



# HÔPITAL UNIVERSITAIRE DE MIREBALAIS (HUM) COSTING STUDY



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# ACRONYMS

<b>GOH</b>	Government of Haiti
<b>HUM</b>	Hôpital Universitaire de Mirebalais
<b>MASH</b>	Management Accounting System for Hospitals
<b>MSPP</b>	Ministère de la Santé Publique et de la Population (Ministry of Health)
<b>OAVCT</b>	Office Assurance Véhicule Contre Tiers (Third Party Vehicle Insurance)
<b>OFATMA</b>	Office d'Assurance Accidents du Travail, Maladie et Maternité (Worker's Compensation)
<b>OR</b>	Operating Room
<b>USAID</b>	United States Agency for International Development







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# EXECUTIVE SUMMARY

The Health Finance and Governance Project (HFG), funded by the United States Agency for International Development (USAID), was asked by USAID Haiti to work with Partners in Health and its sister organization in Haiti, *Zanmi Lasante*, (PIH/ZL) to conduct a costing study of the recently opened Hôpital Universitaire de Mirebalais (HUM). The objective of the study is to provide data and information that will support the development of a financial sustainability plan for HUM.

## Background

HUM was built by the combined efforts of the Ministry of Public Health and the Population (MSPP) and PIH/ZL. Many donors contributed financially to the completion of this hospital complex, with a combined investment estimated to be more than US\$23 million. The newly opened hospital was completed in response to an urgent request from the MSPP in the aftermath of the 2010 earthquake, which destroyed several key elements of Haiti's infrastructure for basic health and education, such as the Hospital of the National University of Haiti (HUEH) in Port au Prince.

Locating HUM in Mirebalais, in Haiti's *Central* department,<sup>1</sup> addresses an acute need in an area where the population's health status and access to care are poor. The hospital was intended to play a major role in fulfilling the MSPP's strategic plan to ensure the decentralized offering of high-quality care in Haiti. Therefore, its mission and structure differ from that of other hospitals: HUM provides primary care to 185,000 inhabitants in Mirebalais, Savanette and Saut-d'Eau and secondary care to 451,000 inhabitants from communes extending from most of Central Plateau, lower-Artibonite and upper-Ouest. Tertiary care upon referral is offered to patients from a broader population of approximately 3.3 million inhabitants, covering the entire center of Haiti including the suburbs of Port-au-Prince. Furthermore, beyond an initial registration fee of 50 HTG<sup>2</sup> (US\$1.1), services are provided free. However, the reality is that the post-earthquake level of funding available for health has peaked and the hospital needs to understand its cost structure in order to increase the efficiency with which it uses its resources and in order to design an effective strategy for financing the hospital in the long term.

## Objectives and Rationale

The primary objective of this analysis is to analyze HUM's cost structure and to estimate unit costs in order to inform the development of the hospital's budgeting, management, and planning systems; this is critical as HUM moves strategically towards a long-term financing strategy aligned with national health financing priorities to ensure the long-term viability of the HUM model in Haiti's public health sector.

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<sup>1</sup> One of Haiti's 10 geo-political regions

<sup>2</sup> 1US\$=42HTG

System	Question	Relevance to Sustainability
Budgeting	<ul style="list-style-type: none"> <li>To what extent, financially, is the hospital's current cost structure fully accounted for in its budget planning?</li> <li>What specific areas of expenditures may currently be off-budget and what level of expenditure does this account for?</li> </ul>	Having these cost structure data allows HUM to increase the accuracy of its future budgets to ensure that it has accurate estimates of its future funding needs.
Management	<ul style="list-style-type: none"> <li>How does resource use change over time; is the facility realizing economies of scale as it increases its level of service delivery?</li> <li>How does resource use compare with other facilities (where data are available)?</li> <li>Do the current information systems provide the data required to track efficiency?</li> </ul>	Having accurately measured and consistently tracked indicators of efficiency and the systems to produce these measures is critical for implementing sound management of the resources available to the facility and demonstrating this efficiency to funders.
Planning	<ul style="list-style-type: none"> <li>Given their current cost structure and recent service delivery levels, which departments/services are anticipated to have unit cost structures that may be appropriate for cross-subsidization to support a revenue generation strategy without posing access to care barriers to its focal indigent population?</li> </ul>	<p>Having an understanding of cost structure allows HUM to determine:</p> <ul style="list-style-type: none"> <li>Revenue generation opportunities</li> <li>Cross-subsidization opportunities</li> </ul> <p>Having an understanding of cost structure informs HUM's response to increasingly sophisticated health service purchasing mechanisms like:</p> <ul style="list-style-type: none"> <li>Results-based financing contracting</li> <li>Health insurance schemes</li> </ul>

## Methodology

This study uses a tool for costing hospital services called the Management Accounting System for Hospitals (MASH), developed by the USAID Partners for Health Reform *plus* project in 2004. MASH uses a top-down approach for allocating costs, with the intent that all hospital costs should be assigned to the departments (also called cost centers) that provide "final" services to patients, either as inpatients or outpatients. A cost center is the smallest hospital unit that provides one kind of service, where costs are accumulated or assigned. Through discussions with hospital staff and administrators, cost centers were defined in a way that would be useful to managers and other final users and would reflect both how departments are organized and how hospital data are stored. Overhead cost centers include all administrative services and physical building costs. Intermediate cost centers include diagnostic services as well as pharmacy and mortuary services. The final medical services cost centers include outpatient, emergency, and inpatient services, by ward. These medical services serve as cost centers for purposes of estimating unit costs that include the distributed overhead and intermediate services costs. The analysis provides an estimate of the cost of an inpatient bed-day and the cost of an outpatient visit.

## Findings

Yearly operating costs at HUM were estimated to be US\$15,267,208 (Table ES-1). This includes the value of all resources used, not just those included in the budget.

**Table ES-1: Hospital Total Costs, 2014**

<b>All Costs</b>	<b>US\$</b>	<b>%</b>
Labor costs	\$ 7,501,112	49.1%
Pharmaceuticals and medical supplies	\$ 1,691,797	11.1%
Depreciation of equipment	\$ 857,290	5.6%
<b>Direct costs</b>	<b>\$ 10,050,198</b>	<b>65.8%</b>
<b>Indirect costs</b>	<b>\$ 5,217,010</b>	<b>34.2%</b>
<b>Total costs</b>	<b>\$ 15,267,208</b>	<b>100%</b>

Approximately 66 percent of HUM's expenses can be allocated directly to cost centers. This level of direct costs provides confidence in the cost estimation for all hospital's cost centers because fewer costs (indirect costs) needed to be allocated. Labor accounts for about 49 percent of total costs, pharmaceutical drugs and medical supplies for 11 percent and 6 percent are attributed to depreciation of equipment. The relatively high proportion of costs accounted for by drugs medical supplies reveals the use of sophisticated equipment at HUM that typically requires relatively sophisticated medical supplies reflecting the integration of new technologies and innovations at HUM that align with its tertiary health care service delivery objectives.

## Labor

Labor is the major cost driver: wages and salaries were the largest proportion of total costs and this is reflective of staffing models specific to tertiary care facilities where clinical specialists are direct providers of health services to treat and diagnose common to complex illness. As a major cost driver labor cost controls or efficiency measures targeted at personnel costs will be important to consider for the future. However, the hospital management is limited in its ability to influence personnel costs at the current time because the hospital is in an expansion phase; many positions are still being filled, including some other specialist doctors; therefore, labor costs are likely to rise. PIH, Boston pays the salaries of a few staff that are complement to the locally trained team in specialties where there's an additional capacity need. However, the hospital itself covers nearly 71 percent of payroll.

## Pharmaceuticals and Medical Supplies

Pharmaceuticals and medical supplies account for a high proportion of direct costs (US\$ \$1,691,797), reflecting the availability and use of sophisticated laboratory and diagnostic equipment as well as the high throughput of the intermediate centers: pharmacy, operating room, radiology, and laboratory departments.

## Depreciation

HUM benefits from relatively new and highly sophisticated diagnostic equipment necessitating high depreciation costs (US\$ 2,093,757 per year). If total<sup>3</sup> depreciation were excluded, the yearly operating costs would be US\$ \$13,173,451.<sup>4</sup>

## Indirect costs

A total of \$5,217,010 of indirect costs per year is estimated as the cost of resources that are used across cost centers. The largest of these costs are the depreciation of buildings, vehicles and energy systems (\$1,236,467). Energy is also a substantial indirect (\$908,767). Other line items include office supplies, other staff expenses, transport, communications and other functioning costs.

## Key Intermediate Cost Centers

The availability and use of key intermediate medical services are critical to the high-quality care that HUM aims to deliver. These centers have high costs and most have high throughput. The operating rooms account for \$1,424,491 a year; they conduct 2,998 surgeries at an average of \$475 per procedure and there is wide variation in the types of surgery performed. The laboratory at HUM is prolific with 330,476 tests per year at approximately \$2 per test, but there is wide variation in actual unit costs due to the wide range of tests conducted. Finally, the radiology unit accounts for \$671,914 per year and conducts 26,616 exams at an average cost of \$25 per exam though specific unit costs vary, as unit outputs range from basic X-rays to MRI scans.

## Final Medical Service Cost Centers

Final medical service unit cost results should be interpreted with a lot of caution: their calculation is very sensitive to hospital activity. Furthermore, while it is tempting to think of cost data as indicative of what fee structures might look like, getting from cost to fee is a process that involves other critical variables such as the projected and feasible service delivery growth, population demographics/epidemiology, demand for services, policy priorities, equity, and revenue opportunities. That being said, the full cost, outpatient visit numbers, and cost per output do indicate opportunities that should be explored further as HUM carries out its strategic plan.

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<sup>3</sup> Total depreciation would include depreciation of medical equipment (direct cost, \$857,290) as well as vehicles, building and energy systems (indirect costs, \$1,236,467)

<sup>4</sup> HUM administration requested that the study team assume five years of useful life for medical equipment, which may be overly conservative and certainly leads to high depreciation costs estimates.

**Table ES-2: Outpatient Unit Costs by Final Cost Centers**

Final Cost Centers	Full Cost	Number of Outpatient Visits	Cost per Outpatient Visit
Outpatient General	\$1,321,275	78,007	\$17
Outpatient Dental clinic	\$488,175	10,102	\$48
Outpatient Community health	\$775,163	1,995 <sup>5</sup>	\$389
Outpatient women health	\$982,207	17,771	\$55
Outpatient Pediatrics	\$263,032	12,115	\$22
Outpatient Mental health	\$66,235	1,738	\$38
Outpatient Oncology	\$867,227	6,553	\$132
Rehabilitation/Physiotherapy	\$469,408	1,033 <sup>6</sup>	\$454
Accident & Emergency <sup>7</sup>	\$2,041,063	14,629	\$140
Labor and Delivery	\$1,410,267	3,082 <sup>8</sup>	\$458

**Table ES-3: Inpatient Unit Costs by Final Cost Centers**

Final Cost Centers	Full Cost	Number of Inpatient Days	Cost per Inpatient Day	Bed Occupancy Rate	Average Length of Stay (days)
Inpatient pediatrics	\$ 879,608	10256	\$86	75%	11.2
Inpatient medical ward	\$ 1,667,872	12368	\$135	72%	27.4
Inpatient surgical ward	\$ 2,164,147	13972	\$155	118%	16.6
Inpatient NICU	\$ 791,242	4219	\$188	65%	11.0
Inpatient isolation ward	\$ 218,081	2787	\$78	70%	30.0
Inpatient antepartum ward	\$ 364,088	2636	\$138	61%	7.4
Inpatient postpartum ward	\$ 498,118	12010	\$41	167%	8.5

<sup>5</sup> This department do a lot of education work (81806 individuals counselled) and immunizations (27982 patients). In this unit cost we only accounted for the 1995 nutritional visits that were done, hence the expensive unit cost

<sup>6</sup> This is a new service that was built in 2014 and the activity is not yet important hence an expensive unit cost.

<sup>7</sup> Emergency department did not have disaggregated data to distinguish between A&E inpatient and A&E outpatient, hence no data on inpatient days.

<sup>8</sup> This represent the number of deliveries both normal deliveries and C-sections.

## Discussion

Based upon these findings, the following key recommendations are offered to support the hospital administration's efforts to move strategically toward being financially sustainable.

### Budgeting

Accurate and realistic budgets that align with HUM's mission and strategic plan are critical.

*To what extent, financially, is the hospital's current cost structure fully accounted for in its budget planning?*

As this was the first complete year of HUM's operation, budgets provided to the study team were theoretical; for example, some line items were budgeted to be the same every month. Obviously, this will not be the case in practice as generally speaking, one would expect health service utilization tends to have some seasonality and therefore operating expenses would be expected to fluctuate from month to month. As more HUM expenditure and service delivery data become available, it will be possible to budget more accurately using the MASH.

*What specific areas of expenditures may currently be off-budget and what level of expenditure does this account for?*

Pharmaceuticals and medical supplies are a major cost driver but full information on their unit costs was not available at the time of data collection. The study team, in preparing the MASH template, has identified nearly all of these unit costs so that in future HUM will be able to accurately account for this resource use. Furthermore, HUM needs to distinguish between donated and purchased resources. Donated resources should be fully accounted for so that accurate resource needs and utilization are captured. Given HUM's commitment to its indigent population, fundraising will be a necessary part of its financial strategy. Being able to accurately quantify what resources HUM needs will be helpful as it approaches different donors who may have different priorities for funding or wish to make in-kind contributions, for example, pharmaceuticals vs. equipment vs. fuel or other resources.

Depreciation/capital costs were also found to be a major cost driver. Budgets must account for these costs to ensure that maintenance and replacement funding is set aside. If charging for sophisticated radiological services is part of a revenue generation strategy, then maintaining and replacing the required equipment is critical.

### Management

Accurately measuring and consistently tracking efficiency indicators as well as having the systems to produce these measures is critical for implementing sound management of the resources available to the facility and demonstrating this to funders.

*How does resource use change over time; is the facility realizing economies of scale as it increases its level of service delivery?*

All of the average unit costs presented in this analysis are subject to change because HUM is still going through its initial start-up phase and service delivery levels and expenditures are yet to stabilize. Once these variables have stabilized, HUM will need to go through a review phase to see how it might allocate its resources more efficiently. This study's modelling of its cost structure will assist HUM in this process. This analysis includes the types of measures that, if monitored over time, can provide information on where economies of scale are being realized because unit costs should be decreasing, at least in the medium term. However, it is important to point out that the unit cost estimation should be further refined to be more specific to the types of services (for example, the types of tests) as well as the types of patients who receive services from a cost center that delivers services to both internal and external patients. For example, it will be important to be able to differentiate between types and numbers of



laboratory services used by patients receiving medical care from HUM versus laboratory services used by referral patients not seen by HUM clinical staff.

*How does resource use compare with other facilities (where data are available)?*

Currently, the study team is not aware of similar costs data being available for other tertiary-level facilities in Haiti. This makes cost comparisons impossible. However, as noted previously, primary health care services are an important output of HUM and these cost data for Haiti are available for comparison. Such comparisons would probably be of interest to MSPP as it explores options for providing primary care as efficiently as possible.

Primary care at HUM as a national referral and teaching hospital was integral to the phasing approach to opening services at the hospital. HUM's mandate included ensuring access to community-linked primary care services for the currently underserved target catchment area for primary care services. During the second phase of operations at HUM there will be a transition of primary care services to the former CDI location, reinforcing an integrated system for primary care management and referral for secondary and tertiary level care at HUM. Therefore in terms of cost comparison data, the transition of primary care services to the CDI location and resulting costs of care would represent the most/a more accurate measure for costs of primary services through HUM in the long term.

*Do the current information systems provide the data required to track efficiency?*

HUM has several sophisticated information management systems. Therefore, it should not be difficult for it to ensure that the appropriate data are available in order to provide more specific unit cost estimates for the future. For example:

- For future revenue generation purposes, it will be important for systems to be able to differentiate between indigent and non-indigent populations receiving care to ensure that indigent populations remain able to access care free of charge and that this care is adequately budgeted while non-indigents are charged appropriately. This distinction is key to effective revenue generation policies that align with HUM's mission of commitment to its local populations.
- Several units within the hospital will need to be able to aggregate and disaggregate services more accurately. Examples of this are L&D, where service delivery data are reported by the number of uniquely identified patients rather than the number of services, the latter of which makes it impossible to determine when a single patient uses the service more than once and the true number of visits. Similarly, several inpatient units currently have occupancy rates of more than 100 percent because the utilization data are rounded up to whole bed days and don't capture situations such as day surgery recovery, or others in which more than one patient occupies a bed in one day.

The ability to accurately determine unit costs will become even more critical as financing strategies for HUM are developed and revenue is collected from out-of-pocket fees, insurance companies, and government contracting.

## Planning

HUM recognizes the need to move toward a sustainable financial position.

*Given their current cost structures and recent service delivery levels, which departments/services are anticipated to have unit cost structures that may be appropriate for cross-subsidization to support a revenue generation strategy without posing access to care barriers to its focal indigent population?*

Revenue generation opportunities: This analysis identified some of the major opportunities for revenue generation that HUM has at hand, including the use of its laboratory, operating room, and radiology facilities. Given the cost of the equipment being used, it will be important for HUM to market these facilities and use them to their maximum capacity. In addition, given that providing medical education is

part of its mission, these facilities might enable HUM to provide (tuition fee supported) education to non-Haitian medical trainees from the Caribbean.

**Cross-subsidization opportunities:** Although HUM is still in its start-up phase, it already serves patients from a wide variety of socioeconomic groups, so it is reasonable to plan for some cross-subsidization between those who are able to pay for services and those who are unable to pay. Examples of services in this group might be radiology, physiotherapy, and surgical services; their costs are too high to expect indigent populations to pay out of pocket, but wealthier patients may want to take advantage of HUM's sophisticated, high-quality facilities and can pay to do so. Similarly, low-cost services may be marked up and priced to cross-subsidize more expensive services.

**Results-based financing (RBF) contracting:** Haiti is currently witnessing the implementation of at least one RBF pilot scheme to support the provision of maternal and neonatal child health. Given HUM's commitment to providing primary health care, it may be possible for the hospital to participate in the RBF schemes. Understanding the resources required to provide the significant amount of primary health care delivered by HUM would be important for setting contract prices (particularly if RBF payments are lower than HUM costs.)

**Formal health insurance schemes:** Although private insurance coverage is very low in Haiti (1 percent<sup>9</sup>) it is highest in the Port-au-Prince region geographically close to HUM. Therefore, understanding its cost structure allows HUM to potentially contract with formal insurance schemes. These schemes include the state-run Office d'Assurance Accidents du Travail; Maladie et Maternité (OFATMA), a provider of worker's compensation program; the Office Assurance Véhicule Contre Tiers (OAVCT), a state-run provider of third party vehicle insurance; and private insurance companies.

HUM is an exciting opportunity to establish a level of quality care in Haiti comparable to that of much wealthier countries for a population that has previously experienced insurmountable barriers to even basic care. Ensuring that the facility has the resources it needs to continue to deliver this care is an important responsibility that will require the involvement of many stakeholders. By understanding its cost structure and being able to discuss its resource needs in evidence-based terms, the administration of HUM will be able to clearly and accurately estimate and express these needs to the many potential stakeholders who are increasingly seeking value for money for their contributions, and to take advantage of the more sophisticated health financing contracting opportunities that are being explored by the Government of Haiti.

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<sup>9</sup> Preliminary Living Standards Measurement Survey data, personal communication

# I. BACKGROUND

USAID's Health Finance and Governance Project (HFG) was asked by USAID Haiti to work with *Zanmi Lasante*/Partners in Health (ZL/PIH) to conduct a costing study of the recently opened Hôpital Universitaire de Mirebalais.

## I.1 Haiti

The Republic of Haiti occupies the western portion of the island of Hispaniola in the Caribbean with a population of approximately 10 million people 44% of which are under 18 years of age. The Human Development Index ranks Haiti at the 161<sup>st</sup> position placing<sup>10</sup> it in the lowest fifth of that table and reflecting its weak economy. Total Health Expenditure for the period 2011-2012 is estimated at 32.4 billion Haitian Gourdes (HTG) or US\$771 million<sup>11</sup>. Health spending per capita over this period is approximately US\$75.9 which is above average for a low income country. However, the country's health expenditure is largely made up of foreign aid which accounted for 53% (bilateral and multilateral donors) of total health expenditure over 2011-2012 and this poses future challenges for all levels of service delivery but particularly the hospital level. Over the same period, total hospital expenditure was estimated to be HTG 8.59 billion (US\$200 million) but direct foreign transfers account for 76% of that expenditure by source of revenue and government accounts for less than 4%.

## I.2 HUM

The *Hôpital Universitaire de Mirebalais* (HUM) was built by the combined efforts of the Ministry of Public Health and the Population (MSPP), and Partners in Health with its sister organization in Haiti, *Zanmi Lasante* (PIH/ZL). Many donors contributed to the completion of this hospital complex, with an estimated investment of over US \$23 million. The locating of HUM in Mirebalais in the department *Central*<sup>12</sup> (about 50 Km from Port au Prince) addresses an acute need in area where the population's health status and access to care are poor. This project was completed in response to an urgent request from the MSPP, in the aftermath of the 2010 earthquake that destroyed several key elements of the infrastructure for basic health and education, such as the Hospital of the National University of Haiti (HUEH) in Port au Prince.

HUM provides primary care to 185, 000 inhabitants in Mirebalais, Savanette and Saut-d'Eau and secondary care to 451,000 inhabitants from communes extending from most of Central Plateau, lower-Artibonite and upper-Ouest. Tertiary care referral is offered to patients from a broader population of approximately 3.3 million inhabitants, covering the entire center of Haiti including the suburbs of Port-au-Prince. HUM also delivers medical education to nurses, medical students as well resident physicians. The hospital was built and equipped to meet the demands for quality care for all users, thus playing a major role in the MSSP's strategic plan to assure the decentralized offering of high quality care in Haiti.

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<sup>10</sup> Human Development Report 2013, <http://hdr.undp.org/en/2013-report>

<sup>11</sup> Haiti National Health Accounts, 2011/12, forthcoming.

<sup>12</sup> One of Haiti's' 10 geo-political regions



As a result of its broad mission, the hospital is unique in that it provides basic primary health care services as well as high end radiology, surgical and medical services such as MRI scans and oncology. Furthermore, beyond an initial registration fee of 50HTG (US\$1.10) services are provided free. However, the reality is that post-earthquake swell of funding available for health has peaked and the hospital needs to understand its cost structure in order to increase the efficiency with which it uses its available resources as well as to design an effective strategy for financing the hospital in the long term.

## 2. OBJECTIVES

### 2.1 Objectives

The primary objectives of the analysis are to estimate and analyze the cost structure of the newly opened hospital with a view to informing budgeting, planning, and management efforts as the hospital moves strategically towards a long-term financing strategy. This strategy should align with national health financing priorities to ensure the long-term viability of the HUM model in Haiti's public health sector.

### 2.2 Rationale

A costing analysis can provide answers to specific questions within each of these three areas that are related to long term sustainability.

System	Question	Relevance to Sustainability
Budgeting	<ul style="list-style-type: none"> <li>To what extent, financially, is the hospital's current cost structure fully accounted for in its budget planning?</li> <li>What specific areas of expenditures may currently be off-budget and what level of expenditure does this account for?</li> </ul>	Having these cost structure data allows HUM to increase the accuracy of its future budgets to ensure that it has accurate estimates of its future funding needs.
Management	<ul style="list-style-type: none"> <li>How does resource use change over time; is the facility realizing economies of scale as it increases its level of service delivery?</li> <li>How does resource use compare with other facilities (where data are available)?</li> <li>Do the current information systems provide the data required to track efficiency?</li> </ul>	Having accurately measured and consistently tracked indicators of efficiency and the systems to produce these measures is critical for implementing sound management of the resources available to the facility and demonstrating this efficiency to funders.
Planning	<ul style="list-style-type: none"> <li>Given their current cost structure and recent service delivery levels, which departments/services are anticipated to have unit cost structures that may be appropriate for cross-subsidization to support a revenue generation strategy without posing access to care barriers to its focal indigent population?</li> </ul>	<p>Having an understanding of cost structure allows HUM to determine:</p> <ul style="list-style-type: none"> <li>Revenue generation opportunities</li> <li>Cross-subsidization opportunities</li> </ul> <p>Having an understanding of cost structure informs HUM's response to increasingly sophisticated health service purchasing mechanisms like:</p> <ul style="list-style-type: none"> <li>Results-based financing contracting</li> <li>Health insurance schemes</li> </ul>



### 3. METHODOLOGY

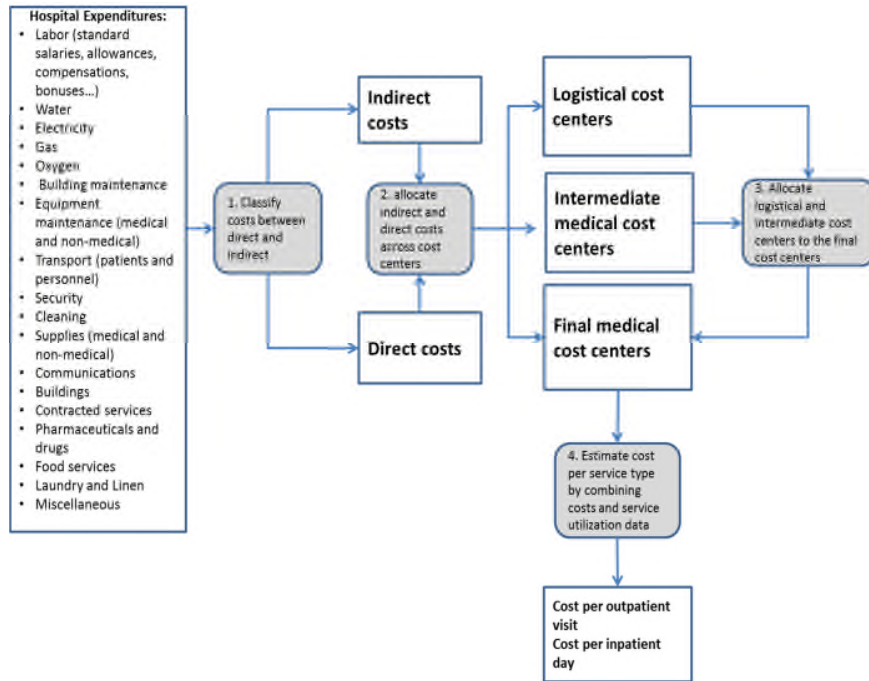
This study uses a tool for costing hospital services called the Management Accounting System for Hospitals (MASH) (Partners for Health Reform *plus* 2004). This tool uses a top-down approach for allocating costs, with the intent that all hospital costs should end up in the departments (also called cost centers) that ultimately provide “final” services to patients, either as inpatients or outpatients. The first step in the MASH process is to define cost centers. A cost center is the smallest hospital unit that provides one kind of service, where costs are accumulated or assigned. Through discussions with the hospital staff and administrators, cost centers were defined in a way that was useful to managers and other final users and reflected both how departments are currently organized as well as how hospital data is stored, Figure 1. Hospital departments were classified into three types: “administrative and logistics,” “intermediate medical services,” and “final medical services.”

**Figure 1: Cost Centers utilized in the MASH set up for HUM**



The method of allocating costs follows a “step-down” process, starting with the administrative and logistical cost centers, then the intermediate cost centers. Figure describes the cost allocation process utilized by the MASH. All line item costs were allocated using this four step process. A detailed description of the relevant assumptions used can be found in Annex C.

**Figure 2: Cost allocation process**



Overhead services and physical building services are included in the administrative and logistical services. Intermediate services include diagnostic services as well as pharmacy and mortuary services. The final medical services include outpatient, emergency and inpatient services by ward. These final medical services were used for purposes of estimating unit costs that include the distributed administrative/logistical and intermediate services costs. This analysis then provided an estimate of the cost of an inpatient bed-day and the cost of an outpatient visit.



## 4. FINDINGS

The findings from the MASH analysis are presented in four sections. In the first section, we look at total costs and the line items that account for the largest proportions of those costs: Direct costs (labor, pharmaceuticals and medical supplies, and equipment depreciation) and indirect costs. The second section will look at the results of the key intermediate cost centers and their costs including pharmacy, operating room, laboratory, radiology etc. The third section looks at the cost structure of the final medical cost centers and the final section presents the unit cost per output for each final medical service by inpatient and outpatient departments.

### 4.1 Total costs

For 2014, operating costs at HUM were US\$15,267,208. This figure includes the value of all resources used<sup>13</sup>, not just those included in the reported operating expenditure: depreciation of capital costs for building and equipment are included in these costs as well as donated drugs and equipment. If we don't consider any depreciation costs<sup>14</sup>, the yearly operating costs of HUM drop to US\$ 13,173,451. This finding highlights the sophistication and newness of the facility. For example, HUM is renowned as being one of the largest solar powered hospitals in the world.

**Table I: Hospital total costs for 2014 in US\$**

All Costs	US\$	%
Labor costs	\$ 7,501,112	49.1%
Pharmaceuticals and medical supplies	\$ 1,691,797	11.1%
Depreciation of equipment	\$ 857,290	5.6%
<b>Direct costs</b>	<b>\$ 10,050,198</b>	<b>65.8%</b>
<b>Indirect costs</b>	<b>\$ 5,217,010</b>	<b>34.2%</b>
<b>Total costs</b>	<b>\$ 15,267,208</b>	<b>100%</b>

Approximately 66% of HUM's expenses can be allocated directly to cost centers (Figure ). This level of direct costs provides confidence in the cost estimation for all hospital's cost centers because fewer costs (indirect costs) needed to be allocated.

<sup>13</sup> Except the value of medical staff who come to work as volunteer at the hospital throughout the year.

<sup>14</sup> Total depreciation would include depreciation of medical equipment (direct cost, \$ 857,290 ) as well as vehicles, building and energy systems (indirect costs, \$1,236,467)

**Figure 3: Breakdown of total costs by Direct/Indirect**

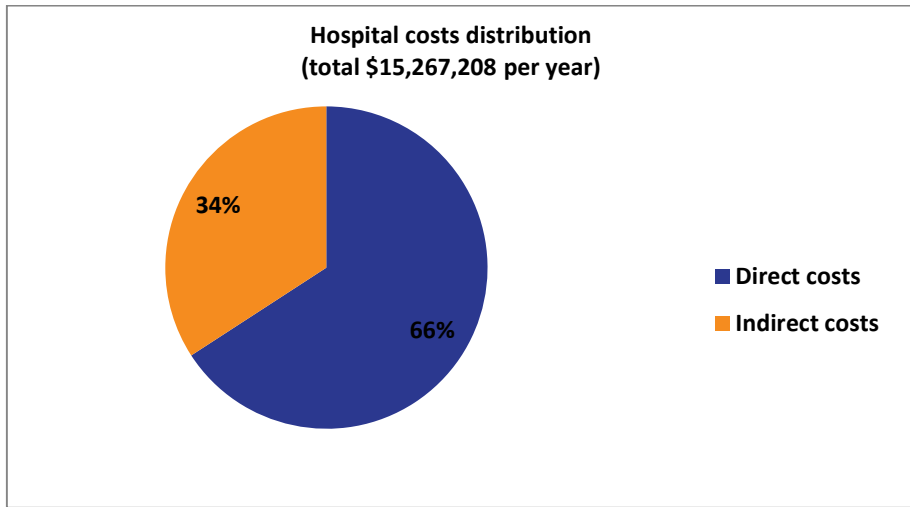
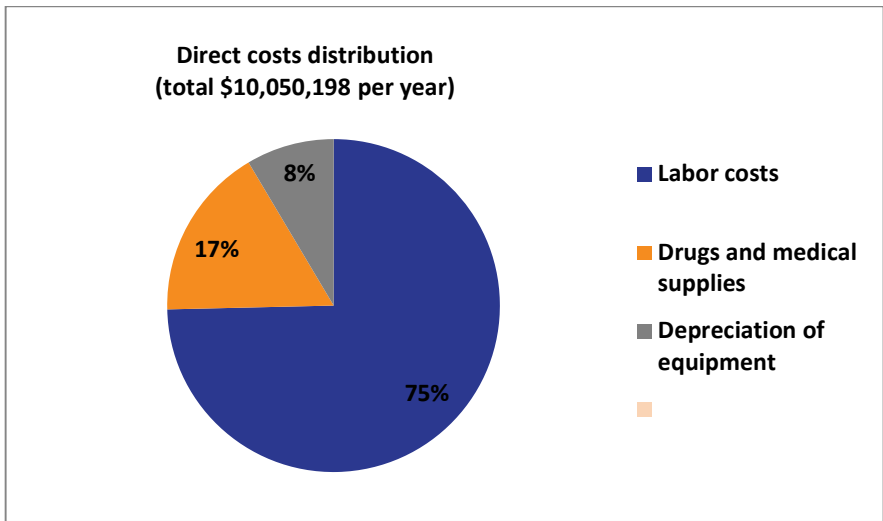


Figure , breaks down direct costs into the major cost categories, labor, pharmaceuticals/medical supplies and depreciation of medical equipment. In Figure , we see that labor accounts for 75 percent of the direct costs, pharmaceutical drugs/medical supplies 17 percent. The 8 percent accounted for by depreciation refers to depreciation on medical equipment only. Each of these is discussed next in more detail.

**Figure 4: Breakdown of direct costs**

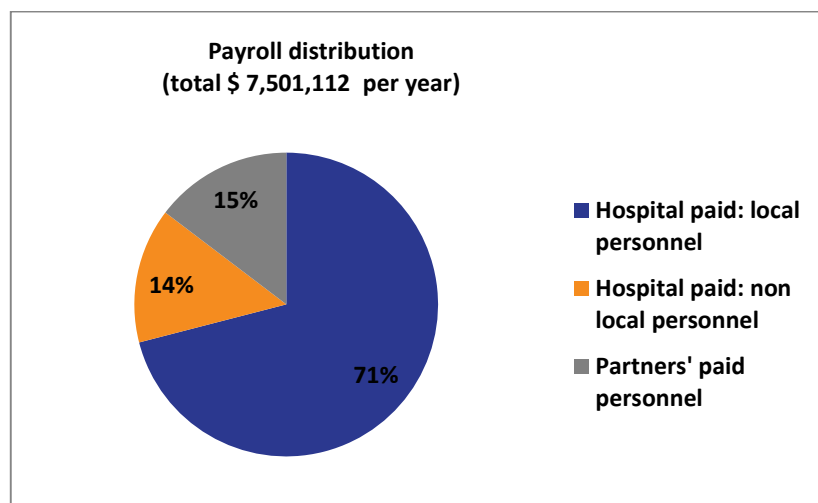


### 4.1.1 Labor

Personnel wages and salaries were the largest proportion of the direct costs at about 75 percent (approximately US\$ 7,501,112 a year) and this is reflective of staffing models specific to tertiary care facilities where clinical specialists are direct providers of health services to treat and diagnose common to complex illness. As a major cost driver, labor cost controls or efficiency measures targeted at personnel costs will be important to consider in the future. However, the hospital management is limited in its ability to influence personnel costs at the current time and it should be noted that many positions are still being filled, including some specialist doctors, because the hospital is still in an

expansion phase. A few staff are paid for by Partners in Health in Boston that are complementary to the locally trained team in specialties where additional capacity is needed. However, most of the payroll (71%) is covered by the hospital, see Figure .

**Figure 5: Breakdown of payroll costs**



#### 4.1.2 Pharmaceuticals/medical supplies

Pharmaceuticals and medical supplies account for US\$ 1,691,797 per year. The relatively high proportion of costs accounted for by drugs and medical supplies reflects the use of sophisticated equipment at HUM that typically requires relatively sophisticated medical supplies. Aside from pharmacy, the operating rooms account for 11 percent of cost, followed by dental clinic (10 percent), Laboratory (9 percent) and Accident & Emergency (7 percent). Pharmaceutical and medical supply costs are shown in detail in Table 2.

**Table 2: Pharmaceutical and medical supply costs by cost center in US\$**

Cost center	Drugs and medical supplies	
	Value in US\$	% of total
Pharmacy	434,296	26%
Operating Room	184,618	11%
Outpatient Dental clinic	172,721	10%
Laboratory	151,330	9%
Accident & Emergency	117,464	7%
All other cost centers	631,368	37%
Total	1,691,797	100%

### 4.1.3 Depreciation and Equipment costs

Capital costs represent the value of fixed assets used in the delivery of services. These are an important component of hospital costing, particularly when the full cost of delivering services is required, for example, for guidance in setting up user fees or to contract with insurance. Capital depreciation costs are not trivial; they represent 8 percent of direct cost (medical equipment only) and 6 percent of total costs.

The cost analysis for HUM does include capital costs; because the hospital opened recently it was possible to obtain the value of fixed assets for the analysis. However, the hospital had not maintained a register of all fixed assets nor are the values of the assets currently in use easily retrievable. An attempt to estimate the cost of fixed assets proved time-consuming; it involved a team of data collectors taking an inventory of equipment for every department and then the study team obtaining price estimates of the costs of those items. The total value of that equipment was then used in order to calculate a yearly depreciation amount that was added to the other direct costs, to arrive at a more accurate estimate of the total costs of running the hospital. For the depreciation calculations we used a life time of 5 years<sup>15</sup> for the equipment at the recommendation of the hospital.

A closer look at the inventory results in terms of total value of the equipment in Table 3 gives insights on the costs centers with the most expensive medical equipment. The radiology department has by far the highest proportion of the equipment value, as HUM is one of the few hospitals in the country having a scanner. The operating room suite is also well equipped and denotes of the surgical potential of HUM. The OB/GYN department also has a high amount of equipment as it is a referral hospital for OB/GYN patients in the region.

**Table 3: Equipment total value by cost center in US\$**

Cost Centers	Equipment	
	value in US \$	% of total
Radiology	1,249,396	29%
Operating Room	538,950	13%
Inpatient OBGYN (labor and delivery)	307,549	7%
All other cost enters	2,190,554	51%
<b>Total</b>	<b>4,286,449</b>	<b>100%</b>

### 4.1.4 Indirect costs

A total of \$5,217,010 of indirect costs per year is estimated as the cost of resources that are used across all cost centers. The largest of these costs are the depreciation of buildings, vehicles and energy systems (\$1,236,467). Energy is also a substantial indirect cost (\$908,767) as well as Food (\$640,920).

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<sup>15</sup> HUM administration requested that the study team assume five years of useful life for medical equipment, which may be overly conservative and certainly leads to high depreciation costs estimates.

Other line items include office supplies, other staff expenses, transport, communications and other functioning costs (see annex A for more details on the line items).

Following the grouping of each department's costs into direct (labor, drugs and supplies, equipment) and indirect costs, the administrative and logistical services' costs were then allocated between intermediate and final medical cost centers. The resulting intermediate medical services' costs were then allocated to final medical costs center to obtain the final medical cost centers' "Full costs", see Annex B for details on this process and Annexes D through E for the intermediary results.

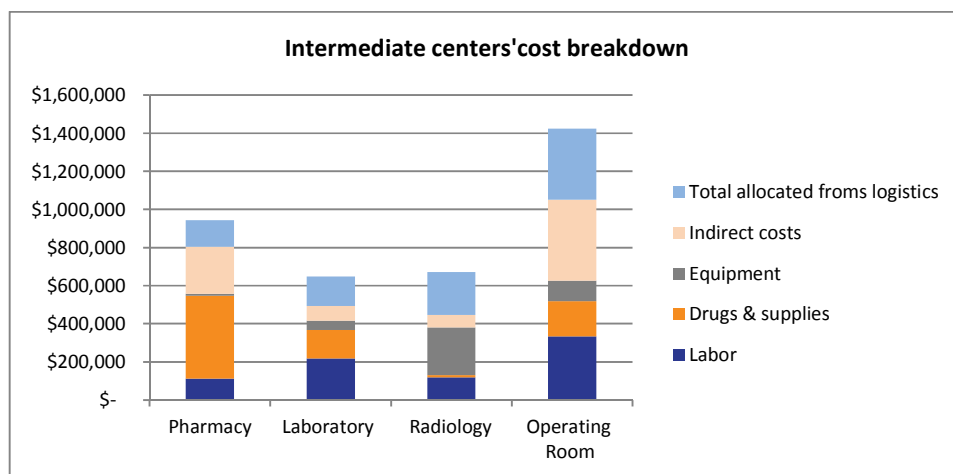
## 4.2 Key intermediate cost centers

The step-down allocation of costs in the MASH tool does not directly report the final costs associated with intermediate cost centers, which may be as important for hospital management to understand as the breakdown for the final cost centers. To provide additional cost information, this section will focus on the following most expensive intermediate cost centers: Pharmacy, Laboratory, Radiology and Operating Room.

There are three types of costs that make up the total cost for each center: direct costs, indirect costs, and allocated costs from logistical cost centers. For the intermediate cost centers, the direct costs include labor, equipment and drugs and medical supplies. The indirect costs consist of utilities, and all other related shared costs (for example stationary). Finally, the costs allocated from all of the logistical and administrative cost centers are also included.

Figure demonstrates that these allocated costs are a significant part of the total cost for the intermediate medical cost centers. For pharmacy and laboratory they account for respectively 15 and 24 percent of the total cost while for radiology it is 33 percent and for the OR suite it is 26 percent.

**Figure 6: Breakdown of costs for intermediate cost centers**



The hospital management might also be interested in the unit cost of output for the intermediate medical cost centers. Using the activity reported by the hospital, those unit costs are shown in

Table 5. Particular care needs to be taken when interpreting these unit costs, depending on the nature of the cost center: single output versus multiple outputs.

Ultrasound, mortuary and blood bank outputs can be considered as homogenous units and as such the costs below are the real unit costs. However, laboratory, radiology, operating room and physiotherapy departments each produce a range of heterogeneous outputs where each output has a different level of resource consumption. For example, the laboratory performs different types of test that require different equipment, reagents or amounts of staff time: an HIV test is different from a biopsy testing for cancer. The radiology department does both X-rays and MRI scanning each of which are very different in terms of cost of the required equipment and materials used. Similarly the time spent on different surgeries carried out in the OR is different; so is the type of staff time and medical supplies used for them. For physiotherapy, different patients need different number of/or longer sessions depending on their condition. Therefore, because of these considerations, the unit costs for laboratory, radiology, operating room and physiotherapy should be interpreted as being ‘the average cost of a unit of output from these cost centers’ and not ‘the average cost of any one service’.

**Table 4: Unit cost for intermediate cost centers**

<b>Intermediate Medical Services</b>	<b>Cost after logistical services allocation</b>	<b>Volume of services</b>	<b>Average Unit Cost</b>
			<b>Per day of conservation</b>
Morgue	\$ 39,199	4,126	\$ 10
			<b>Per test</b>
Laboratory	\$ 647,003	330,476	\$ 2
			<b>Per exam</b>
Radiology	\$ 671,914	26,616	\$ 25
			<b>Per unit of blood</b>
Blood Bank	\$ 171,017	1,783	\$ 96
			<b>Per surgery</b>
Operating Room	\$ 1,424,491	2,998	\$ 475

### 4.3 Final medical services cost structure

This section presents the cost structure of the final medical services. For HUM we found that outpatient care accounts for 34 percent or just over a third of total hospital costs. Typically that figure is close to a quarter or a fifth. However this finding reflects the mission of HUM which includes the delivery of

primary health care to its indigent local population. Figure shows the cost of inpatient and outpatient care broken into major inputs, salaries and drugs/supplies. For both outpatient and inpatient cost centers, salaries and drugs/medical supplies make up the majority of allocated costs at around 60 percent.

**Figure 7: Summary cost structure for inpatient and outpatient care**

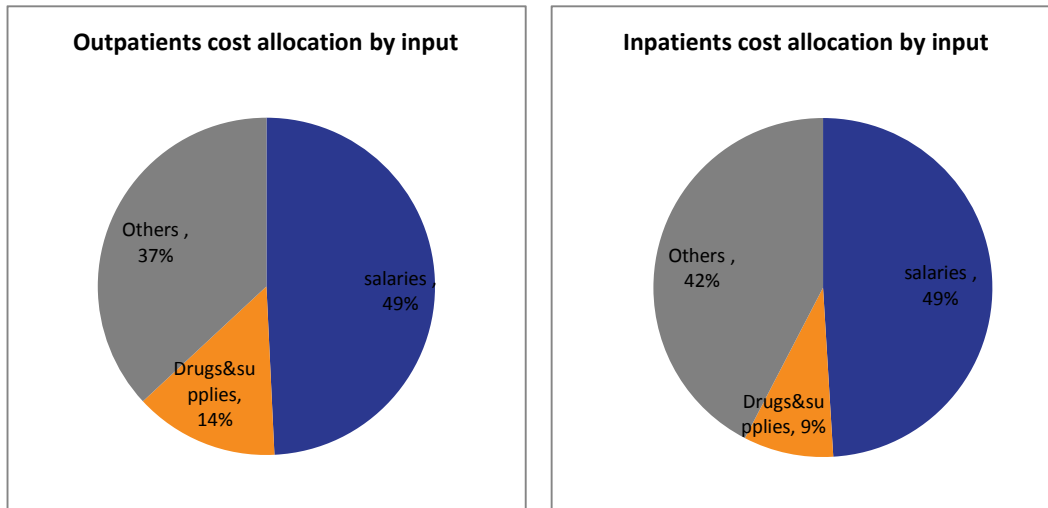


Table 5 (outpatient units) and Table 6 (inpatient units) show the cost structure in more detail. General outpatient care was the largest cost center followed by Women health and Oncology. The outpatient Physiotherapy/Rehabilitation reported the highest proportion spent on salaries with 67 percent which can be explained by the fact that very little drugs and supplies were reported for this cost center.

**Table 5: Cost allocations by input for final medical cost centers, outpatients**

Final Cost centers	Full cost	Salaries	%	Drugs and supplies	%	Other	%
Outpatient General	\$1,321,275	\$573,971	43%	\$197,013	15%	\$550,291	42%
Outpatient Dental clinic	\$488,175	\$94,024	19%	\$256,698	53%	\$137,452	28%
Outpatient Community health	\$775,163	\$496,525	64%	\$4,087	1%	\$274,552	35%
Outpatient women health	\$982,207	\$533,521	54%	\$127,904	13%	\$320,782	33%
Outpatient Pediatrics	\$263,032	\$124,603	47%	\$14,487	6%	\$123,942	47%
Outpatient Mental health	\$66,235	\$25,933	39%	\$163	0%	\$40,138	61%

Outpatient Oncology	\$867,227	\$379,907	44%	\$163,554	19%	\$323,766	37%
Physiotherapy/rehabilitation	\$469,408	\$315,717	67%	\$4,719	1%	\$148,971	32%
<b>Total</b>	<b>\$5,232,722</b>						

Surgery, A&E, medicine and L&D were the largest departments in terms of costs amongst the inpatient units and each of them is larger, in terms of cost, than any of the outpatient units. All inpatients services have a higher proportion spent on salaries than on drugs and this difference in cost structure is typical for inpatient units.

**Table 6: Cost allocations by input for final medical cost centers, inpatients**

Final Cost centers	Full cost	Salaries	%	Drugs and supplies	%	Other	%
Accident & Emergency	\$2,041,063	\$1,036,809	51%	\$238,199	12%	\$766,056	38%
Labor and Delivery	\$1,410,267	\$636,241	45%	\$141,982	10%	\$632,043	45%
Inpatient Pediatrics	\$879,608	\$416,816	47%	\$55,308	6%	\$407,483	46%
Inpatient Medical Ward	\$1,667,872	\$829,660	50%	\$153,312	9%	\$684,900	41%
Inpatient Surgical Ward	\$2,164,147	\$1,232,650	57%	\$139,692	6%	\$791,805	37%
Inpatient NICU	\$791,242	\$378,947	48%	\$86,565	11%	\$325,730	41%
Inpatient Isolation ward	\$218,081	\$65,140	30%	\$22,462	10%	\$130,478	60%
Inpatient Prenatal ward	\$364,088	\$153,577	42%	\$32,172	9%	\$178,339	49%
Inpatient Postnatal ward	\$498,118	\$207,070	42%	\$53,478	11%	\$237,570	48%
<b>Total</b>	<b>\$10,034,486</b>						

#### 4.4 Final medical services cost per output

The last step in the cost structure analysis is to use the cost estimate data in combination with service utilization data to give average costs per output for each unit. The activity data was provided by the hospital: number of outpatient visits, number of admissions and number of inpatient days. The data on the number of beds was extracted from the equipment inventory data and from documents provided by the hospital. The bed occupancy rate were calculated by multiplying the total number of beds per ward by 360 to get the total possible inpatient days per year; then the number of reported inpatient days was divided by the number of possible inpatient days. The average length of stay per ward was calculated as the ratio of number of inpatient days over number of admissions.



These unit cost results should be interpreted with a lot of caution: their calculation is **very** sensitive to hospital activity. Furthermore, for some cost centers it is very difficult to separate the different services provided. Whenever different services uses different amounts of resources from the same cost center, simply dividing the total cost by the number of units will give inaccurate unit cost estimates. For example the outpatient oncology's number of outpatient visits includes patients who came for follow-up visits and those who came for a chemotherapy session. Unless more detailed data are made available on the consumption of resource for each type of service (visit vs. chemotherapy) it is not possible to provide a more accurate determination of how much of the total cost of the oncology department can be allocated to visits versus chemotherapy sessions and therefore what the corresponding unit cost for each type of service may be.

Table 7 shows the cost per outpatient visit across the outpatient units. The general outpatient unit follows a typical primary care high volume, low cost pattern (although from a sound research perspective it would be necessary to compare this with costs from a primary care center to determine whether it is accurate to refer to \$17 per visit as being low.)

**Table 7: Outpatient unit costs by final cost centers**

Final cost centers	Full cost	Number of visits	Cost per visit
Outpatient General	\$1,321,275	78,007	\$17
Outpatient Dental clinic	\$488,175	10,102	\$48
Outpatient Community	\$775,163	1,995 <sup>16</sup>	\$389
Outpatient women health	\$982,207	17,771	\$55
Outpatient Pediatrics	\$263,032	12,115	\$22
Outpatient Mental health	\$66,235	1,738	\$38
Outpatient Oncology	\$867,227	6,553	\$132
Rehabilitation/Physiotherapy	\$469,408	1,033 <sup>17</sup>	\$454
Accident & Emergency	\$2,041,063	14,629	\$140
Labor and Delivery	\$1,410,267	3,082 <sup>18</sup>	\$458

The Accident and Emergency department is currently not collecting data that allow for any distinction to be made between patients kept for observation and those who are discharged immediately after treatment. However this unit does 'admit' some patients for observation and have approximately 30 beds that may be used. The activity found in table 7 is then a mix of patients kept for observation (1 or 2 days) and those discharged immediately.

Table 8 presents the average output costs for inpatient care. We see several units with bed occupancy rates above 100% because the available data are not yet disaggregated enough to allow us to

<sup>16</sup> This department do a lot of education work (81806 individuals counselled) and immunizations (27982 patients). In this unit cost we only accounted for the 1995 nutritional visits that were done, hence the expensive unit cost

<sup>17</sup> This is a new service that was built in 2014 and the activity is not yet important hence an expensive unit cost.

<sup>18</sup> This represent the number of deliveries both normal deliveries and C-sections.

differentiate between beds that two different patients have occupied on the same day. For example, post day-surgery patients may use surgical ward beds for recovery and be discharged. If this happens twice in one day for a single bed then this is counted as two bed days according to the available data rather than half a bed day each. Similarly with the postpartum ward that may stabilize and discharge more than one patient per bed per day, the data are not able to differentiate between a full bed day and a half bed day, rather both situations are counted as one bed day.

**Table 8: Inpatient Unit costs by final cost centers**

<b>Final cost centers</b>	<b>Full cost</b>	<b>Number of inpatient days</b>	<b>Cost per inpatient day</b>	<b>Bed Occupancy rate</b>	<b>Average length of stay (days)</b>
Inpatient pediatrics	\$ 879,608	10256	\$86	75%	11.2
Inpatient medical ward	\$ 1,667,872	12368	\$135	72%	27.4
Inpatient surgical ward	\$ 2,164,147	13972	\$155	118%	16.6
Inpatient NICU	\$ 791,242	4219	\$188	65%	11.0
Inpatient isolation ward	\$ 218,081	2787	\$78	70%	30.0
Inpatient antepartum ward	\$ 364,088	2636	\$138	61%	7.4
Inpatient postpartum ward	\$ 498,118	12010	\$41	167%	8.5

Results presented here are the summary and key findings from the analysis. More detailed results are presented and described in Annex D of this report along with all the intermediate analysis results. While many of the assumptions that the study team were required to make have been discussed here, Annex C contains a complete list of the assumptions used to complete the step down allocation of costs.

## 5. DISCUSSION

This section of the report takes the resulting cost structure described in the results section and uses these data to provide responses and recommendations for each of the subject areas laid out in the study objectives as they support the hospital administration's efforts to move strategically towards being financially sustainable.

System	Question	Relevance to sustainability
Budgeting	<ul style="list-style-type: none"> <li>To what extent, financially, is the hospital's current cost structure fully accounted for in its budget planning?</li> <li>What specific areas of expenditures may currently be off-budget and what level of expenditure does this account for?</li> </ul>	Having these cost structure data allows HUM to increase the accuracy of its future budgets to ensure that it has accurate estimates of its future funding needs.
Management	<ul style="list-style-type: none"> <li>How does resource use change over time; is the facility realizing economies of scale as it increases its level of service delivery?</li> <li>How does resource use compare with other facilities (where data are available)?</li> <li>Do the current information systems provide the data required to track efficiency?</li> </ul>	Having accurately measured and consistent tracked indicators of efficiency and the systems to produce these measures is critical for implementing sound management of the resources available to the facility and demonstrating this to funders.
Planning	<ul style="list-style-type: none"> <li>Given their current cost structure and recent service delivery levels which departments/services are anticipated to have unit cost structures that may be appropriate for cross subsidization to support a revenue generation strategy without posing access to care barriers to its focal indigent population?</li> </ul>	<p>Having an understanding of cost structure allows HUM to determine</p> <ul style="list-style-type: none"> <li>revenue generation opportunities</li> <li>cross subsidization opportunities</li> </ul> <p>and how to respond to increasingly sophisticated health service purchasing mechanisms like</p> <ul style="list-style-type: none"> <li>results based financing contracting</li> <li>health insurance schemes</li> </ul>

### Budgeting

Accurate and realistic budgets that align with HUM's mission and strategic plan are critical.

*To what extent, financially, is the hospital's current cost structure fully accounted for in its budget planning?*

As this was the first complete year of HUM's operation, budgets provided to the study team were theoretical; for example, some line items were budgeted to be the same every month. Obviously, this will not be the case in practice as generally speaking, one would expect health service utilization tends to have some seasonality and therefore operating expenses would be expected to fluctuate from month to month. As more HUM expenditure and service delivery data become available, it will be possible to budget more accurately using the MASH.

*What specific areas of expenditures may currently be off-budget and what level of expenditure does this account for?*

Pharmaceuticals and medical supplies are a major cost driver but full information on their unit costs was not available at the time of data collection. The study team, in preparing the MASH template, has identified nearly all of these unit costs so that in future HUM will be able to accurately account for this resource use. Furthermore, HUM needs to distinguish between donated and purchased resources. Donated resources should be fully accounted for so that accurate resource needs and utilization are captured. Given HUM's commitment to its indigent population, fundraising will be a necessary part of its financial strategy. Being able to accurately quantify what resources HUM needs will be helpful as it approaches different donors who may have different priorities for funding or wish to make in-kind contributions, for example, pharmaceuticals vs. equipment vs. fuel or other resources.

Depreciation/capital costs were also found to be a major cost driver. Budgets must account for these costs to ensure that maintenance and replacement funding is set aside. If charging for sophisticated radiological services is part of a revenue generation strategy, then maintaining and replacing the required equipment is critical.

## Management

Accurately measuring and consistently tracking efficiency indicators as well as having the systems to produce these measures is critical for implementing sound management of the resources available to the facility and demonstrating this to funders.

*How does resource use change over time; is the facility realizing economies of scale as it increases its level of service delivery?*

All of the average unit costs presented in this analysis are subject to change because HUM is still going through its initial start-up phase and service delivery levels and expenditures are yet to stabilize. Once these variables have stabilized, HUM will need to go through a review phase to see how it might allocate its resources more efficiently. This study's modelling of its cost structure will assist HUM in this process. This analysis includes the types of measures that, if monitored over time, can provide information on where economies of scale are being realized because unit costs should be decreasing, at least in the medium term. However, it is important to point out that the unit cost estimation should be further refined to be more specific to the types of services (for example, the types of tests) as well as the types of patients who receive services from a cost center that delivers services to both internal and external patients. For example, it will be important to be able to differentiate between types and numbers of laboratory services used by patients receiving medical care from HUM versus laboratory services used by referral patients not seen by HUM clinical staff.

*How does resource use compare with other facilities (where data are available)?*

Currently, the study team is not aware of similar costs data being available for other tertiary-level facilities in Haiti. This makes cost comparisons impossible. However, as noted previously, primary health care services are an important output of HUM and these cost data for Haiti are available for comparison. Such comparisons would probably be of interest to MSPP as it explores options for providing primary care as efficiently as possible.

Primary care at HUM as a national referral and teaching hospital was integral to the phasing approach to opening services at the hospital. HUM's mandate included ensuring access to community-linked primary care services for the currently underserved target catchment area for primary care services. During the second phase of operations at HUM there will be a transition of primary care services to the former CDI location, reinforcing an integrated system for primary care management and referral for secondary and tertiary level care at HUM. Therefore in terms of cost comparison data, the transition of primary care services to the CDI location and resulting costs of care would represent the most accurate measure for costs of primary services through HUM in the long term.

*Do the current information systems provide the data required to track efficiency?*

HUM has several sophisticated information management systems. Therefore, it should not be difficult for it to ensure that the appropriate data are available in order to provide more specific unit cost estimates for the future. For example:

- For future revenue generation purposes, it will be important for systems to be able to differentiate between indigent and non-indigent populations receiving care to ensure that indigent populations remain able to access care free of charge and that this care is adequately budgeted while non-indigents are charged appropriately. This distinction is key to any effective revenue generation policies that align with HUM's mission of commitment to its local populations.
- Several units within the hospital will need to be able to aggregate and disaggregate services more accurately. Examples of this are L&D, where service delivery data are reported by the number of uniquely identified patients rather than the number of services, the latter of which makes it impossible to determine when a single patient uses the service more than once and the true number of visits. Similarly, several inpatient units currently have occupancy rates of more than 100 percent because the utilization data are rounded up to whole bed days and don't capture situations such as day surgery recovery, or others in which more than one patient occupies a bed in one day.

The ability to accurately determine unit costs will become even more critical as financing strategies for HUM are developed and revenue is collected from out-of-pocket fees, insurance companies, and government contracting.

## Planning

HUM recognizes the need to move toward a sustainable financial position.

*Given their current cost structures and recent service delivery levels, which departments/services are anticipated to have unit cost structures that may be appropriate for cross-subsidization to support a revenue generation strategy without posing access to care barriers to its focal indigent population?*

**Revenue generation opportunities:** This analysis identified some of the major opportunities for revenue generation that HUM has at hand, including the use of its laboratory, operating room, and radiology facilities. Given the cost of the equipment being used, it will be important for HUM to market these facilities and use them to their maximum capacity. In addition, given that providing medical education is part of its mission, these facilities might enable HUM to provide education to non-Haitian medical trainees from the Caribbean.

**Cross-subsidization opportunities:** Although HUM is still in its start-up phase, it already serves patients from a wide variety of socioeconomic groups, so it is reasonable to plan for some cross-subsidization between those who are able to pay for services and those who are unable to pay. Examples of services in this group might be radiology, physiotherapy, and surgical services; their costs are too high to expect indigent populations to pay out of pocket, but wealthier patients may want to take advantage of HUM's sophisticated, high-quality facilities and can pay to do so. Similarly, low-cost services may be marked up and priced to cross-subsidize more expensive services.

**Results-based financing (RBF) contracting:** Haiti is currently witnessing the implementation of at least one RBF pilot scheme to support the provision of maternal and neonatal child health. Given HUM's commitment to providing primary health care, it may be possible for the hospital to participate in the RBF schemes. Understanding the resources required to provide the significant amount of primary health

care delivered by HUM would be important for setting contract prices (particularly if RBF payments are lower than HUM costs.)

Formal health insurance schemes: Although private insurance coverage is very low in Haiti (1 percent<sup>19</sup>) it is highest in the Port-au-Prince region geographically close to HUM. Therefore, understanding its cost structure allows HUM to potentially contract with formal insurance schemes. These schemes include the state-run Office d'Assurance Accidents du Travail; Maladie et Maternité (OFATMA), a provider of worker's compensation program; the Office Assurance Véhicule Contre Tiers (OAVCT), a state-run provider of third party vehicle insurance; and private insurance companies.

HUM is an exciting opportunity to establish a level of quality care in Haiti comparable to that of much wealthier countries for a population that has previously experienced insurmountable barriers to even basic care. Ensuring that the facility has the resources it needs to continue to deliver this care is an important responsibility that will require the involvement of many stakeholders. By understanding its cost structure and being able to discuss its resource needs in evidence-based terms, the administration of HUM will be able to clearly and accurately estimate and express these needs to the many potential stakeholders who are increasingly seeking value for money for their contributions, and to take advantage of the more sophisticated health financing contracting opportunities that are being explored by the government of Haiti.

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<sup>19</sup> Preliminary Living Standards Measurement Survey data, personal communication

# ANNEX A: TOTAL EXPENDITURES BY LINE ITEM

## Data types and sources

After determining the cost centers, the next step was to gather the necessary output and cost data. This includes service volumes, quantities of drug and medical supplies, total staff numbers, direct expenditure data, and other data such as building space allocations, equipment and vehicle inventories, and other capital and fixed asset costs.

Expenditure data were collected from the Hospital, as well as procurement and some invoice data for drugs and medical consumables. Service volume data collection included bed numbers, inpatient admissions, number of patient days, outpatient visits, and number of procedures per department. In total, service volume data were collected from all outpatient clinics, all inpatient wards, the emergency department, the physiotherapy department, the laboratory, the blood bank the pharmacy, the radiology, the ultrasound, the operating rooms (OR), the mortuary, and some logistical services (kitchen, transport). Data concerning drugs and medical supplies included quantity of drugs and supplies used by each cost center as well as some unit costs of specific drugs. Staff positions, numbers of staff, salaries/wages and any additional compensation or allowances, and where possible, allocation of staff time spent in different cost centers were also obtained. Expenditure data were collected from the financial department and included indirect costs (covering utilities, equipment, fuel, maintenance, etc.). Capital and equipment inventories were collected, as well as square footage of space occupied by the different wards.

## Payroll data

Staff costs (human resource expenses): these represent the human resources expenses incurred for the provision of services per production unit. In the context of this study, these expenses take into account the base salaries, the ONA fees borne by the institution and the bonuses received by the employees as a function of the position and of the category with reference to a code. The staff hired by the hospital can be classified in 3 subgroups: the local staff (paid in local currency), an intermediate group (paid in US dollars). These first 2 subgroups are paid directly by the hospital; the third subgroup is composed in part of expatriates who are paid from Boston (PIH registered office).

As for the distribution of human resources working time between the cost centers, an estimate of this time (expressed as a percentage) was carried out with the aid of the heads of services and when needed, with the resource persons of the services in question.

## Depreciation assumptions

The depreciation periods used for the costing in the model are variable and depend on the type of equipment (heavy equipment, light equipment, rolling stock, etc.). This information is generally made available by the manufacturer. At HUM, the majority of this equipment and certain consumables were received as gifts and therefore it was difficult to retrace the exact value and the probable useful life of these goods. Research was conducted through central purchasing websites on the internet on the theoretical acquisition cost of the equipment. . Despite these efforts certain materials could still not be assigned a value and these are generally associated with the operational block, with the laboratory, with radiology, etc. Therefore depreciation on medical equipment may be underestimated. Depreciation

periods used were according to information provided by the hospital. All medical and non-medical equipment were inventoried and depreciated at 5 years with the exception of those discussed below.

### Building depreciation

The total acquisition cost of the premises was decided by mutual agreement with the administration and operations manager. The estimation was made on the basis of a cost per square foot of 60 US\$. The period of amortization recommended by the HUM was 25 years.

### Energy systems depreciation

The hospital uses various sources to provide the electricity necessary for the functioning of its units, i.e. solar energy, and generators using fuel oil. For medical gas (oxygen, vacuum) and water, the hospital has its own production units. The period of depreciation for this equipment recommended by HUM was 5 years. The study team notes that this can be considered as a relatively short period in relation to the acquisition costs of such devices compared to their manufacturer warranty. This assumption, combined with the significant expenditures for the supply of inputs could result in inflated total hospital costs.

### Vehicle depreciation

The value of vehicle depreciation was estimated using the sum of the acquisition value of new vehicles and the current total value of used vehicles vehicle. That information was provided by the Head of the Transport department. For the depreciation of vehicle HUM proposed 3 years.

### Drugs and medical supplies data

The receipt of orders and the distribution of drugs and medical supplies amongst the services are carried out by the "procurement" service. Each unit or medical department receives its endowment from the hospital warehouse. The two pharmacies are also supplied from the warehouse. For the period under study, some medical inputs (drugs and consumables) were ordered and purchased from the PIH registered office in Boston. The monitoring system at HUM can retrace the endowment and the consumption recorded by each of the units or departments in the hospital. But the estimate in monetary terms of the consumption by services is not yet integrated into the system. Where prices for pharmaceuticals and medical supplies were missing, the study team did an internet search. The IDA Foundation Electronic Price Indicator (April 2014) database and other internet sources were used to obtain prices where they were not available from HUM.

### Expenditure data

Although budget information was available, the HFG team followed the standard process of using actual expenditure data which were available for 2014. Actual expenditure data present a more accurate picture of financial resources used than budgets from which expenditure may vary in practice. Table 9 presents the expenditures utilized in this analysis. In general all the direct costs were estimated by the study team. We note that pharmaceutical and medical supply expenditures were estimated by the study team directly as described above. The team estimated depreciation directly as well. Labor was also estimated by the team using payroll data received from HUM.



**Table 9: Total expenditures provided for December 2013 in US\$**

<b>All Costs</b>	<b>US\$</b>	<b>% of Total Costs</b>
Labor costs	\$ 7,501,112	49.1%
Drugs and medical supplies	\$ 1,691,797	11.1%
Depreciation of equipment	\$ 857,290	5.6%
Staff part time	\$ 297,257	1.9%
Staff fringe	\$ 222,954	1.5%
Other staff expenses	\$ 83,696	0.5%
Food	\$ 640,920	4.2%
Food special events	\$ 5,756	0.0%
Medical supplies	\$ 21,419	0.1%
Computer supplies	\$ 4,910	0.0%
Cleaning supplies	\$ 116,715	0.8%
Office Supplies	\$ 20,794	0.1%
Home supplies	\$ 8,321	0.1%
Other supplies and accessories	\$ 15,791	0.1%
Medical services cost	\$ 19,054	0.1%
Other fuel	\$ 213,397	1.4%
Energy: generator, electricity, water.	\$ 908,767	6.0%
Infrastructure Insurance	\$ 32,424	0.2%
Transport -patient	\$ 31,658	0.2%
Transport/shipping drugs	\$ 23,123	0.2%
Other transport	\$ 33,955	0.2%
Transport -personnel	\$ 37,897	0.2%
Communications	\$ 139,512	0.9%
Rental costs	\$ 109,513	0.7%

<b>All Costs</b>	<b>US\$</b>	<b>% of Total Costs</b>
Educational costs	\$ 10,718	0.1%
Funtionning costs	\$ 210,825	1.4%
Miscellaneous	\$ 136,455	0.9%
Social support payments	\$ 100,635	0.7%
Travel costs	\$ 19,001	0.1%
Administrative costs	\$ 58,271	0.4%
Maintenance	\$ 232,366	1.5%
Other maintenance	\$ 38,102	0.2%
Construction/renovation	\$ 61,343	0.4%
Small medical equipment	\$ 31,423	0.2%
Other equipment & furniture	\$ 93,570	0.6%
Energy systems depreciation	\$ 517,800	3.4%
Buildings depreciation	\$ 567,667	3.7%
Vehicles depreciation	\$ 151,000	1.0%
<b>Total costs</b>	<b>\$ 15,267,208</b>	<b>100%</b>

# ANNEX B: COST ALLOCATION PROCESS

## Cost allocation

The final cost analysis process includes assigning direct costs to the relevant cost centers, determining the rules for allocating indirect costs, finalizing the “step-down” sequence, and performing final cost calculations.

The main hospital resources in providing care are: labor, equipment and drugs and medical supplies. Most of the time those costs can be directly traced to a particular cost center, which is why we defined them as “direct costs”: sum of payroll, capital depreciation and medical drugs/supplies consumption specific to each cost center. We further define “fixed direct costs” (payroll + capital depreciation) and “variable direct costs” (drugs+ medical supplies consumption). This is to make a distinction between the direct costs that instantly change with the volume of patient (variable) and the one that do not instantly depend on the volume of medical activity (fixed).

Some hospital resources are shared in a way that makes it impossible or impractical to measure directly how much of the resource is used in a particular cost center: here there are referred to as “indirect costs”. For administration, communication and transportation costs, an indirect allocation process was used to distribute them across the cost centers. Indirect cost allocation is based on identified “cost drivers”, or indicators that most directly influence the cost being incurred. These could be floor space utilized, number of staff, number of patients, etc. The fixed and variable direct costs defined above can also be used as criteria for indirect cost allocation.

In the step-down sequence, cost centers are assigned to different “levels.” Centers at the top “supply” the centers below them with some kind of service, and they in turn do the same for the centers below them. The assumption is that a cost center is either a supplier or a customer to another cost center. For example, in this analysis we assumed that the cleaning/landscaping and laundry unit ‘serves’ the administrative department while acknowledging that the general administration/HR department may offer management services to the cleaning/landscaping and laundry unit employees. In this case (and others) the provision of services is not necessarily one directional, but, in order to conclude the step-down process, a decision was made as to which order is either larger (in terms of the value of services offered) or that the value of services is small enough that the hierarchy of levels will not affect final costs in a substantive way.



## ANNEX C: STEP DOWN ALLOCATION ASSUMPTIONS

In order to conduct the step-down allocation, each cost center was given allocation base/criteria, which was used to allocate the total costs from that cost center across all the remaining cost centers at lower levels. Table 10 lists the allocation bases used for each cost center, as well as any assumptions or calculations used to determine the amount of the base unit to be applied to each of the remaining cost centers.

**Table 10: Step down allocation assumptions**

Cost Center	Allocation Base	Assumptions
<b>Administrative Services and Logistics</b>		
Cleaning/Landscaping/laundry	Cleaning staff distribution	<ul style="list-style-type: none"> <li>The distribution of cleaning staff across the different cost centers (number of staff for that cost center) determine the importance of that cost center in terms of corresponding :more resources needed for cleaning.</li> </ul>
General administration/HR	Staff number	<ul style="list-style-type: none"> <li>Calculated from the hospital payroll data. Where necessary staff was distributed to different cost centers according to time spent in that cost center. The more staff, the more management needed.</li> </ul>
Transport	Distance driven	<ul style="list-style-type: none"> <li>Number of kilometers driven for each cost center. The higher the number of kilometers driven for a cost center, the higher its proportion of the shared transport costs should be.</li> </ul>
Financing and Accounting	Staff number	<ul style="list-style-type: none"> <li>Calculated from the hospital payroll data. Where necessary staff was distributed to different cost centers according to time spent in that cost center. The more staff, the more management needed.</li> </ul>
Building Maintenance	Floor space	<ul style="list-style-type: none"> <li>Building space by square feet was measured and reported based on blueprints for the hospital. The more space used, the more resources needed for maintenance.</li> </ul>
Medical Equipment maintenance	Number of interventions	<ul style="list-style-type: none"> <li>The department provided the list of interventions provided to each of the cost centers that it served. The higher the number of interventions, the higher the corresponding maintenance costs.</li> </ul>
Kitchen	Number meals served	<ul style="list-style-type: none"> <li>We got the number of meals served to each department. The higher the number of meals, the higher the share of the kitchen corresponding costs.</li> </ul>
Security	Value of equipment	<ul style="list-style-type: none"> <li>Calculated from the depreciation cost of equipment. Allocated to all cost centers. The higher the value of the equipment, the higher the resources for its protection.</li> </ul>
Procurement	Direct costs	<ul style="list-style-type: none"> <li>Direct costs were calculated by summing drugs /medical supplies consumption, labor and equipment depreciation attributable to a cost center. The higher the value, the more resources used for provision.</li> </ul>

<b>Cost Center</b>	<b>Allocation Base</b>	<b>Assumptions</b>
Medical Information System	fixed direct costs	<ul style="list-style-type: none"> <li>Fixed direct costs were calculated summing labor costs and depreciation of equipment directly attributable to a cost center. The more expensive a center is to run, the higher its proportion of the shared costs should be.</li> </ul>
General IT	fixed direct costs	<ul style="list-style-type: none"> <li>Fixed direct costs were calculated summing labor costs and depreciation of equipment directly attributable to a cost center. The more expensive a center is to run, the higher its proportion of the shared costs should be.</li> </ul>
Residence	fixed direct costs	<ul style="list-style-type: none"> <li>Fixed direct costs were calculated summing labor costs and depreciation of equipment directly attributable to a cost center. The more expensive a center is to run, the higher its proportion of the shared costs should be.</li> </ul>
Teaching	Number of residents	<ul style="list-style-type: none"> <li>There were 23 interns assigned to final medical cost centers based on a list received from the Hospital Accounts team.</li> </ul>

#### ***Intermediate Medical Services***

Pharmacy	Percentage estimates	<ul style="list-style-type: none"> <li>Based on direct consumption (cost) of drugs and consumables reported in the pharmacy records.</li> </ul>
Laboratory	Number of tests	<ul style="list-style-type: none"> <li>As reported by the laboratory records</li> </ul>
Blood Bank	Number of units of blood	<ul style="list-style-type: none"> <li>As reported by the Blood bank records</li> </ul>
Mortuary	Number of cadavers	<ul style="list-style-type: none"> <li>As reported by the mortuary records</li> </ul>
Radiology	Number of exams	<ul style="list-style-type: none"> <li>As reported by radiology and wards records.</li> </ul>
Operating Room	Number of surgeries	<ul style="list-style-type: none"> <li>As reported by operating rooms and wards records.</li> </ul>

# ANNEX D: STEP DOWN ALLOCATION RESULTS

## Step 1: Classify costs between direct and indirect costs

All line item expenditures listed in Table 9 were classified into direct or indirect categories using the following criteria:

- Direct costs: the costs that can be directly traced to a particular cost center e.g. salaries, drugs, etc.
- Indirect costs: the costs that are shared among many cost centers e.g. utilities, maintenance etc.

## Step 2: Allocate direct and indirect costs across cost centers

This cost analysis divided cost centers into “administrative services and logistics,” “intermediate medical services,” and “final medical services.” The goal of this first stage of the hospital costing is to define a total cost for each of the hospital’s administrative/logistical, intermediate medical and final medical cost centers. This is accomplished by first accumulating the direct costs<sup>20</sup> of each cost center and second by allocating the indirect costs<sup>21</sup> in the second step using the appropriate allocation statistics. This cost per service center is needed information for budget management and planning at the hospital level. The cost structure HUM is presented in Table 11,

Table 12 and

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<sup>20</sup> In this report, the term direct cost means costs for the main resources in health care production that are easily linked to a specific cost center: Labor, Equipment, Drugs and medical supplies.

<sup>21</sup> Indirect costs refer to all other hospital costs.

**Table 13.**

The final medical services are the most expensive to run with 46 percent of total costs, followed by logistical services (35 percent) and intermediate medical services (19 percent). The top cost center in terms of cost is the Inpatient Surgical ward (7.3%) followed by the operating room (6.9%) and the General administration (6.2 %).



**Table 11: Administrative and Logistical Cost Allocation**

Cost centers	Direct costs (USD)	%	Indirect costs(USD)	%	Total costs(USD)	%
General Administration/HR	644,781	6.4%	305,639	5.9%	950,421	6.2%
Transport	131,222	1.3%	440,704	8.4%	571,926	3.7%
Financing and Accounting	229,562	2.3%	38,728	0.7%	268,290	1.8%
Building Maintenance(facilities and operations)	261,864	2.6%	204,317	3.9%	466,180	3.1%
Equipment maintenance (Biomedical)	128,363	1.3%	40,952	0.8%	169,315	1.1%
Kitchen	77,765	0.8%	448,579	8.6%	526,345	3.4%
Security	144,891	1.4%	68,365	1.3%	213,256	1.4%
Procurement	132,140	1.3%	39,477	0.8%	171,617	1.1%
Medical information system	377,277	3.8%	95,231	1.8%	472,508	3.1%
General IT	98,827	1.0%	26,717	0.5%	125,545	0.8%
Residence	39,101	0.4%	405,867	7.8%	444,968	2.9%
Teaching	171,821	1.7%	205,485	3.9%	377,306	2.5%
<b>Total Admin/Logistical Services</b>	<b>2,678,407</b>	<b>26.7%</b>	<b>2,663,773</b>	<b>51.1%</b>	<b>5,342,180</b>	<b>35.0%</b>

**Table 12: Intermediate Medical Services Cost Allocation**

Cost centers	Direct costs(USD)	%	Indirect costs(USD)	%	Total costs(USD)	%
Pharmacy	557,850	5.6%	246,878	4.7%	804,728	5.3%
Morgue	8,551	0.1%	7,338	0.1%	15,889	0.1%
Laboratory	414,818	4.1%	79,414	1.5%	494,231	3.2%
Radiology	380,294	3.8%	66,780	1.3%	447,075	2.9%
Blood Bank	49,028	0.5%	14,274	0.3%	63,302	0.4%
Operating Room	626,021	6.2%	425,711	8.2%	1,051,732	6.9%
<b>Total Intermediate Medical Services</b>	<b>2,036,562</b>	<b>20.3%</b>	<b>840,395</b>	<b>16.1%</b>	<b>2,876,957</b>	<b>18.8%</b>

**Table 13: Final Medical Services Cost Allocation**

Cost centers	Direct costs(USD)	%	Indirect costs(USD)	%	Total costs(USD)	%
Outpatient General	312,122	3.1%	148,689	2.9%	460,811	3.0%
Outpatient Dental clinic	211,449	2.1%	37,071	0.7%	248,520	1.6%
Outpatient Community health	322,569	3.2%	115,300	2.2%	437,870	2.9%
Outpatient women health	447,326	4.5%	132,006	2.5%	579,332	3.8%
Outpatient Pediatrics	59,355	0.6%	29,459	0.6%	88,814	0.6%
Outpatient Mental health	21,902	0.2%	14,002	0.3%	35,905	0.2%
Outpatient Oncology	313,553	3.1%	68,048	1.3%	381,601	2.5%
Rehabilitation/Physiotherapy	238,404	2.4%	39,729	0.8%	278,133	1.8%
Accident & Emergency	679,803	6.8%	143,785	2.8%	823,588	5.4%
Inpatient Labor and Delivery	383,890	3.8%	146,903	2.8%	530,793	3.5%
Inpatient Pediatrics	305,686	3.0%	126,884	2.4%	432,571	2.8%
Inpatient Medical Ward	631,623	6.3%	181,003	3.5%	812,627	5.3%
Inpatient Surgical Ward	875,566	8.7%	238,947	4.6%	1,114,513	7.3%
Inpatient NICU	253,022	2.5%	87,350	1.7%	340,372	2.2%
Inpatient Isolation ward	42,238	0.4%	61,845	1.2%	104,083	0.7%
Inpatient Antenatal ward	92,687	0.9%	66,966	1.3%	159,653	1.0%
Inpatient Postnatal ward	144,034	1.4%	74,853	1.4%	218,887	1.4%
<b>Total Final Medical Services</b>	<b>5,335,230</b>	<b>53.1%</b>	<b>1,712,841</b>	<b>32.8%</b>	<b>7,048,071</b>	<b>46.2%</b>

**Table 14: Total Direct and Indirect Cost Allocation**

Cost centers	Direct costs(USD)	%	Indirect costs(USD)	%	Total costs(USD)	%
Admin/logistical Services	2,678,407	26.7%	2,663,773	51.1%	5,342,180	35.0%
Intermediate Medical Services	2,036,562	20.3%	840,395	16.1%	2,876,957	18.8%
Final Medical Services	5,335,230	53.1%	1,712,841	32.8%	7,048,071	46.2%
<b>TOTAL</b>	<b>10,050,198</b>	<b>100%</b>	<b>5,217,010</b>	<b>100%</b>	<b>15,267,208</b>	<b>100%</b>

### Step 3: Allocate administrative/logistical costs to intermediate and final cost centers

Step three in the allocation process takes the administrative and logistics cost center costs and allocates them to the intermediate and final cost centers. The criteria used for allocating any cost center's costs (described in Annex B) reflects the use of that cost center's services by the others and may include space utilized, number of staff, or number of patients. At the end of step three, the costs appear as shown in

Table 15.

**Table 15: Administrative and logistical cost allocations to intermediate and final cost centers**

Cost Centers	Total Cost before allocation(USD )	Administrative and logistical costs allocated		Total Cost after allocation(USD)	% of total cost
		Value in US\$	% of total		
Pharmacy	804,728	137,848	2.6%	942,576	6%
Morgue	15,889	23,310	0.4%	39,199	0%
Laboratory	494,231	152,772	2.9%	647,003	4%
Radiology	447,075	224,839	4.2%	671,914	4%
Blood Bank	63,302	107,715	2.0%	171,017	1%
Operating Room	1,051,732	372,759	7.0%	1,424,491	9%
<b>Total Intermediate Medical Services</b>	<b>2,876,957</b>	<b>1,019,243</b>	<b>19%</b>	<b>3,896,200</b>	<b>26%</b>
Outpatient General	460,811	225,095	4.2%	685,906	4%
Outpatient Dental clinic	248,520	57,396	1.1%	305,915	2%
Outpatient Community health	437,870	334,392	6.3%	772,262	5%
Outpatient women health	579,332	222,639	4.2%	801,972	5%
Outpatient Pediatrics	88,814	77,302	1.4%	166,116	1%
Outpatient Mental health	35,905	30,214	0.6%	66,119	0%
Outpatient Oncology	381,601	149,395	2.8%	530,996	3%
Physiotherapy	278,133	160,354	3.0%	438,487	3%
Accident & Emergency	823,588	582,161	10.9%	1,405,749	9%
Labor and Delivery	530,793	330,750	6.2%	861,543	6%
Inpatient Pediatrics	432,571	296,589	5.6%	729,160	5%
Inpatient Medical Ward	812,627	592,139	11.1%	1,404,766	9%
Inpatient Surgical Ward	1,114,513	598,944	11.2%	1,713,457	11%
Inpatient NICU	340,372	259,858	4.9%	600,230	4%
Inpatient Isolation ward	104,083	86,790	1.6%	190,873	1%
Inpatient Antepartum ward	159,653	129,625	2.4%	289,278	2%
Inpatient Postpartum ward	218,887	189,294	3.5%	408,180	3%
<b>Total Final medical services</b>	<b>7,048,071</b>	<b>4,322,937</b>	<b>81%</b>	<b>11,371,008</b>	<b>74%</b>
<b>Total</b>	<b>9,925,028</b>	<b>5,342,180</b>	<b>100%</b>	<b>15,267,208</b>	<b>100%</b>

Note that the total under column “Administrative and logistical Costs Allocated” equals the subtotal in Table 11, and is added to the Total Costs column to its left to calculate the new totals for each intermediate and final cost center. Further details on allocation assumptions can be found in Annex B above. Intermediate cost centers now account for about 26 percent of the total hospital cost, and final cost centers for the remaining 74 percent.

## Step 4: Allocate intermediate costs centers’ costs across the final medical services

The fourth step is to allocate the costs of the intermediate medical service cost centers to the final cost centers. This is done on the basis of the usage of these intermediate cost center services by the final cost centers. The result is the “full costs by final medical cost center,” as shown in Table 16.

Intermediate cost centers were allocated by direct consumption for Pharmacy, number of tests for Laboratory, number of exams for Radiology, number of surgeries for Operating Theater, number of cadavers for the Mortuary, number of units of blood for the Blood Bank. Further detail regarding these allocation bases and assumptions are included in Annex B.

**Table 16: Full costs by final medical cost center**

Cost Centers	Cost before allocation(USD)	Medical intermediate costs allocated		Full Cost after allocation(USD)	% of total cost
		Value in US\$	% of total		
Outpatient General	685,906	635,369	16.3%	1,321,275	9%
Outpatient Dental clinic	305,915	182,260	4.7%	488,175	3%
Outpatient Community health	772,262	2,902	0.1%	775,163	5%
Outpatient women health	801,972	180,235	4.6%	982,207	6%
Outpatient Pediatrics	166,116	96,916	2.5%	263,032	2%
Outpatient Mental health	66,119	116	0.0%	66,235	0%
Outpatient Oncology	530,996	336,231	8.6%	867,227	6%
Physiotherapy	438,487	30,921	0.8%	469,408	3%
Accident & Emergency	1,405,749	635,314	16.3%	2,041,063	13%
Labor and Delivery	861,543	548,724	14.1%	1,410,267	9%
Inpatient Pediatrics	729,160	150,448	3.9%	879,608	6%
Inpatient Medical Ward	1,404,766	263,106	6.8%	1,667,872	11%
Inpatient Surgical Ward	1,713,457	450,690	11.6%	2,164,147	14%
Inpatient NICU	600,230	191,012	4.9%	791,242	5%
Inpatient Isolation ward	190,873	27,208	0.7%	218,081	1%
Inpatient Antepartum ward	289,278	74,810	1.9%	364,088	2%
Inpatient Postpartum ward	408,180	89,938	2.3%	498,118	3%
<b>Total</b>	<b>11,371,008</b>	<b>3,896,200</b>	<b>100%</b>	<b>15,267,208</b>	<b>100%</b>

Inpatient cost centers accounted for about 66 percent of costs, while outpatient services accounted for about 34 percent. Surgical ward was the largest single cost center (14 percent) followed A&E (13 percent), by medical ward (11 percent) and L&D (9 percent), all of them inpatient services.

Accident and Emergency (outpatient plus inpatient) accounted for a high proportion of full costs: 13 percent. Staff interviews suggest that a large majority of hospital inpatients are admitted through the A&E, which could be causing an inflated cost that does not reflect true patient needs, but data to support this claim were unavailable. If true, the Hospital could benefit from determining a more efficient way to admit patients not in need of A&E care.









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