3). These variations occurred in each of the three types of major inputs: salaries¹⁶, drugs and medical supplies, and operating costs. The salaries and operating costs are both the actual expenditures, as reported by the health centres.

The drug and medical supply costs were a combination of actual expenditure on drugs by the health centre, and the value of donated drugs.¹⁷

¹⁶ Specialized outreach visits by district hospital doctors to the health centers were not included in the cost model. This was due to two reasons: firstly, the district hospital doctor's salary was paid by the district hospital and was not a cost to the health center; and secondly, because the visits were not frequent enough to warrant a separate costing. This can be done at a later stage if the MOH wishes to know those costs.

¹⁷ Health centres provided detailed list of quantities of donated drugs for the year, which were then costed using the ERC International Drug Price Indicator guide. Note that these costs do not include CAMERWA markups.

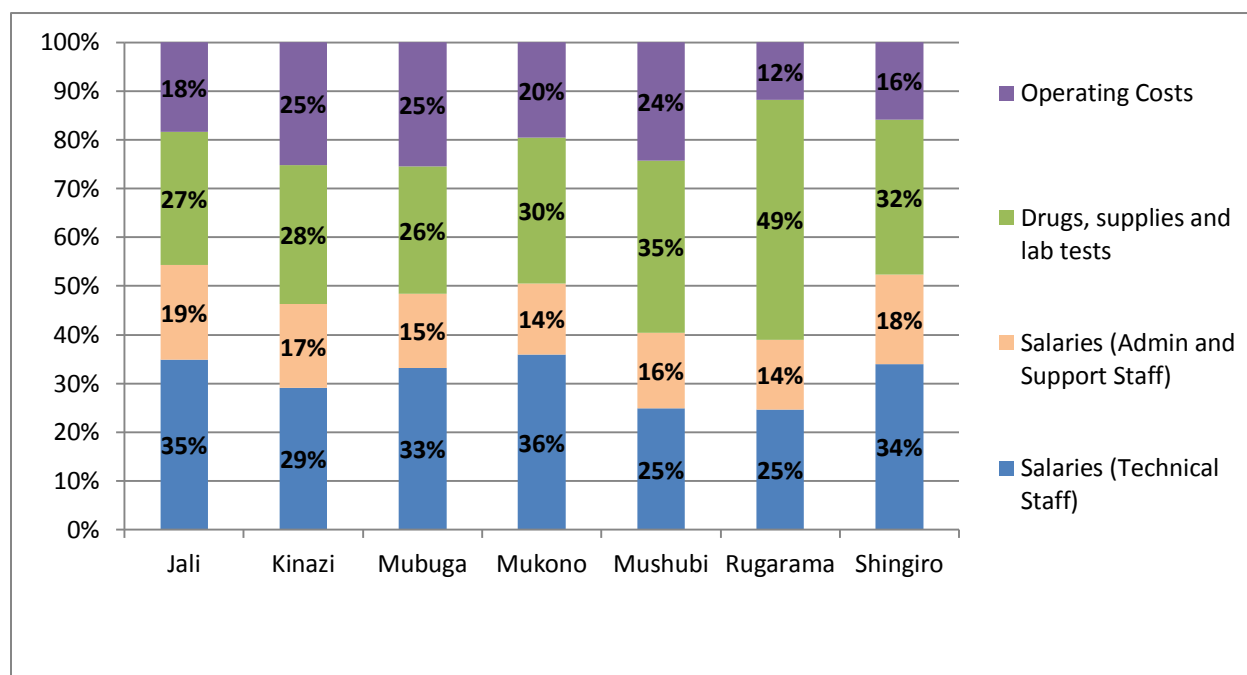
Table 3. Comparison of total actual cost figures, broken down by input type, across the sampled health centres in 2009 (RWF)

	Jali	Kinazi	Mubuga	Mukono	Mushubi	Rugarama	Shingiro
Total cost of all services	98,346,677	110,783,996	92,995,036	112,201,368	66,538,048	99,592,152	79,685,511
Salaries (Technical Staff)	34,308,975	32,229,047	30,851,570	40,399,358	16,536,745	24,438,636	27,085,720
Salaries (Admin and Support Staff)	19,129,579	19,072,942	14,190,140	16,262,896	10,363,193	14,414,303	14,588,954
Drugs and supplies	26,901,328	31,535,316	24,283,127	33,618,291	23,500,414	49,023,338	25,405,619
Operating costs ¹⁸	18,006,795	27,946,691	23,670,199	21,920,823	16,137,696	11,715,875	12,605,218

Figure 2 below shows the expenditure on each input type as a percentage of the total expenditures. In this graph staff costs were separated between technical staff (nurses etc.) and administrative and support staff. In most health centers, salaries comprised the majority of the costs (an average of 47% of the total), with drugs and medical supplies consuming an average of 33% of the total, and operating costs an average of 20%. Technical staff salaries comprised 30% of the total costs on average and administrative staff salaries comprised the other 17%.

¹⁸ Kinazi reported a very high figure for “Other” expenditures under Operating Costs (15 million RWF compared with an average of about 2 million RWF across the other 6 health centres). There is a need to check this with the health centre to see if this figure should be reduced or removed.

Figure 2. Total actual costs broken down by % allocated to salaries, drug and medical supplies, and operating costs for the sampled health centres in 2009



The most important way of comparing the actual costs across the sampled health centres is to use the unit cost for each service since these figures are unaffected by service mix variations¹⁹ and can, therefore, potentially be used to derive an average actual cost per service. These unit costs are calculated by dividing the total actual cost for each type of service by the number of services. Since there are too many types of service to show here, we chose the 10 highest-volume services (Table 4). As can be seen from the table, the actual unit costs for these services also differed significantly. For example, the cost of a service to treat an upper respiratory infection (IAVRS) ranged from RWF1,005 at Rugarama to RWF 2,271 at Kinazi. These variations are not, however, surprising since they result from the large differences in technical staffing, drug and medical supply expenditures and administrative and support expenditures that we showed earlier in this section.

¹⁹ While the model for each health centre shows an average cost per service across all services, these figures are not comparable across the health centres because the mix of services is different at each one.

Table 4. Actual Cost per Service for the 10 highest volume services at the sampled health centres in 2009 (RWF)

		Jali HC	Kinazi HC	Mubuga HC	Mukono HC	Mushubi HC	Rugarama HC	Shingiro HC
1	Planification familiale: Depo-proverat	875	1,266	1,719	1,327	1,236	1,656	975
2	VCT	1,308	2,161	2,336	2,359	2,293	1,996	1,779
3	IAVRS	1,157	2,271	1,811	1,942	1,445	1,005	1,658
4	Surveillance de la Croissance	1,364	1,000	1,378	849	298	577	219
5	Planification familiale: Pilule	325	473	631	494	460	627	367
6	Vaccination Polio-DTC-HepB/Hib 1,2,3	1,282	2,138	1,835	2,015	1,968	2,814	1,718
7	IAVRI	1,739	3,158	2,776	2,842	2,515	2,152	2,524
8	Parasitose intestinale	1,540	2,710	2,529	2,408	2,304	1,460	2,180
9	CPN	1,678	2,210	3,608	2,344	2,498	2,021	1,666
10	ARV	3,237	5,423	4,608	5,193	5,075	8,065	4,651

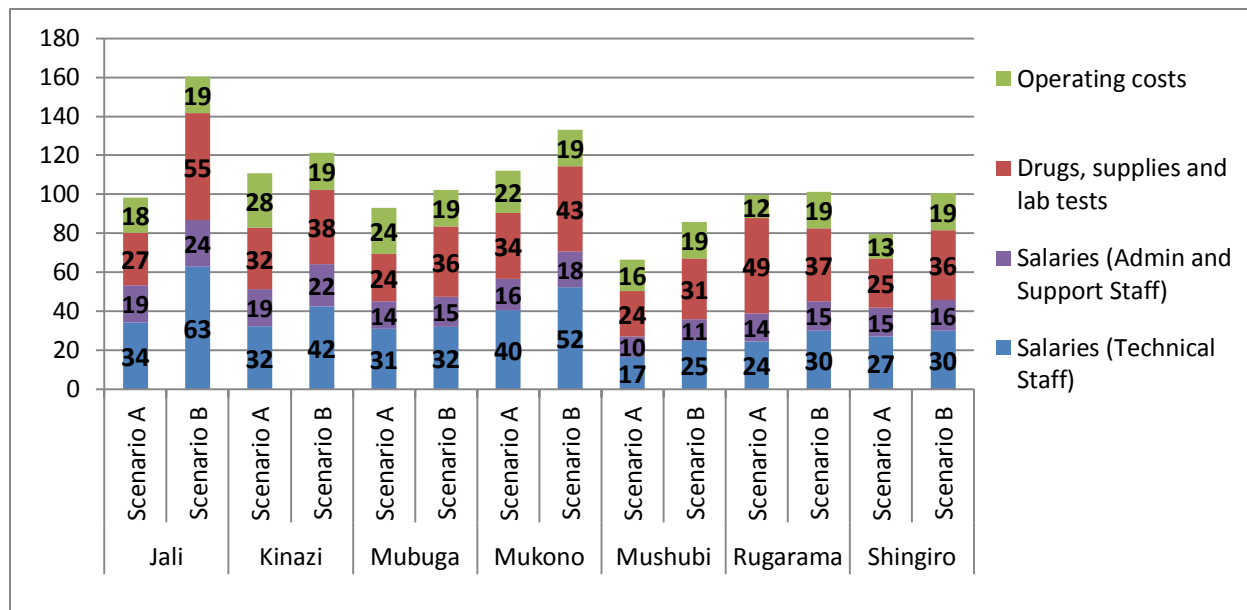
Actual costs compared with standard costs

As stated above, the variations in the unit costs per service across health centres are due to the differences in staffing and in drug, medical and laboratory supply and non-staff operating expenditures. Another way to analyze the figures is to compare the actual and standard costs.

The costing model automatically produces standard total and unit costs and these figures were compared with the actual costs for the sampled health centers. The standard costs are calculated by taking the actual utilization figures for 2009 and multiplying these figures by the standard unit costs per service.

Figure 3 below shows a comparison between actual and standard costs for the actual numbers of services. Scenario A shows the actual health centre costs and the actual utilization for 2009; Scenario B shows the standard costs for the same actual 2009 utilization. Since the same numbers of services are used, the differences relate purely to quantities and costs of the resources used and needed. As can be seen from the figure, the total standard cost is higher than the total actual cost for all the health centres apart from Rugarama. At Jali, for example, the actual total expenditure was RWF 98 million whereas the standard total expenditure was RWF 160 million.

Figure 3. Total actual vs. standard costs, broken down by input, for the sampled health centres in 2009 (RWF millions)



Scenario A = Actual utilization, actual costs. Scenario B = Actual utilization, standard costs.

The graph shows that the actual amount spent on technical costs was less than the amount needed for all the health centres; indicating that they were all understaffed.²⁰ At Jali, for example, expenditure on technical staff was only RWF 34 million, which was only about half the amount of RWF 63 million that they needed to spend. Most of the health centres appear to have under-spent on drugs as well, but this may be because not all of the actual drug expenditures were captured in the data collection. At Rugarama the reason for the actual spending being higher than needed is because more was spent on drugs and medical supplies than was needed.²¹

Administrative and support staff costs are the same under both scenarios but the total amount of technical staff time spent on administration increased slightly under the standard version where the more technical staff were needed.²² We used an average of the actual non-staff operating costs as the standard and so half the health centres appear to have spent more than needed and the other half less than needed²³.

²⁰ The same salary levels are used in both the actual and standard scenarios and so differences can only be due to variance in staffing numbers or mixes.

²¹ This can happen where more drugs were acquired than were needed in the short term and were in stock at the end of the year.

²² In some cases these figures include the salary cost for a community health person.

²³ There is a need to review the norms for administrative and support staff since the MOH norms appear low. There is also a need to develop some norms for non-staff operating costs.

Additional analysis of staffing numbers clearly highlights the significant differences across the health centres and between actual and standard costs. Table 5 shows the technical staffing numbers by staff type for each health centres, the average and the MOH normative numbers, and the standard staffing numbers. The total number of technical staff ranged from 9 in Mushubi to 17 in Rugarama, with an average of 14.3 across the 7 health centres. When the actual total staffing numbers are compared with the standards we can see that every health centre had fewer technical staff than it needed – an average of 19.9 compared with the actual average of 14.3.

According to the MOH staffing norms²⁴ a health centre serving a catchment population of 20,000 people with a utilization rate of 1.4 consultations per capita plus preventive services should have a total of 29 staff, of whom 23 are technical and 6 are administrative and support²⁵. The average catchment population of the 7 sampled health centres was 24,962 and the average number of curative services per capita was 0.94 so, on average, these health centres probably needed at least the numbers of staff stated in the MOH norms.

The last two rows of the table show the actual and standard numbers of services per staff day equivalent. These figures were calculated by dividing the total number of services provided by the total number of days worked for all the staff. The numbers show that, on average, each technical staff person provided 17.0 services per day but should have only provided 12.9, indicating that either staff spent many more hours seeing patients than the hours they were supposed to work or the time spent with each patient was less than it should have been²⁶. These numbers relate to the specific quantities of services provided in 2009.

Table 5. Technical staffing numbers for sampled health centers in 2009

	Jali	Kinazi	Mubuga	Mukono	Mushubi	Rugarama	Shingiro	Average	MOH Norm
A1 Nurses	1	2	1	1	0	0	3	1.6	1
A2 Nurses	8	9	10	11	6	14	9	8.7	18
Laboratory Technicians	2	2	2	1	2	1	2	1.7	2
Assistant(e) Social(e)	3	2	2	1	1	2	2	1.9	2
TOTAL (Actual)	14	15	15	14	9	17	16	14.3	23
Actual number of services per staff day equivalent	25	16	12	15	18	17	16	17.0	
TOTAL (Standard)	26	20	16	19	13	19	19	18.9	
Standard number of services per staff day equivalent	14	13	11	12	13	15	14	12.9	

²⁴ Politiques et Normes de Services de Sante. Normes Relatives au Personnel de: Umugudugu, Poste de Sante Communautaire, Centre de Sante, Hospital de District, Volume No 4, Octobre 2009. Ministere de la Sante.

²⁵ The Guidelines state that the total should be 28 persons but the figures add up to 29.

²⁶ Anecdotally we have been informed that technical staff in fact spend more hours than the norm seeing patients, which may be partly influenced by the PBF incentives.

The numbers of administrative and support staff also varied significantly across the 7 health centres, ranging from a total of 8 at Jali to 15 at Mubuga, with an average of 11 (Table 6). (It is interesting to note here that Jali provided many more services than Mubuga). We do not have service-based standards for these staff but the MOH norm is 6 persons so it is possible that some of the health centres had more administrative and support staff than they needed²⁷.

Table 6. Administrative and support staffing figures for sampled health centres in 2009

Health Centre	Jali	Kinazi	Mubuga	Mukono	Mushubi	Rugarama	Shingiro	Average	MOH Norm
Aides/Autres	0	1	2	1	1	0	1	0.86	N/A
Auxiliaires	2	2	4	0	1	3	0	1.71	N/A
Cassier	0	1	1	0	1	0	1	0.57	1
Chauffeur	0	3	1	0	0	0	0	0.57	N/A
Comptable	1	1	1	1	1	1	1	1.00	N/A
Data Manager	1	1	1	1	1	1	1	1.00	1
Hygiéniste / Travailleur / Veilleur	3	5	5	7	5	6	5	5.14	4
Community Health	1	0	0	0	0	1	1	0.43	N/A
TOTAL	8	14	15	10	10	12	10	11.29	6

The above analysis shows that the actual expenditures are probably not reliable enough to be used to determine the service costs due to the large variations across the health centres and the indications that the recorded expenditures probably did not reflect all the drugs and medical supplies that were acquired and staffing numbers were inadequate. Since the other option was to use the standard costs we compared those figures across the seven health centres (Table 7).

²⁷ Since the costs are based partly on actual numbers of administrative and support staff that are much higher than the MOH norms, separate research should be conducted to assess how many staff are really needed.

Table 7. Top Ten Services by volume and Standard Cost per Service for the sampled health centre in 2009 (RWF)

		Jali HC	Kinazi HC	Mubuga HC	Mukono HC	Mushubi HC	Rugarama HC	Shingiro HC
1	Planification familiale: Depo-proverat	1,424	1,392	1,529	1,482	1,450	1,227	1,314
2	VCT	2,231	2,361	2,578	2,643	2,646	1,954	2,140
3	IAVRS	1,845	2,402	2,148	2,464	2,241	1,592	1,833
4	Surveillance de la Croissance	1,532	1,025	1,455	990	1,758	601	1,197
5	Planification familiale: Pilule	534	523	572	555	543	465	496
6	Vaccination Polio-DTC- HepB/Hib 1,2,3	2,421	2,530	2,536	2,552	2,519	2,302	2,360
7	IAVRI	2,932	3,470	3,281	3,703	3,474	2,580	2,918
8	Parasitose intestinale	2,476	2,981	2,821	3,287	3,053	2,053	2,437
9	CPN	2,367	2,369	2,696	2,768	2,637	1,704	2,066
10	ARV	6,428	6,498	6,547	6,599	6,585	6,325	6,403

The standard costs vary much less than the actual costs across the health centres since the reasons for the major differences (staffing variations and under-recording of drugs and supplies) have been removed. The standard costs are, on average 21.9% higher than the recorded²⁸ actual costs, but it is important that the costs reflect the resources needed to provide good quality services.

²⁸ A reminder that the recorded costs are likely to be less than the total standard costs because of the probable under-capture of drug and medical supply expenditures.

IV. Results of National Health Centre Cost Model

Scenarios

The National Health Centre Cost Model was populated with the standard utilization figures and standard costs (see Methodology Section). The Rwandan MOH standard health center catchment size of 20,000 people was used. The utilization figures were driven by applying the standard incidence or prevalence rate for each service to the catchment population size. Standard costs were used for technical and administrative/support staffing.²⁹ Standard costs were also used operating costs, but these were calculated not from norms but from an average of the actual costs at the 7 sampled health centres. For drugs, medical supplies and lab reagents, standard costs were also used, and reflect the resources required to provide a good quality service according to standard treatment protocols.

Utilization

Table 8 below shows the assumptions for each scenario used in the model for level of utilization. The assumptions for the numbers of individual services are shown in Table 10. Based on the standard catchment population size of 20,000, and the incidence/prevalence rates for each service, the total number of services should be 59,651. For the National Health Center Model, we used a target coverage rate of 66% of the total met need, which results in a total of 39,634 services. Dividing this figure by the standard catchment population size of 20,000, results in 1.98 services per capita. This total utilization figure breaks down into 16,174 curative services, 22,790 preventive services, and 670 deliveries.

Table 8. Utilization assumptions for National Health Center Service Cost Model

	Standard Utilization figures based on 20,000 Catchment Population and 66% Coverage Target
Catchment population	20,000
Total services provided	39,634
Average number of services per capita	1.98
Total curative services provided	16,174
Average number of curative services per capita	0.81
Total preventive services provided	22,790
Average number of preventive services per capita	1.14
Total deliveries	670
Average number of other services per capita	0.03

²⁹ In one case where there was no MOH standard salary indicated (for travailleur/veuilleur), an average of the actual salaries for this category was used.

Cost Summary

Table 9 below shows a summary of the total standard costs needed to deliver services at the levels of utilization described above (see Annex 5 for USD equivalent).³⁰ The total costs in Scenario D are based on standard staff and drug and medical supply costs, and the average actual operating costs from the sampled health centres. These costs reflect, therefore, the staffing that the health centre should have in place to provide the stated numbers of services with good quality of care. Based on these standards, the total cost of the health centre would be 120 million RWF, with approximately 47 million RWF spent on salaries (technical and admin staff), 55 million RWF spent on drugs, and 19 million RWF on operating costs.

Table 9. Cost Summary for National Health Centre Service Cost Model based on 66% Target Coverage Utilization Assumptions, Scenario D (RWF)

	Scenario D (66% Target) Standard costs
Costs: Total and per capita	
Total cost of all services	120,288,076
Total Cost at HC – primary	116,824,853
Total Cost at HC – secondary	3,463,223
Average cost per service	3,035
Total cost of curative services	70,613,054
Average cost per curative service	4,366
Total cost of preventive services	41,106,580
Average cost per preventive service	1,804
Total cost of deliveries	8,568,442
Average cost per delivery	12,794
Break-down of Total Costs	
Salaries (Technical Staff)	26,559,747
<i>Technical Salaries as % of total</i>	22%
Salaries (Admin and Support Staff)	20,218,377
<i>Admin Salaries as % of Total</i>	17%
Drugs, supplies and lab tests	54,652,337
<i>Drugs, medical supplies, and tests as % of total</i>	45%
Operating costs	18,857,614
<i>Operating costs as % of total</i>	16%
Break-down by National Program	
Maternal, Newborn, Child Health	26,784,698
Communicable Disease Control	65,933,816
Non-communicable Diseases	404,547

³⁰ Note that the cost of district hospital doctors who make visits to the health centers was not included as part of the health center costs.

Reproductive Health	11,804,349
Deliveries	15,360,667
Staff	
Total number of technical staff in scenario	18
Average services per technical staff per day	11
Average pay per technical staff	1,475,542

The average cost per service comes to 3,035 RWF. Note that these figures are for this particular mix of services and will change when the mix changes. Also note that these are costs per service as defined earlier in the report, and are not the same as the costs per case being used for hospital inpatient services. The costs of deliveries and other inpatient services do, however, cover the costs of the whole stay.

Cost per service

The provisional standard cost for each service is shown in Annex 5.

The cost per service for each individual service was determined by taking the standard unit cost (staff, drugs and medical supplies, and lab tests), and loading the indirect and operating costs proportionally across the services. The standard MOH salary for each grade of staff was used so the figures can be easily updated by the MOH. The indirect costs are allocated based on the amount of direct staff time for each individual service, divided by the total staff time. Thus, in addition to showing the cost per individual service, such as the cost per treatment of malaria, the model can show the drug cost per malaria treatment, or the indirect staff time per malaria treatment. In this way, if the MOH would like to reimburse specific elements of individual service costs, these can be identified. The operating costs are treated as indirect costs and the amount included in the cost of each service varies with the total number of services and also with the mix of services. The costs shown in the table relate, therefore, specifically to the numbers of services shown in the table. If those numbers change the distribution of the operating costs changes and the amount included in the cost of each service also changes. Unless there is a major change in the total number or mix, however, the impact on the total cost of each service is small.

We compared the results of this study with figures produced in a previous health centre costing study conducted in Rwanda (Beaston Blaakman, 2008³¹)³². The weighted cost of a VCT service in the 2008 study was RWF 2,407 compared with RWF 2,511 in this study. The weighted cost of an acute upper respiratory tract infection was RWF 1,926 in the 2008 study and was RWF 2,149 in this study. Not all costs were similar, however. For example the weighted cost of a normal delivery was RWF 7,815 in the

³¹ 2006 Rwanda Health Centre and Hospital Cost Study. It should be noted that these figures are not strictly comparable because the 2008 study included depreciation and the report did not state what percentage of the costs that represented so we could not adjust those costs.

³² We did not compare the results with the findings of an earlier study (Kagubare, 2004) because those findings are older.

2008 study but was RWF 12,794 in this study. Some costs cannot, however, be compared because the unit of service costed was different in the two studies. For example, family planning services were bundled in the 2008 study but were separated in this study.

V. Summary of conclusions

The Rwandan Ministry of Health (MOH), in collaboration with the USAID-funded Integrated Health Systems Strengthening Project (IHSSP), has undertaken a costing exercise to determine the costs of providing the *Paquet Minimum d'Activités* (PMA) and the *Paquet Complémentaire d'Activités* (PCA). The results of the costing will be used for improving insurance reimbursement mechanisms and levels. The costing can also be used for other purposes, such as resource allocation, budgeting and comparisons of efficiency.

Actual expenditure data were collected for a sample of seven well-performing health centres. A comparison of the results showed that there were significant variations across the health centres for all the major types of expenditure: technical staffing, administrative and support staffing, drugs and medical supplies, and operating costs. In addition, the differences between the actual and standard costs were significant. Using the standards, technical staffing costs were 33% more on average and drug and medical and laboratory supplies were 36% more on average, than the actual costs.

Standard costs, utilization, and catchment population were entered into a stand-alone version of the costing tool, which was named the Health Centre Cost Model. The MOH will be able to use this model to update and modify the costs as necessary. The model can be used for the restructuring of reimbursement rates, as intended, and for comparing efficiency across health centres and improving the planning and budgeting of resources.

Based on the Health Centre Cost Model, serving a standard population of 20,000 people, the total cost of the health centre for one year would be 120 million RWF, with approximately 47 million RWF spent on salaries (technical and admin staff), 55 million RWF spent on drugs, and 19 million RWF on operating costs. In addition to the total costs, the individual costs per service were calculated (Refer to Table 10 above).

Annex 1. Staffing and Salary Input into the Health Centre Service Cost Model (RWF)

Category	Title/Name	# Staff	Salaire Brut	Primes	CSR (5%)	RAMA (7.5%)
Infirmièr(e) A1	Infirmier A1 (Titulaire)	1	2,545,714	332,224	67,886	148,500
	Infirmier A1	1	2,545,714	332,224	67,886	148,500
Infirmièr(e) A2	Infirmier A2	5	1,508,143	239,206	40,217	87,975
Infirmièr(e) A2 – Maternite	Infirmier A2 – Maternite	5	1,508,143	239,206	40,217	87,975
Nutritionist(e)	Nutritionist	1	1,508,143	239,206	40,217	87,975
Laborantin(e)	Laborantin	2	1,508,143	239,206	40,217	87,975
Assistant Social	Assistant Social	2	1,508,143	239,206	40,217	87,975

Note that standard Rwanda MOH salaries for clinical staff were used for Salarie Brut, CSR, and RAMA. Primes were calculated based on an assumption of 80% PBF quality score. Note that salaries are annual.

Category	# Staff	Total Salary	Note
Aides/Autres	1.00	966,735	Assume A3 salary level
Auxiliaires	2.00	966,735	Assume A3 salary level
Cassier	1.00	966,735	Assume A3 salary level
Chauffeur	1.00	966,735	Salary specified in MOH structure
Comptable	1.00	1,636,335	Assume A2 salary level
Data Manager	1.00	1,636,335	Assume A2 salary level
Travailleur/Veilleur/Hygieniste	6.00	155,192	Not in MOH structure; average of actuals
Community Health In-Charge	1.00	2,762,100	Assume A1 salary level

Note that support staff salaries are based, where possible, on standard MOH salary structure. For Travailleur/Veilleur/Hygieniste, the salaries are an average of actual salaries paid by the sampled health centers; this was due to the fact that these staff categories were not available in the MOH salary structure. Note that salaries are annual.

Annex 2. Operating Costs and Average Input into Health Centre Service Cost Model (RWF)

DEPENSES	Jali	Kinazi	Mubuga	Mukono	Mushubi	Rugarama	Shingiro	AVERAGE
Frais de mission et jetons	514,500	3,004,500	2,562,100	4,167,600	3,773,300	929,400	1,871,000	2,403,200
Fournitures bureau / imprimés / carnets	1,707,040	1,295,450	959,334	3,193,135	1,079,080	1,088,400	1,324,785	1,521,032
Entretien & maintenance équipement médical	241,630	-	-	310,000	11,800	10,000	-	81,919
Entretien & maintenance équipement non médical	630,500	521,000	351,350	979,100	715,000	132,800	289,500	517,036
Entretien & maintenance équipement moyen de locomotion	-	-	1,295,366	420,200	818,500	530,700	3,500	438,324
Entretien & réhabilitation infrastructures	1,398,102	190,370	10,326,485	2,237,950	149,800	314,000	-	2,088,101
Matériel d'entretien, produits nettoyage	319,740	202,450	189,180	354,450	-	137,750	290,500	213,439
Carburant, lubrifiants	5,671,900	5,726,992	2,135,980	1,933,893	1,569,900	1,645,850	1,744,300	2,918,402
Eau, électricité	1,048,310	720,000	930,220	985,800	761,440	1,250,780	1,177,048	981,943
Communication (Téléphone, Internet...)	846,000	311,660	381,934	1,140,000	652,000	660,251	504,500	642,335
Formations	3,287,100	100,000	-	2,309,800	927,500	704,000	360,000	1,098,343
Frais liés aux indigents	180,000	2,100	2,825,850	-	2,743,740	-	26,143	825,405
Achat équipement médical	90,000	106,087	1,262,400	651,100	158,330	848,000	-	445,131
Achat équipement non médical	1,006,450	202,345	450,000	948,500	224,000	104,000	86,400	431,671
Achat moyen de locomotion	-	-	-	-	-	-	-	-
Autres sorties	1,065,523	15,563,737	-	2,289,295	2,553,306	3,359,944	4,927,542	4,251,335
TOTAL	18,006,795	27,946,691	23,670,199	21,920,823	16,137,696	11,715,875	12,605,218	18,857,614

Annex 3. List of Services in CORE Plus and Categorization by Program, Classification, Target Population, and Level

Health Service	Program	Classification	Target Population	Level
Accouchement	MNCH	Other	Pregnant Women	HC - primary
Affections bucco-dentaires	Other	Curative	All	HC - primary
Affections cutanées	Other	Curative	All	HC - primary
Affections des yeux	Other	Curative	All	HC - primary
Affections gynéco obstétriques	RH	Curative	Female Rep Age	HC - primary
ARV	CDC	Curative	All	HC - primary
Autres causes de consultation	Other	Curative	All	HC - primary
Autres IST femme	RH	Curative	Female Rep Age	HC - primary
Autres IST homme	RH	Curative	Male Adult	HC - primary
Autres: Maladies rares	CDC	Curative	All	HC - primary
Avitaminose A	Other	Curative	All	HC - primary
Céphalées rebelles aux antalgiques	Other	Curative	Adults >5	HC - primary
CPN	MNCH	Preventive	Pregnant Women	HC - primary
Diabète	NCD	Curative	Adults >15	HC - primary
Diarrhée non sanglante	Other	Curative	All	HC - primary
Diarrhée sanglante	Other	Curative	All	HC - primary
Douleurs articulaires	Other	Curative	Adults >15	HC - primary
Ecoulement urétral	RH	Curative	Female Rep Age	HC - primary
Ecoulement vaginal	RH	Curative	Male Adult	HC - primary
Gastrites / Douleurs épigastriques	Other	Curative	All	HC - primary
Hypertension artérielle	NCD	Curative	Adults >15	HC - primary
IAVRI	CDC	Curative	All	HC - primary
IAVRS	CDC	Curative	All	HC - primary
Infections opportunistes (SIDA maladie)	CDC	Curative	All	HC - primary
Infections urinaires	CDC	Curative	All	HC - primary
Malformations congénitales	MNCH	Curative	Newborns	HC - primary
Malnutrition protéino-énergétique	MNCH	Curative	All	HC - primary
Paludisme simple confirmé	CDC	Curative	All	HC - primary
Paludisme simple présumé	CDC	Curative	All	HC - primary

Health Service	Program	Classification	Target Population	Level
Parasitose intestinale	CDC	Curative	All	HC - primary
Planification familiale: Barrières, MJF, Auto-observation	RH	Preventive	Female Rep Age	HC - primary
Planification familiale: Depo-proverat	RH	Preventive	Female Rep Age	HC - primary
Planification familiale: Implant & DIU	RH	Preventive	Female Rep Age	HC - primary
Planification familiale: Pilule	RH	Preventive	Female Rep Age	HC - primary
PMTCT	CDC	Preventive	Female Rep Age	HC - primary
Surveillance de la Croissance	MNCH	Preventive	Children <5	HC - primary
TPI: Femmes Enceintes	MNCH	Preventive	Pregnant Women	HC - primary
Traumatismes physiques	Other	Curative	All	HC - primary
Troubles mentaux et neurologiques	NCD	Curative	Adults >5	HC - primary
Tuberculose pulmonaire BK+	CDC	Curative	Adults >5	HC - primary
Vaccination BCG, PO	MNCH	Preventive	Newborns	HC - primary
Vaccination Polio-DTC-HepB/Hib 1,2,3	MNCH	Preventive	Newborns	HC - primary
Vaccination Rougeole	MNCH	Preventive	Newborns	HC - primary
VAT: Femmes Enceintes	MNCH	Preventive	Pregnant Women	HC - primary
VCT	CDC	Preventive	Adults >15	HC - primary
Affections gynéco obstétriques	RH	Curative	Female Rep Age	HC - secondary
Affections ostéo-articulaires	Other	Curative	Adults >15	HC - secondary
Autres causes d'hospitalisation	Other	Curative	All	HC - secondary
Autres: Maladies rares	CDC	Curative	All	HC - secondary
Complications du post partum	MNCH	Curative	Pregnant Women	HC - secondary
Diarrhée non sanglante	Other	Curative	All	HC - secondary
Diarrhée sanglante	Other	Curative	All	HC - secondary
IAVRI	CDC	Curative	All	HC - secondary
Malnutrition protéino-énergétique	MNCH	Curative	All	HC - secondary
Observation du post partum	MNCH	Curative	Pregnant Women	HC - secondary
Paludisme simple confirmé	CDC	Curative	All	HC - secondary
Infections opportunistes (SIDA maladie)	CDC	Curative	All	HC - secondary
Traumatismes physiques	Other	Curative	All	HC - secondary
Troubles mentaux et neurologiques	NCD	Curative	All	HC - secondary
Tuberculose pulmonaire BK+	CDC	Curative	All	HC - secondary

Annex 4. Comparison of total cost figures across the sampled health centres for 2009 (USD)

	Jali	Kinazi	Mubuga	Mukono	Mushubi	Rugarama	Shingiro
Total cost of all services	166,689	187,769	157,619	190,172	112,776	168,800	135,060
Total Cost at HC - primary	164,206	184,450	150,360	172,522	107,025	166,943	120,795
Total Cost at HC - secondary	2,484	3,320	7,259	17,650	5,751	1,857	14,265
Cost per service	2.31	3.95	4.46	4.08	3.34	2.94	2.58
Cost per capita	3.39	9.27	18.59	10.39	6.69	5.20	4.63
Total cost of curative services	95,450	97,518	84,550	96,021	55,663	84,997	64,309
Average cost per curative service	2.84	6.08	5.12	5.46	4.30	3.01	4.02
Total cost of preventive services	68,587	81,475	63,575	83,944	50,598	72,257	62,023
Average cost per preventive service	1.78	2.62	3.42	2.93	2.48	2.52	1.74
Total cost of other deliveries	2,652	8,777	9,494	10,207	6,515	11,546	8,729
Average cost per delivery	13.26	21.00	34.15	21.13	17.80	21.42	13.39

Annex 5. Cost per Service based on 66% Target Coverage utilization and using standard costs for all inputs (RWF)

Service	Total Cost	Number of Services	Total Cost per Service	Drugs Cost per Service	Medical Supplies Cost per Service	Lab Supplies Cost per Service	Technical Staff Costs per Service	Operating Costs per Service	Description of Service	
PRIMARY LEVEL SERVICES										
1	Affections bucco-dentaires	899,916	379	2,374	263	108	-	785	1,218	1 visit (treatment)
2	Affections cutanées	1,071,774	496	2,161	414	161	-	619	967	1 visit (treatment)
3	Affections des yeux	375,675	236	1,589	207	38	-	522	822	1 visit (treatment)
4	Affections gynéco-obstétriques	616,601	186	3,316	611	78	545	830	1,251	1 visit (treatment)
5	ARV	30,204,153	4,624	6,531	5,816	35	-	268	413	1 visit of 12 total visits (monthly) for a full case
6	Autres causes de consultation ³³	1,608,473	736	2,184	398	35	-	684	1,066	1 visit (treatment)
7	Autres IST femme	194,388	38	5,167	1,543	142	502	1,175	1,804	1 visit (treatment)
8	Autres IST homme	192,048	41	4,664	1,543	142	-	1,175	1,804	1 visit (treatment)
9	Autres: Maladies rares	6,169	2	3,977	39	98	89	1,482	2,270	1 visit (treatment)
10	Avitaminose A					35	9		989	1 visit

³³ Drugs cost unknown at time of study.

Service		Total Cost	Number of Services	Total Cost per Service	Drugs Cost per Service	Medical Supplies Cost per Service	Lab Supplies Cost per Service	Technical Staff Costs per Service	Operating Costs per Service	Description of Service
		54,572	32	1,695	30			633		(treatment)
11	Céphalées rebelles aux antalgiques	221,842	152	1,459	19	35	-	546	858	1 visit (treatment)
12	CPN	6,777,695	2,679	2,530	32	193	57	901	1,348	1 visit of 4 total visits for full case
13	Diabète	25,927	8	3,091	-	158	39	1,140	1,753	1 visit (Physical exam & referral, no treatment)
14	Diarrhée non sanglante	1,196,806	383	3,124	720	188	16	863	1,337	1 visit (treatment)
15	Diarrhée sanglante	270,056	68	3,971	671	291	71	1,157	1,781	1 visit (treatment)
16	Douleurs articulaires	911,786	634	1,438	59	35	-	522	822	1 visit (treatment)
17	Ecoulement urétral	78,972	21	3,769	250	93	447	1,175	1,804	1 visit (treatment)
18	Ecoulement vaginal	258,983	69	3,771	249	95	447	1,175	1,804	1 visit (treatment)
19	Education pour la Sante	5,210,582	3,322	1,568	-	35	-	595	939	1 30-min educational session
20	Gastrites / Douleurs épigastriques	986,027	684	1,442	63	35	-	522	822	1 visit (treatment)
21	Hypertension artérielle	111,404	25	4,472	0	147	89	1,675	2,561	1 visit (Physical exam, minimal treatment,

Service	Total Cost	Number of Services	Total Cost per Service	Drugs Cost per Service	Medical Supplies Cost per Service	Lab Supplies Cost per Service	Technical Staff Costs per Service	Operating Costs per Service	Description of Service	
									referral)	
22	IAVRI	3,754,963	1,141	3,292	330	397	94	971	1,500	1 visit (treatment)
23	IAVRS	5,169,899	2,406	2,149	52	47	-	800	1,250	1 visit (treatment)
24	Infections opportunistes (SIDA maladie)	50,758	19	2,710	339	35	-	916	1,420	1 visit (Treatment for Candidose and Zona)
25	Infections urinaires ³⁴	582,379	217	2,680	91	85	52	964	1,489	1 visit (treatment)
26	Malformations congénitales	6,141	4	1,638	-	35	-	625	978	1 visit (Physical exam and referral)
27	Malnutrition protéino-énergétique	146,438	35	4,188	63	35	164	1,881	2,044	1 visit (treatment and referral if necessary)
28	Paludisme simple confirmé	4,168,084	846	4,927	1,441	143	93	1,281	1,968	1 visit (treatment)
29	Paludisme simple présumé	3,585,360	848	4,229	834	46	99	1,281	1,968	1 visit (treatment)
30	Parasitose intestinale	2,710,928	962	2,818	76	128	67	1,002	1,546	1 visit (treatment)
31	Planification familiale: Barrieres, MJF, Auto-	286,490	182	1,577	-	35	108	575	859	1 visit (counseling and tests)

³⁴ Drugs costs need to be reviewed.

Service	Total Cost	Number of Services	Total Cost per Service	Drugs Cost per Service	Medical Supplies Cost per Service	Lab Supplies Cost per Service	Technical Staff Costs per Service	Operating Costs per Service	Description of Service
observation									
32	7,142,516	4,865	1,468	608	102	108	263	387	1 visit of 4 total visits for full case (every 3 months)
33	2,036,420	654	3,115	959	84	108	792	1,172	1 visit including insertion and follow up if needed
34	820,720	1,492	550	177	35	108	93	137	1 visit of 12 total visits for full case (every month)
35	2,864,606	116	24,783	24,219	35	-	217	313	1 visit (part of ANC visit) and 30 days' nevirapine supply for mother and newborn
36	3,732,603	2,692	1,386	18	60	42	706	560	1 visit (regular monitoring)
37	519,820	670	776	53	35	-	282	407	1 TPI treatment (part of

³⁵ This cost needs to be reviewed.

Service	Total Cost	Number of Services	Total Cost per Service	Drugs Cost per Service	Medical Supplies Cost per Service	Lab Supplies Cost per Service	Technical Staff Costs per Service	Operating Costs per Service	Description of Service	
									ANC visit)	
38	Traumatismes physiques	1,421,019	428	3,321	-	494	-	1,114	1,713	1 visit (treatment)
39	Troubles mentaux et neurologiques	255,194	62	4,109	52	48	-	1,587	2,422	1 visit (minor treatment and referral)
40	Tuberculose pulmonaire BK+	6,013,095	70	85,981	79,128	611	-	2,412	3,830	1 treatment of full TB case (8 months' TB drugs)
41	Vaccination BCG, PO	507,894	638	796	153	35	-	233	375	1 visit (two vaccination)
42	Vaccination Polio-DTC-HepB/Hib 1,2,3	4,757,719	1,914	2,486	1,843	35	-	233	375	1 visit (1 combined vaccination)
43	Vaccination Rougeole	492,595	638	772	129	35	-	233	375	1 visit (1 vaccination)
44	VAT: Femmes Enceintes	283,321	670	423	229	35	-	65	94	1 TT injection (part of ANC visit)
45	VCT	5,673,598	2,260	2,511	-	237	451	717	1,106	1 visit (1 counseling session and test)

Service	ALOS (days)	Total Cost	Number of Services	Total Cost per Service	Drugs Cost per Service	Medical Supplies Cost per Service	Lab Supplies Cost per Service	Technical Staff Cost per Service	Operating Costs per Service	Description of Service	
SECONDARY LEVEL (HOSPITALIZATION) SERVICES											
1	Accouchement	1	8,568,442	670	12,794	529	828	21	4,658	6,758	1 visit (delivery only)
2	Affections gynéco-obstétriques	1	177,212	18	9,731	611	139	545	3,431	5,006	1 visit (overnight stay)
3	Affections ostéo-articulaires	1	26,565	5	5,199	59	35	-	2,030	3,075	1 visit (overnight stay)
4	Autres causes d'hospitalisation ³⁶	1	467,734	46	10,124	898	35	-	3,664	5,527	1 visit (overnight stay)
5	Autres: Maladies rares	1	8,156	1	11,499	39	98	89	4,497	6,776	1 visit (overnight stay)
6	Complications du post partum	2	45,053	4	12,316	15	35	89	4,965	7,211	1 visit (2 days observation)
7	Diarrhée non sanglante	1	307,000	28	11,067	4,089	648	155	2,461	3,713	1 visit (overnight stay)
8	Diarrhée sanglante	1	98,831	6	15,588	4,351	649	155	4,161	6,272	1 visit (overnight)

³⁶ Drugs cost unknown at time of study.

											stay)
9	IAVRI	1	551,450	51	10,909	330	397	229	3,969	5,984	1 visit (overnight stay)
10	Malnutrition protéino-énergétique	2	12,622	1	12,320	63	35	315	5,076	6,831	1 visit (2 day observation and referral of severe cases)
11	Observation du post partum	1	934,354	103	9,035	-	35	-	3,665	5,334	1 visit (overnight observation)
12	Paludisme simple confirmé	1	420,810	38	11,220	114	143	178	4,300	6,486	1 visit (overnight stay)
13	Infections opportunistes (SIDA maladie)	1	14,403	1	9,978	339	35	-	3,819	5,785	1 visit (overnight stay)
14	Traumatismes physiques	1	232,007	18	13,109	657	494	132	4,731	7,095	1 visit (overnight stay)
15	Troubles mentaux et neurologiques	1	12,021	1	8,792	52	48	-	3,482	5,210	1 visit (overnight stay and referral)
16	Tuberculose pulmonaire BK+	1	155,004	2	93,249	79,128	611	-	5,315	8,194	1 visit (overnight stay and referral if needed)

Annex 6. Cost Summary for Health Centre Service Cost Model, Scenario D (USD)

	Scenario D 66% Target Coverage Utilization Standard Costs
Costs: Total and Per Capita	
Total cost of all services	203,878
Total Cost at HC – primary	198,008
Total Cost at HC – secondary	5,870
Cost per service	5.14
Total cost of curative services	119,683
Average cost per curative service	7.40
Total cost of preventive services	69,672
Average cost per preventive service	3.06
Total cost of deliveries	14,523
Average cost per delivery	21.68
Break-down of Total Costs	
Salaries (Technical Staff)	45,017
<i>Technical Salaries as % of total</i>	22%
Salaries (Admin and Support Staff)	34,268
<i>Admin Salaries as % of Total</i>	17%
Drugs, supplies and lab tests	92,631
<i>Drugs, medical supplies, and tests as % of total</i>	45%
Operating costs	31,962
<i>Operating costs as % of total</i>	16%
National Program Costs	
Maternal, Newborn, Child Health	45,398
Communicable Disease Control	111,752
Non-communicable Diseases	686
Reproductive Health	20,007
Other	26,035
Staff	
Total number of technical staff in scenario	18
Average services per technical staff per day	11
Average pay per technical staff	2,501

Annex 7. References

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