



**Technical Assistance to the
Health Sector Policy Support Programme
In the Philippines
(EC-TA HSPSP)**

**Costing study for selected hospitals
in the Philippines**

Final Report

Submitted by:

Tsolmongerel Tsilaajav
**Consultant for
Health facilities costing**

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- Roxas Memorial Provincial Hospital
- Capiz Emmanuel Hospital
- Davao Regional Hospital
- D.O.Plaza Hospital
- Bunawan District Hospital
- Kapitalong District Hospital

ACRONYMS

ALOS	Average Length of Stay
BDH	Bunawan District Hospital
BDRD	Benefits Development and Research Department
CEH	Capiz Emmanuel Hospital
COA	Commission on Audit
D.O.P	D.O. Plaza Hospital
DOH	Department of Health
DR	Delivery room
DRG	Diagnosis Related Group
DRH	Davao Regional Hospital
EC	European Commission
ECCE	Extra capsular Cataract Extraction
ER	Emergency room
F1	Fourmula 1
HIS	Health Information System
KDH	Kapalong District Hospital
LGU	Local Government Unit
MOOE	Maintenance and Operating Expenses
MSH	Management Sciences for Health
NCHFD	National Center for Health Facility Development
NGAS	New Government Accounting Standard
NSD	Normal Single Delivery
Ob&Gyne	Obstetrics and Gynecology
OR	Operating room
PC	Patient Chart
PF	Professional fee
PHIC	Philippine Health Insurance Corporation
QMMC	Quirino Memorial Medical Center
R1MC	Region I Medical Center
RMPH	Roxas Memorial Provincial Hospital
USA	United States of America

EXECUTIVE SUMMARY

PhilHealth has plans to address the issues of increasing out-of pocket payment and inefficiencies of claim processing system for hospitals. One of the policy measures to achieve this objective is related to changing the hospital payment mechanisms from the fee-for-service to a case-based payment system. The case-based payment system requires some specific clinical and cost information that PhilHealth needs for effective design and implementation of reforms.

This study aimed to estimate unit costs of some key hospital services at selected hospitals in Philippines. It has employed two types of costing methodologies for reasons of validating the results and also obtaining patient/disease level cost data. The methodology and survey instruments were designed to address issues of trade-off between cost of data collection efforts and time while ensuring the reliability and accuracy of results. The survey team comprised of mainly PhilHealth central office staff visited 6 tertiary and 2 secondary hospitals in 5 provinces located in 3 island groups. Data was collected on clinical, financial and administrative activities of each hospital. Attempts were exerted to collect all costs incurred in delivery of health services. In addition, cost data was collected on selected patients confined for medical diagnoses of pneumonia, acute bronchitis, asthma, normal delivery, and senile cataract.

For all sampled hospitals, average unit costs were estimated per discharge and per bed day by various inpatient wards as well as per key outpatient and ancillary services. Since there were only 2 secondary public and 1 private tertiary hospitals, conclusions and interpretations are focused to unit cost figures of tertiary public hospitals where most health financing reforms are piloted.

Some key findings from this study are:

- On average, unit costs per inpatient discharge at tertiary public hospitals were estimated to be 9,499P for Medical ward, 9,180P for Ob&Gyne ward, 8,746P for Pediatrics ward and 11,447P for Surgery ward respectively. Unit cost per bed day is 1,910P for Medical ward, 2,399P for Ob&Gyne ward, 1,461P for Pediatrics ward, and 2,282P for Surgery ward.
- The weighted average unit costs for both discharge and bed day at tertiary public hospitals have shown reasonable variations across most inpatient specialties which is taken as a good sign for reliability and validity of estimated results. Findings show that unit cost variations were partially explainable by factors including 1/ service utilization rates and level of outputs, 2/ differences in patient complexity and 3/ length of stays. These factors will help to identify areas of examining and improving hospital performance.
- In addition, other key service cost estimates show that weighted average unit cost per outpatient visit: 378P; per emergency visit: 552P; per X-ray taken: 352P; per lab test done: 64P; per major surgery: 8,891P; and per delivery: 3,392P respectively.

- The study conducted detailed investigations of 480 Patient Charts and estimated individual patient level cost for selected key common disease categories. They are the top five disease categories for which PhilHealth pays most frequently. On average, unit costs of cases at tertiary public hospitals ranged at 8,047P for pneumonia-organism unspecified; 5,834P for acute bronchitis; for normal single delivery 5,316P; senile cataract 14,319P; and asthma 7,065P respectively. The direct cost takes about half of the total unit cost, while the overhead cost consumes approximately 40% at secondary and tertiary hospitals. In addition, results have shown that except for cataract case, the cost of medicines and medical supplies, laboratory and imaging, staff cost takes about 60% of the total cost of treating one case. Due to special clinical complexity of service delivery direct cost takes 80% of the total unit cost of the cataract case.
- As mentioned above, the study selected top-down and bottom-up costing methodologies in order to validate the accuracy of the results.

Costing approaches	Pneumonia	Acute Bronchitis	NSD	Cataract	Asthma
Bottom-up costing	8,047	5,834	5,316	14,319	7,065
Top-down costing	6,723	4,857	5,946	11,695	5,210
Differences	1,324	977	-629	2,624	1,855

The international studies which assessed the comparability of costing approaches have shown that average percentage of difference of unit costs between the top-down and bottom-up approach ranged 5%-20%. In this study, the comparison of the unit costs of stated disease categories at tertiary public hospitals appear to be positive showing in conformity with results of other studies.

The results of costing study could be used for following purposes:

- **Use as inputs to efforts exerted in hospital payment reforms at PhilHealth.** Decision to establish case based payment rates can depend partly on this data and also more importantly on the PhilHealth's policy considerations such as budget ceiling, hospital performance and contracting reforms and improving financial protection for members. In this regard, PhilHealth could take into account following data on average unit costs and resulting figures on cost weights of disease categories. The cost weights show relative resource consumption of specific case in relation to average case.

Case types	Cost weight	Cost per case					Total cost per disease category
		Direct			Indirect		
		Medicines and supplies cost	Diagnostics cost	Clinical staff cost	Overhead costs	Depreciation of capital assets	
Pneumonia	0.85	2,545	561	1,597	2,531	812	8,047
Acute bronchitis	0.61	1,478	409	1,353	1,818	776	5,834
NSD	0.56	1,227	369	1,310	1,683	728	5,316
Cataract	1.51	6,105	691	4,287	1,275	1,962	14,319
Asthma	0.74	2,062	557	1,651	1,947	848	7,065
Average cost		9,502					

	Per discharge at wards of:				Per bed day at wards of:			
	Medicine	Ob&Gyne	Pediatrics	Surgery	Medicine	Ob&Gyne	Pediatrics	Surgery
Cost weights	1.00	0.97	0.92	1.20	0.92	1.16	0.71	1.10
Average cost	9502				2065			

- Inputs to development of sustainable cost accounting system for case based system.** For case based payment, it is important to calculate national average costs and cost weights on a routine basis. In this regard, PhilHealth as one of the major public corporations who provide substantial portion of hospitalization benefits should have plans on a more strategic approach to case based costing issues. Issues to consider here include 1/ making methodologies universal and standard, 2/ more efforts to improving the hospital cost data, and possibly creating incentives for hospitals to develop their hospital information system and lastly 3/ improving PhilHealth central and provincial staff capacity in costing. In this regard, this report can serve as a good reference and background for understanding and initiating the related efforts.
- Improving hospitals financial management system.** Hospitals can use the results of this costing study as basis for identifying areas of inefficiencies by comparing the costs and outputs with other similar facilities, contracting hospital wards and departments internally, and for setting or revising current patient charges of different medical and ancillary services.

1 INTRODUCTION AND OBJECTIVES

PhilHealth is one of the key forces to health sector reforms in the Philippines. Fourmula One for Health (or F1) sets four (4) major components of health sector reforms, namely: health financing, health regulation, health service delivery and good governance in health. In recognition of PhilHealth's mandate, Administrative Order No. 23 emphasized PhilHealth's lead role in pursuing major reform initiatives encompassing the four major health reform areas. *The Order stated that "the National Health Insurance Program (NHIP) shall serve as the main lever to effect desired changes and outcomes in each of the four major implementation components, where the main functions of the NHIP including enrollment, accreditation, benefit delivery, provider payment and investment are employed to leverage the attainment of the targets for each of the reform components."*¹

In 2008, PhilHealth endorsed its Medium term plan for 2008-2010. The Plan declares the strategic directions of the organization for next couple of years. In recognition to achieving strategies of the plan, PhilHealth board resolution No.1113: "Leaping four(4)ward towards financial protection in 2010" was approved in July 2008. The FOUR LEAPS are:

- Shifting to new payment mechanism
- Contracting of preferred provider service agreements
- Investing in health care providers, particularly public ones
- Expanding outpatient benefits

Through implementation of the LeapFour, PhilHealth intends to prioritize financial protection for members, improve benefit framework and design, and improve hospital capacity and capability.

A decision has been made to gradually implement the case based payment as the key provider payment system that would lead to achievements of objectives. Sometimes referred as DRG² (Diagnosis Related Group), the case based/case-mix system is a way of classifying hospital services into homogeneous groups or classes in terms of attributes like cost or outcome of care. For example, each DRG is intended to contain patient care episodes which are similar in terms of health problem and also costs. It is expected that the case-based payment system will reduce inefficiencies of current claim processing arrangements of the PHIC and provide more financial protection to members. However, one should note that members' financial protection will increase, only if PhilHealth implements the case based system with effective contracting of providers. Case based payment rates should not be increased without proper incentive for hospitals to behave differently to reduce balance billing of patients.

In relation to above reform objectives, PhilHealth plans to implement the case based payment system through step by step strategies. In relation to this initiative, the number of options has been currently considered such as starting from a simple few case classifications and moving into more detailed full DRG system used in countries like USA, Australia and recently in some developing countries.

¹ PHIC: 2008-2010 Medium-Term Plan

² DRG has been first designed and used in Medicare reimbursement system in USA early 1980s.

Whatever option is chosen or piloted, the implementation of case based payment system requires 1/ clinical as well as 2/ cost information on different cases treated at hospitals. Within the framework of the design and preparation step, PhilHealth in association with EC funded Technical assistance for Health Sector Policy Support Reform program in Philippines undertook a Hospital Costing Study from October 2008 to February 2009. The terms of reference for technical assistance are attached in the Appendix 1.

The objective for this study is to support current hospital payment system reform efforts of PhilHealth by providing cost information of services or outputs provided at selected hospitals in Philippines. In other words, outputs of this study will provide information on the actual costs of services in hospitals from different regions in Philippines and in addition costs of specific disease categories (pneumonia, asthma, cataract, acute bronchitis and normal delivery) which will assist the establishment of national average reimbursement rates by cases.

2 METHODOLOGY AND DATA COLLECTION

International literature agrees that there is no universally accepted appropriate methodology for costing of health services³. There are normative or prospective and the observation based or retrospective methods. Normative approach of costing of hospital services is a relatively new concept, especially in developing countries. As the name explains, the normative approach answers the question of “What we expect the cost to be, if care is provided in a good way?” Therefore, it requires clinical guidelines of managing diseases as well as respective resource norms to be clearly defined. Staffing, diagnostics, and medication norms should be clearly written. Past experiences in some developing countries like Mongolia have shown that this type of costing is quite demanding and has little value as health resources are scarce and often results likely to show more financial inputs than health sectors can afford. Therefore, most studies use the retrospective approaches to estimate the actual average costs of providing health services.

The calculation of actual average costs can be based on:

- Top down or step down costing
- Bottom-up or resource costing

Advantages and shortcomings of the both methods have been widely acknowledged and documented. The top-down costing methodology is known to be less-costly, less time-consuming and also can be accurate as well. On the other hand, the bottom-up costing methodology produces more detailed and accurate cost data for each disease and patient treated at hospitals. However, the latter approach is also well-known to be more time and resource consuming and tedious.

As mentioned above, we used both top-down and bottom-up costing approaches for this study. Reasons of selecting the top-down approach are justified by its advantages of being fast, cheap and same time accurate method to maintain regular hospital costing exercises by PhilHealth in coming years. The bottom-up approach was used to 1) obtain case specific costs on selected common diseases and 2) to validate the estimates produced through top-down costing method. Overall, the study was exploratory and analytical, estimating the average unit costs of major hospital outputs like discharges, inpatient days, various ancillary services and also certain types of common diseases paid by PhilHealth.

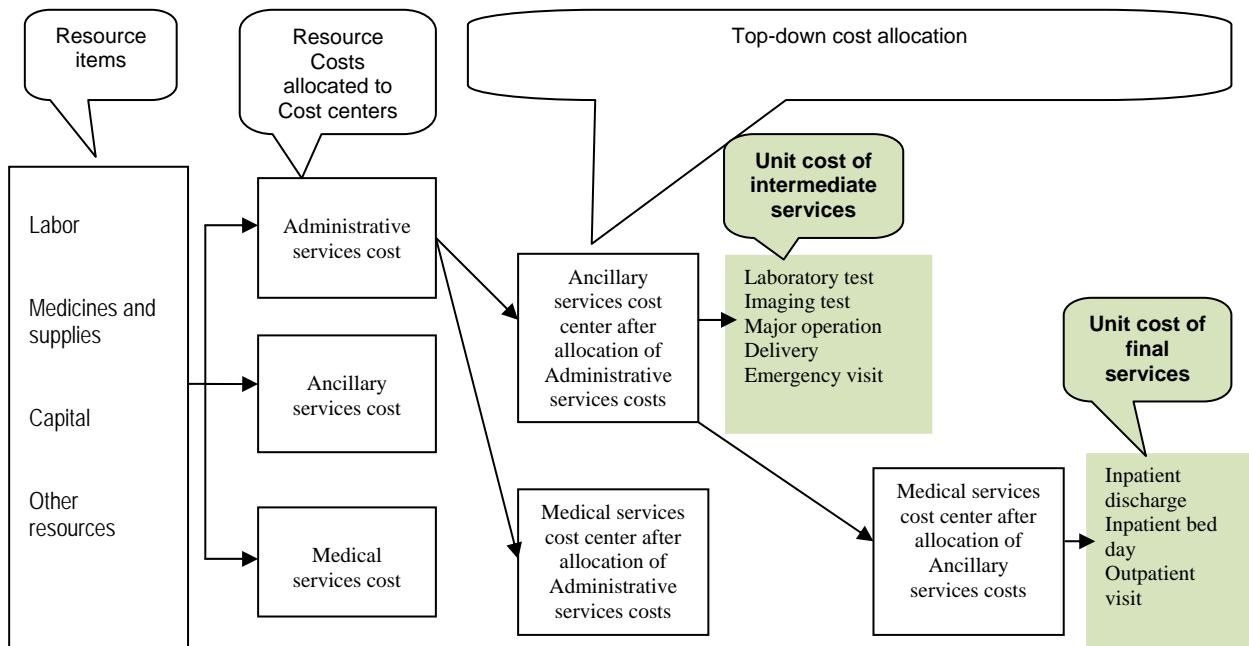
2.1 Top down costing and data collection

Top down method or Yale cost model assigns costs based on data from the hospital's financial accounts. The major limitation of this approach is that it is dependent on the accuracy of these data. The top-down approach allocates the total hospital cost for a given period to health services or products based on predefined set of rules. The underlying methodology for top-down costing follows several distinct steps in order to

³ The main methodological issues in costing health care services, Center for Health Economics, University of York, 2005

achieve the allocation of the total hospital costs into cost centers and patient level services like inpatient bed days, discharges, outpatient visits, laboratory test, X-ray image, delivery etc. The figure below shows the sequence of hospital service costing.

Figure 1: Hospital service costing sequence



Step 1: Define the final services or cost objects to be costed. In our case cost objects were unit cost of bed-day, discharge, outpatient visit, and ancillary services of hospitals.

Step 2: Define cost centers. In order to be able to assign costs to cost objects we need to first attach the costs to specific department or unit of the hospital. The cost centers were defined by:

1. examining the current DOH Manual for organization and management and staffing standards of government hospitals
2. interview and consultation with staff at hospitals
3. examining the PhilHealth accreditation application forms

The hospital is structured around three main departments. They are Administrative services, Ancillary services and the Medical care services departments. Prior to data collection, the names and structures of cost centers under each of main departments were discussed and agreed at the orientation meeting with hospital staff.

Step 3: Identify the full cost for each type of inputs/line items. It is the most important step in costing exercise and the purpose was to account all total costs that hospital incurred in 2007.

As starting point and to ensure the completeness of the data, we used the Circular of COA, which laid out all possible expense items in an entity. Regardless of who paid or funded the expense item we tried to record all costs that hospital expended or used for functioning of day to day operations during 2007. The major sources of hospital financing include:

- Funding from the Department of Health
- Internal revenue allotments from Local government units
- PHIC reimbursements and
- User fees
- Others

Although not always complete, the information on the recurrent costs could be found in the financial statement of the hospital.

2.1.1 Capital costs

Capital assets are those items acquired in one period but used over several years. They are building, equipment, vehicles and land. In reality, assets are being worn down by hospital's daily activities, and this depreciation is a cost, even though it is not an expense (unlike salaries or drug purchases). Therefore, a cost of assets is reflected in costing of services through calculating their depreciation value. In order to calculate depreciation of capital assets we used Commission on Audit Circular 2002-002 where the New Government Accounting Standard (NGAS) manual was adopted. The NGAS manual gives details on the depreciation of capital assets. In order to estimate depreciation as instructed in the NGAS manual, the conventional straight line method of depreciation was followed.

Collection of accurate and reliable information on capital assets was a challenging task for surveyors. Tertiary DOH retained hospitals had relatively better records of capital assets as they had established Property management committees. Each year, the committee organized the inventory of all equipment and furniture and recorded costs, quantities, and date of purchase. For other hospitals including the private tertiary level hospital, the information on capital assets were gathered with assistance of hospital staff through detailed investigations of administrative records at hospital as well as provincial level. In several cases, the provincial or local government offices had been keeping the inventory and other capital asset related information.

For building, the depreciation could be calculated by multiplying the total original cost of construction recorded in the book by the depreciation rate. Usually depreciation rate for building is 0.3% or useful life is 30 years. However, this underreports the true depreciation since the recorded costs of the older buildings is very much less than current prices and cannot be accurately adjusted for currency deflation. Therefore, standard construction cost of 17,500P per m² was used to estimate the depreciation of hospital building. In order to calculate the building depreciation for a specific inpatient ward or other units the total building depreciation is divided by the total floor area and multiplied by the floor area for the department in question. It should be noted that in many hospitals, the floor area information was not readily available. In some cases, the Survey team had to do approximations of room floor area based on discussion with maintenance personnel at the hospital.

We used 7 year of depreciation for equipment and furniture. Nearly all equipment and furniture fixtures were included, regardless if purchased or donated. Moreover, all assets currently used were included even if they were fully depreciated according to accounts. The information on costs of clinical and other equipment was not always available at hospitals. In such situation, we had to follow an assumption of using capital asset cost data from similar level hospitals included in the study. For all equipment and furniture, the cost was obtained and multiplied by the depreciation rate to estimate the annual depreciation value.

2.1.2 Cost of Personnel services

All hospitals had information on their personnel services cost. The source of information for filling up the forms included salary /plantila/ records, financial statement, staff time table as well as interview with human resources or administrative officers. We attempted to account all persons participated in service delivery and other operations of the hospital. The personnel included in accounting of the personnel services costs were all regular, part-time, casual and contractual employees. For some hospitals, casual workers were paid by the provincial government units or health departments, for others the fee came from trust funds. We reflected staff costs where there data and records were available. In some circumstance, we also had to take proxy measures in order to account staff costs. For example, the official record of personnel services did not show interns and volunteers worked in the hospital. We then estimated the cost for these categories of staff by taking the average salary and remuneration rate of similar level staff at that hospital.

The personnel services costs included all types of basic salary and wages as well various non-wage compensations provided to employees in addition to their normal wages or salaries. It included benefits like step increment, personal economic relief allowance, additional compensation allowance, clothing uniform allowance, subsistence laundry allowance, productivity incentive benefits, extra hazard premium, cash gift, year-end bonus and various contributions. The PhilHealth professional fee is an important part of the personnel services costs. At hospitals, for payment of PhilHealth professional fee, there are two types of arrangements existed. Some part of this fee payment was directly transferred to hospitals and distributed among staff (mainly regular staff). However, for other part, it was transferred to medical doctors' private bank accounts. For this latter part, hospitals did not have records therefore we used PhilHealth central office data for Professional fee allocation to these hospitals and distributed amounts to medical doctors.

Since staff did not service only one cost center/department of the hospital, staff time allocation among departments was obtained. Time allocation percents were collected from individuals then multiplied by the total annual staff cost to get the total staff cost of each personnel in that specific department.

2.1.3 Drugs/medicines and medical supplies costs

Drugs/medicines and medical supplies are funded through regular budget as well as trust fund or revolving drug funds. For public hospitals, drug and medical supplies expense funded by trust fund is not recorded in the financial statement. However,

hospitals had good records of trust fund utilization. We also attempted to account expenses of drugs and medical supplies funded by various initiatives including donors, charity, congressional funds etc.

Availability of information on the consumption of drugs and medical supplies varied at study sites. First, none of the hospitals had proper records of the distribution of total consumption of drug and medicines across various cost centers/departments. Information was available in terms of total sell's values. Therefore, various approaches were taken to distribute the total costs of drugs/medicines and medical supplies to various medical and ancillary cost centers. Medicines and drugs are dispensed from the hospital Pharmacy to various medical and ancillary departments. Drug dispenses to each department consisted of two parts: 1) provided or replaced by pharmacy for emergency cases and 2) bought by patients for utilization during hospitalization. At some hospitals there were records of drug and medicines supplies to various wards and departments for emergency replacement. This allocation statistics was used to distribute the total cost across cost centers. In other sites, such information was not available. In these circumstances we studied a sample of prescriptions. Periods to study were selected in consultation with pharmacists. Prescriptions show drugs and medical supplies as well as name of prescribing doctors. For each prescription selected we recorded costs for medicines and supplies separately by various departments. The resulting statistics was used to estimate the annual total cost for medicines and medical supplies dispensed from Pharmacy department to various cost centers.

Medical supplies to clinical cost centers are provided by pharmacy, central supply office and central supply room. Medical supplies dispensed from Pharmacy include syringes, needles and other small items. The supply office also had some records of medical supplies by types of supplies. In most cases the records separated issuances to laboratory, diagnostic imaging and operating rooms. The total cost of medical supplies was allocated to various inpatient and outpatient cost centers based on the shares received through examination of prescriptions.

In other situations, the information on drug and medical supplies distribution could be obtained neither from hospital records nor from the prescriptions. In these situations percentage of distribution has been estimated using: (a) allocation to cost centers estimations according to the chief of Pharmacy, (b) analysis of expenses on drugs and medical supplies (info prepared by the accountant office) and (c) quick review of workload according to statistics. Notwithstanding, using this approach for final cost allocation of drug/medicines and medical supplies to various cost centers deserves cautious consideration, since no single evidence has been collected to come up with the final distribution aside from laboratory and X-ray diagnostic, classified separately by the accountant department.

2.1.4 Other recurrent costs

Other recurrent costs were taken as recorded in the financial statement of hospitals. Recurrent costs or maintenance and operating expenses included traveling expenses, training expenses, office supply expenses, postage and deliveries expenses, telephone expenses-Landline telephone expenses-mobile subscriptions expenses gasoline, oil and lubricants expenses, food supply expenses, water and electricity expenses, janitorial

services, general services and security services, repair and maintenance of equipment, building, motor vehicles and other maintenance and operating expenses.

Step 4: Assign inputs to cost centers. Once costs of inputs are defined, they were allocated to various administrative, ancillary and medical services cost centers. Personnel services cost, drug and medical supplies cost, capital assets costs were directly allocated to each of the cost centers as described in the previous section. Other recurrent cost items were allocated among various departments based on predefined set of rules.

Table 1: Allocation rules for assigning inputs to cost centers

<i>Inputs/Resources</i>	<i>Allocation rules</i>
Personnel services cost, drug and medical supplies cost, capital assets costs	Allocated directly to respective cost centers
Traveling cost	Allocated to administrative services cost center
Food supply and cooking gas cost	Allocated to inpatient wards based on number of bed days
Electricity, water, general services, and other hotel services, equipment and building maintenance costs	Allocated to cost center on the basis of floor area of each cost centers
Gasoline, oil lubricants and vehicle maintenance costs	Allocated to emergency and administrative services cost center on the basis of cost values of the ambulance and administrative services vehicles
Office supply costs, postage and deliveries expenses, telephone expenses, subscriptions expenses and training costs	Allocated to cost centers on the basis of full time equivalent staff

Step 5: Allocate all costs to final cost centers. Once the input costs are allocated to various cost centers, the full costs of Administrative services and Ancillary services cost centers are allocated to Clinical/medical services cost centers through step down allocation process. We used number of full time equivalent staff of each ancillary and medical services cost centers to be the basis for allocating the full cost of administrative services cost center. We then allocated all total cost of ancillary services cost centers costs into medical services cost centers or wards and outpatient departments.

Table 2: Allocation keys for allocating ancillary services costs to medical cost centers

<i>Cost centers</i>	<i>Allocation keys</i>
<i>Imaging</i>	Percentage distribution of images done in inpatient, outpatient and emergency cost centers obtained. Allocated to inpatient cost centers based on number of bed days
<i>Laboratory</i>	Percentage distribution lab tests done in inpatient, outpatient and emergency cost centers obtained. Allocated to inpatient cost centers based on number of bed days
<i>Operation theatre</i>	Percentage distribution of major surgeries done for Ob&Gyne, Surgery and Private patients obtained.
<i>Delivery room</i>	Allocated fully to Ob&Gyne cost center
<i>Pharmacy</i>	Percentage distribution of prescriptions serviced for inpatient, outpatient and emergency cost centers obtained. Allocated to inpatient cost centers based on number of bed days
<i>Physical therapy</i>	Percentage distribution of physical therapy patients in inpatient, outpatient and emergency cost centers obtained. Allocated to inpatient cost centers based on number of bed days
<i>Dietetics</i>	Allocated to inpatient cost centers based on number of bed days

Step 6: Compute unit cost for each final cost center. In this step, all total costs for each clinical/medical cost centers are related to the outputs delivered during 2007. The unit cost is calculated by dividing the all total cost of wards, outpatient department, and other final service delivery cost centers into total number of outputs. For instance, the unit cost of medical ward is estimated by dividing the all total cost into total number of discharges and bed days.

The final results were estimated using the Excel based tool. For top down costing, with some adjustments the hospital costing software called “Hospical” was used to calculate the final costs. The Hospical was developed by the Institute of Management Sciences for Health in the United States. Although it is possible to develop a similar kind of cost estimates model easily, we used the Hospical because the software has been tested and used in Philippine hospitals and have been adjusted to reflect hospital structural and administrative characteristics of different hospitals in this country. The Hospical uses a “step-down” approach to allocate administrative, ancillary costs to departments providing the final patient care service.

2.2 Bottom up costing and data collection

It is argued that with the top-down costing method, the allocation of average expenditures per inpatient served is obtained, but the total cost of resources/inputs used to treat a patient with a particular disease, regardless of the number of patients served, is not estimated. Therefore, the alternative method is the bottom-up or resource costing. The Bottom-up costing requires recording of every item of service that a patient receives, and changing them into costs. Bottom-up costing gives more accurate results, but it requires a large investment in time and resources. In this study the bottom-up

approach was used to 1) obtain the case specific unit costs on five common diseases and 2) to validate the unit cost estimates produced through top-down costing method.

The total cost of a patient at the hospital consists of direct and indirect costs of all inputs/resources used to treat or provide various services.

2.2.1 Direct costs

Direct costs are costs of inputs used in service delivery that can be directly assigned to patients. Direct costs included 1) cost of staff serviced or attended the patient 2) cost of drugs and supplies used and 3) cost of diagnostic and imaging tests performed.

Costs of staff serviced patient

Direct cost for staff cost covers staff of the inpatient department where the patient admitted and the outpatient/emergency staff cost where patient had been initially consulted or referred from. Basic salaries and additional allowances, bonuses, contributions, payments were obtained from hospital personnel services administrative records as described above in the top-down costing section. We also added the share of distribution from PhilHealth professional fee to each staff. Summing up all staff costs gave the total staff cost of each cost center. In order to estimate staff cost per patient, the total staff cost for each cost center was divided by the total number of outputs like bed days/outpatient visits/emergency visits, ancillary services. This unit cost was then multiplied by bed days of individual patient to estimate staff cost per patient.

Cost of inpatient drugs/medicines and medical supplies

Drugs/medicines and fluids prescribed to the patient were recorded on Patient Charts. Acquisition unit costs of each drug were obtained from pharmacy offices of each site. Drugs prescribed and purchased by patients for take home or during hospital confinement were also recorded from Patient Charts. On the other hand, Patient charts did not show the medical supplies used for patients. This information was impossible to find from hospital patient level records within the timeframe of the data collection. Medical supplies used for patient was calculated by dividing the total cost of medical supplies allocated to respective department/cost center into annual total number of bed days. The departmental level medical supplies cost is obtained through top-down allocation process. This number is then multiplied by bed days for the specific patient to get total cost of medical supplies used during the hospital stay.

Cost of laboratory tests and diagnostic images

Direct costs for imaging and laboratory tests consist of staff time and medical consumables. Staff time cost per one imaging diagnose and laboratory tests is estimated by dividing the total annual staff cost for diagnostic and laboratory staff into total number of tests and images performed in 2007. Then the average cost per unit of output or per diagnostic image and laboratory test will be multiplied by the number of tests and images performed for the patient.

In order to estimate cost of medical consumables, the lists, quantities and unit cost of all supplies used in laboratory tests and diagnostic images were obtained in consultation with laboratory and diagnostic imaging technicians. The average unit cost of each item was taken from central supplies or procurement offices. Based on acquired data, total cost of medical consumables was estimated. The total cost was multiplied by number of

tests and images performed for each patient in order to get the total cost of medical supplies used.

Cost of surgical operation

Cost of surgical operation is incurred if patient went through such procedures. Direct costs of surgery performed for the patient consists of the cost of staff and the cost of the medical supplies. For the operating room (OR), the average staff cost per an hour of surgery is calculated. The average duration of each minor and major types of surgical operation is taken on the basis of judgments provided by surgeons or operating room nurses. The total hours for all surgeries are estimated multiplying the average hour for minor and major types of surgeries by the actual total number of surgeries. The total OR staff cost then divided by the total hours to get the average staff cost per an hour of surgery. In order to get surgical staff cost per patient in the sample, the average staff cost per hour of surgery will be multiplied by the time duration of that specific operation or procedure which is recorded in the Patient Chart.

The cost of surgical supplies was estimated by obtaining the list of supplies, their quantities/volumes used for specific type of minor and major surgeries performed for the patient. Unit cost of surgical supplies and consumables were taken from hospital supplies/procurement office. Among 5 disease categories examined, the most common types of surgical procedures performed included perineal repair and extra capsular cataract extraction (ECCE).

2.2.2 Indirect costs

Indirect costs are costs of resources/inputs shared among all patients at the department or hospital. It is impossible to assign these types of costs into a specific patient. Indirect costs include labor cost of administrative staff, overhead expenses (office supplies, travel expenses, communication expense etc...), depreciation of equipment and furniture (equipment and furniture in the clinical departments, diagnostic departments, operating room) and equipment and building for common use.

Administrative services labor cost

Although administrative staff does not directly provide clinical services their costs should be included in calculation of patient costs. Administrative staff such as chief of the hospital, finance and budgeting officers, housekeeping and laundry workers is responsible for ensuring a smooth provision of clinical services to all patients by providing supportive services like personnel management, accounting, cleaning of wards, washing linens and supply of necessary medical and other items. Therefore in order to estimate their costs at patient level, administrative staff costs are shared among all patients. We estimated the total annual staff cost of the administrative services cost center and divided by total annual number of bed days which gave us the average annual administrative staff cost per bed day. The staff cost per patient in question is then calculated multiplying the cost per bed day by the length of stays for that patient.

Capital asset costs

Capital costs are reflected in costing of patient through calculating their depreciation value for each reporting period. In this costing study we calculated depreciation of building, depreciation of operating room equipment if patient went through surgical procedures, depreciation of image diagnose and testing equipment, depreciation of building and equipment for common use, and depreciation of clinic (diagnose)

equipment. Depreciations of building and equipment will be included in total costs for patient by getting department level total depreciation cost divided by the total number of bed days, laboratory tests, diagnostic images and surgical operations to get the building depreciation cost per output. The cost will then be multiplied by length of stays of patients investigated.

The study attempted to separate capital assets utilized for specific department and those for common use such as conference rooms, garage, garbage tank, water tank, pump station, lift and loudspeaker etc. The annual depreciation cost for these capital items were allocated to each patient total cost on a bed day basis.

Other indirect costs

All expenses are recorded on hospital financial statements. We separated all direct and indirect expenses which were already allocated to patients. Other indirect costs were allocated among patients on the basis of bed days. This means that the cost of these items are summed and divided by total number of bed days of the hospital to get the other indirect cost per bed day. This unit cost is then multiplied by the length of stays of the patient in question to estimate the total other indirect cost used.

Calculation of patient level total costs

First, the total cost of all patients sampled in each disease category is estimated by summing the direct and indirect costs for all patients. Then the average cost for each disease category or patient was calculated by dividing the total cost into the number of patients or number of samples selected on each case. In order to estimate total cost for patient services we developed a patient costing input output spreadsheet model. This tool allowed us to look at direct and indirect cost components of all patients by all specific cost items. The tool can be used for any type of disease category.

3 STUDY SITES AND SURVEY TEAM

3.1 Hospitals

The hospitals to be involved in this study were selected through stratified convenience sampling approach. Initially we selected 15 hospitals (See Appendix 2) based on predefined set of criteria. The criteria were decided during discussions with relevant officials at PhilHealth and Department of Health as follows:

- PhilHealth accreditation
- 3 island groups (Luzon, Visayas, Mindanao)
- F1 provinces
- Mainly secondary and tertiary
- DOH and LGU hospitals
- Accessibility to reach and willingness to participate
- Stronger HIS
- Provinces with higher PhilHealth claims and enrolment
- Public and private
- Coordination with other pilots (contracting, PhilHealth pilot hospitals on Benchbook and E-logbook etc...)

However, after testing the survey instruments at Quirino Memorial Medical Center and Mother Regina Hospital, we had to revise and concentrate on following key criteria:

- PhilHealth accreditation
- 3 island groups
- F1 provinces
- Accessibility to reach and willingness to participate
- Secondary and tertiary
- Mainly public hospitals

The reasons for refining the criteria for selection of hospitals were:

- Reluctance of cooperation by private hospitals and lack of incentives to participate
- Consideration of PhilHealth central office and provincial staff work schedule
- Limitations due to travel safety issues
- Time allocation for data collection

Thus, the final selection of study hospitals came down as in the Table below. We encountered issues such as limited cooperation by particularly private hospitals, unavailability of required data, time constraints by the surveyors etc. Appendix 2 shows the initial as well as final list of selected hospitals.

Table 3: Distribution of hospitals participated in the costing study

Island groups	Provinces	Secondary level hospitals	Tertiary level hospitals
LUZON	Manila		Quirino Memorial Medical Center
	Pangasinan		Region 1 Medical Center
VISAYAS	Capiz		Roxas Memorial Provincial Hospital Capiz Emmanuel Hospital
MINDANAO	Davao Del Norte	Kapalong District Hospital	Davao Regional Hospital
	Agusan Del Sur	Bunawan District Hospital,	D.O.Plaza Hospital

3.2 Disease categories

This study used two types of costing methodologies which will be described in more detail in the following Section. For the purpose of conducting bottom-up costing study, we selected top five common disease categories which are commonly claimed from PhilHealth by the hospitals in Philippines:

- 1) Pneumonia, organism unspecified
- 2) Acute bronchitis
- 3) Normal single delivery
- 4) Asthma
- 5) Senile cataract

There was an initial suggestion to cost 20 cases of each disease category at each hospital. However, the actual number of cases was decided during data collection process at each hospital in discussion with hospital doctors, on the basis of number and complexity of cases treated while ensuring the accuracy and completeness of Patient Charts kept at sites. It should be noted that except one private hospital, all other public hospitals in the study sample serviced only 4 out of the 5 disease categories. Tertiary hospitals do not treat acute bronchitis cases.

Table 4: Number of patients surveyed for bottom-up costing exercise

Disease category	Kapalong District Hospital	Bunawan District Hospital	Quirino Memorial Medical Center	Region 1 Medical Center	Roxas Memorial provincial hospital	Capiz Emmanuel hospital	Davao Regional Hospital	D.O.Plaza Hospital	Total sample size
Pneumonia, organism unspecified	20	10	15	15	15	15	20	20	130
Acute bronchitis		16		4		7		17	44
Normal single delivery	20	6	19	15	20	20	20	20	140
Senile cataract			17	15	6	10	20		68
Asthma	13	5	20		7	13	20	20	98
Total	53	37	71	49	48	65	80	77	480

The final number of cases came down to 480 instead of 640 as initially planned.

3.3 Survey team and instruments

This study was conducted with extensive participation and leadership of PhilHealth staff (Appendix 3). Based on the methodology discussed during the inception phase and using the survey instruments, the data collection efforts were organized and assisted by PhilHealth central office staff from various departments. Departments involved include Benefits Development and Research, Actuary, Health Informatics System and Accreditation. The survey instruments were first tested out at Quirino Memorial Medical Center in Manila. Although the process was lengthy and tedious, we collected a complete set of data on this hospital hence included in the study, as one of the official survey sites. Since this study used top-down and bottom-up costing methods at same time, the survey instruments were designed to ensure data requirements of each approaches. Following survey instruments were used for this study:

1. Hospital costing form: Personnel services cost and time allocation
2. Hospital costing form: Drugs and medical supplies cost
3. Hospital costing form: Capital assets: Building, medical and non medical equipment and fixtures
4. Hospital costing form: Service utilizations and Operating room surgeries
5. Hospital costing form: Expenses and Revenue
6. Patient costing form: Patient basic information
7. Patient costing form: Drugs and medicines
8. Patient costing form: Laboratory and Diagnostic imaging supplies
9. Patient costing form: Surgical supplies

The Terms of references included tasks to study perceptions of different stakeholders' views on hospital payment reform. The instruments were designed however, given the time frame and extend of efforts needed to collect costing data did make it possible to for data collectors to pay proper attention to this part of the exercise. Therefore, we had to concentrate efforts on the actual costing exercises.

During study design phase, surveyors were briefed on costing data collection instruments and methods. Prior to data collection process, an instruction to surveyors was developed and distributed. Moreover, in order to minimize the workload and help to ensure an optimal time allocation for data collection, PhilHealth central office sent an official letters to respective provincial offices and hospitals. There were 9 survey teams comprised from 3-4 surveyors for each site. Each team was led by a PhilHealth central office staff. For most sites, either provincial or service office staff of PhilHealth has participated and facilitated the data collection process. On average, data collection at each site took, 2-3 days. Various types of data from different areas of hospital structure and operations were collected. Most importantly, cost data as well as statistics on service activities (discharges, inpatient days, outpatient visits) were gathered.

4 GENERAL INFORMATION ON HOSPITALS

Before we present main results, this section gives short outline of the main characteristics of the hospitals participated in this study.

Table 5: Main activity indicators, all hospitals

Type of hospitals	Name of hospitals	Number of beds	Number of discharges	Number of bed days	ALOS	Number of outpatient visits	Number of staff	Total cost, pesos
Secondary hospitals	Bunawan District Hospital	50	5,709	16,617	3	11,737	107	25,629,436
	Kapalong District Hospital	25	2,910	4,415	2	12,055	54	18,877,774
Tertiary private hospital	Capiz Emmanuel Hospital	108	5,330	19,932	4	34,277	325	120,301,315
Tertiary public hospitals	D.O. Plaza Hospital	143	14,048	40,623	3	32,298	278	89,962,601
	Roxas Memorial Provincial Hospital	116	6,879	35,699	5	19,615	167	72,620,615
	Quirino Memorial Medical Center	294	21,630	138,292	6	98,438	627	439,326,935
	Region I Medical Center	300	23,698	104,653	4	90,475	657	221,907,417
	Davao Regional Hospital	455	24,137	113,467	5	80,017	618	317,588,344
	Average for all hospitals	186	13,043	59,212	4	47,364	354	163,276,805
	Average for tertiary public hospitals	262	18,078	86,547	5	64,169	469	228,281,183

As shown in the table above, the study covered range of hospitals that has different characteristics in terms of size, service activities, and costs. Between two secondary hospitals, BDH keeps twice as many beds as the KDH and provides higher number of and more intensive inpatient services. Among tertiary hospitals, it can be observed that D.O Plaza, Roxas Memorial and Capiz Emmanuel hospitals have similar sizes and service activities and are fairly comparable. On the other hand, QMMC, R1MC and DRH have similar characteristics and therefore to some extent comparable.

The size of hospital beds ranges from 25 to 50 for secondary hospitals and 116 to 455 beds for tertiary public hospitals. Capiz Emmanuel Hospital serviced fewer patient discharges and bed days compared to similar level tertiary hospitals. Among tertiary level public hospitals, Davao Regional Hospital shows the highest number of beds but their bed days are not the among the highest. QMMC clearly seems to be treating more complex patients therefore has longer bed days and ALOS.

5 RESULTS

In this section, we provide the key results of this study. For each hospital in the study, total cost allocation and unit costs were estimated for various cost centers and different disease categories. Foremost of all, it should be noted that there were only two secondary hospitals and one private tertiary hospital involved in the study. Therefore it is difficult to make any definite conclusions based on respective cost results. For these hospitals the cost results are shown only for illustrative purposes.

5.1 Secondary hospitals

The two secondary hospitals participated in the study sample are Kapalong District Hospital (KDH) in Davao Del Norte and Bunawan District Hospital (BDH) in Agusan Del Sur provinces. Following Figure 2 shows the breakdown of the total hospital cost by major provinces. It can be observed from the figure that both hospitals spent higher share of their resources on personnel services.

Figure 2: Hospital cost breakdown by major line items-Secondary hospitals, percent

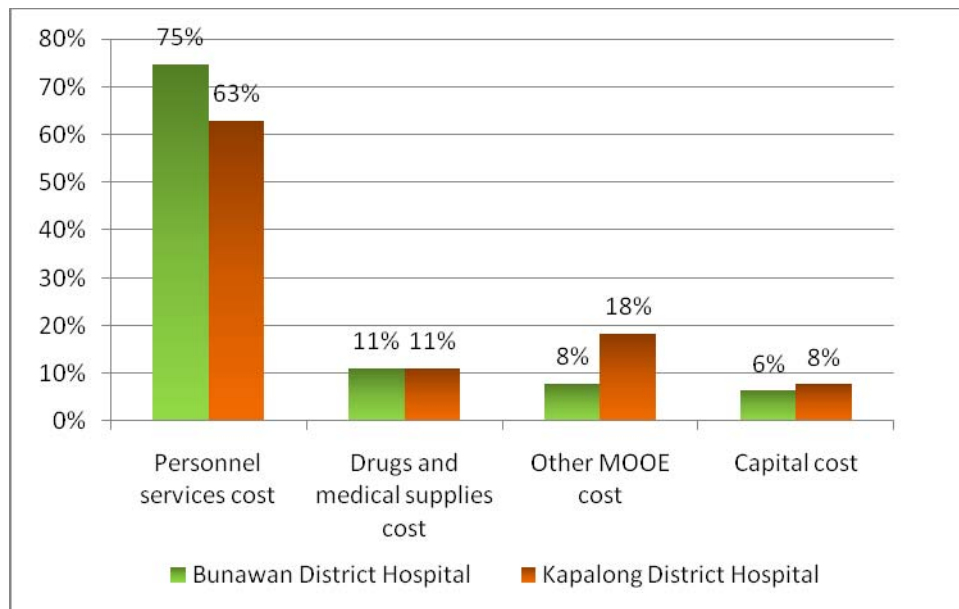


Table 6 shows the weighted average unit costs for different inpatient specialties. Based on the data in the table, we can observe that on average, costs are higher at KDH. It can be explained partially due to lower level of outputs and higher fixed costs.

Table 6: Comprehensive unit cost per discharge by inpatient specialties-Secondary hospitals, in pesos

Hospital name	Medicine		Ob&Gyne		Pediatrics		Surgery	
	Per discharge	Per bed day	Per discharge	Per bed day	Per discharge	Per bed day	Per discharge	Per bed day
Bunawan District Hospital	2,856	975	2,147	768	2,372	787	12,449	4,179
Kapalong District Hospital	3,612	1,199	4,236	2,720	3,187	1,129	8,868	4,766

Table 7 shows the unit costs of other key clinical services provided at two hospitals.

Table 7: Unit cost of other clinical services, in pesos

Hospital name	Per OPD visit	Per ER visit	Per X-ray	Per Lab test	Per Delivery
Bunawan District Hospital	163	501	349	34	1,383
Kapalong District Hospital	293	1,445	340	32	3,374

In addition to calculating unit costs of various wards and outpatient services, the study estimated average costs of 30 pneumonia, 16 acute bronchitis, 26 normal single delivery, and 18 asthma cases at two secondary hospitals. KDH did not service acute bronchitis patients in 2007.

Table 8: Unit cost of selected disease categories-Secondary public hospitals, in pesos

Unit cost components	Pneumonia		Asthma		SPD		Acute bronchitis
	BDH	KDH	BDH	KDH	BDH	KDH	BDH
Direct costs							
Medicines and supplies cost	1,111	1,855	1,071	1,471	319	841	996
Diagnostics cost	614	1,459	850	1,034	547	178	626
Clinical staff cost	1,726	810	1,808	500	1,304	781	1,742
Indirect costs							
Overhead costs	2,695	2,922	2,560	1,924	1,572	1,864	1,937
Depreciation of capital assets	280	598	304	343	75	662	235
Average	6,425	7,645	6,593	5,271	3,816	4,326	5,537

Table 8 shows that, at two secondary hospitals, unit cost of treating pneumonia case amounts to 7,035P; asthma 5,932P; NSD 4,071P and acute bronchitis 5,537P respectively.

Table 9: Cost structure of selected disease categories-Secondary public hospitals, percent

Unit cost components	Pneumonia		Asthma		SPD		Acute bronchitis
	BDH	KDH	BDH	KDH	BDH	KDH	BDH
Direct costs							
Medicines and supplies cost	17%	24%	16%	28%	8%	19%	18%
Diagnostics cost	10%	19%	13%	20%	14%	4%	11%
Clinical staff cost	27%	11%	27%	9%	34%	18%	31%
Indirect costs							
Overhead costs	42%	38%	39%	36%	41%	43%	35%
Depreciation of capital assets	4%	8%	5%	7%	2%	15%	4%
Total	100%	100%	100%	100%	100%	100%	100%

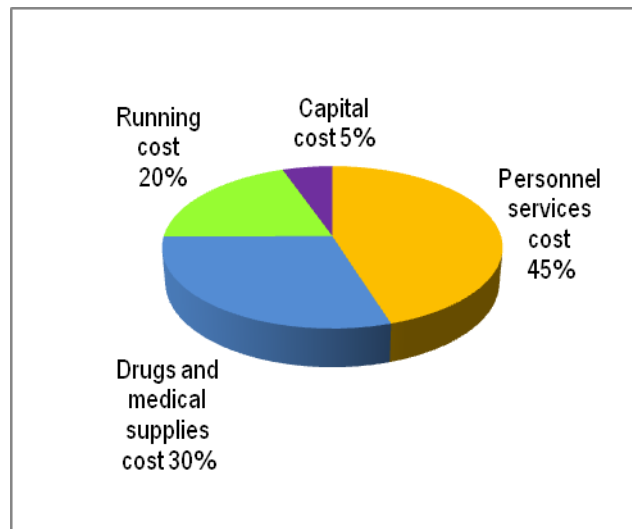
As shown in the table 9, the direct cost takes about half of the total unit cost while the overhead cost takes approximately 40% at secondary hospitals. Among direct cost components, BDH spent more on staff cost and KDH utilized more medicines and supplies.

5.2 Private hospital

Although we planned to cover 4 private hospitals, only one tertiary private health facility was able to fully participate in this study. Lack of cooperation to provide necessary information and limited time allocation for data collection prevented us to further continuing the exercise at other private hospitals. The private facility studied here, is the Capiz Emmanuel Hospital in Roxas city.

The total cost for Capiz Emmanuel Hospital amounted to 120,301,315P in 2007. The structure of annual total cost is shown in the figure below.

Figure 3: Capiz Emmanuel Hospital cost structure, percent



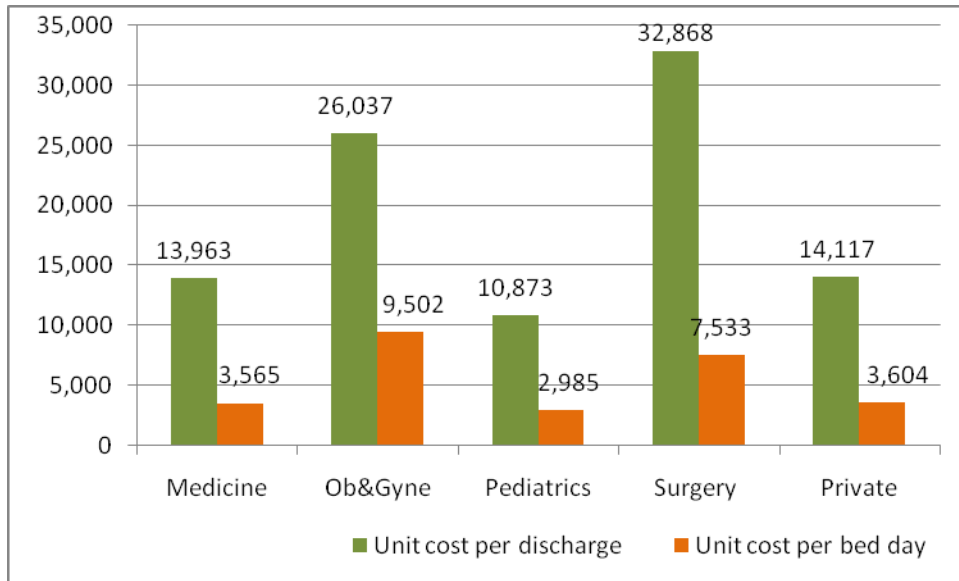
As shown in the above figure, the recurrent cost takes 95% of the total cost and only 5% for capital costs. The share for capital cost might be underestimated due to weaknesses in capital asset management information system. It was very difficult to obtain reliable and comprehensive information on capital asset. The hospital did not have the full list of inventory of assets. As expected, within the recurrent cost, the labor cost and drugs&medical supplies cost took 75% in the total value.

Table 10: Capiz Emmanuel Hospital-Hospital inpatient activity, 2007

Cost centers	Number of beds	Number of discharges	Number of bed days	ALOS	Bed Occupancy rate
Medicine	26	1,001	3,921	3.9	41%
Obstetrics&Gynecology	8	612	1,677	2.7	57%
Pediatrics	16	1,519	5,533	3.6	95%
Surgery	18	427	1,863	4.4	28%
Private	40	1,771	6,938	3.9	48%
Total/ Average	108	5330	19932	4	53.9%

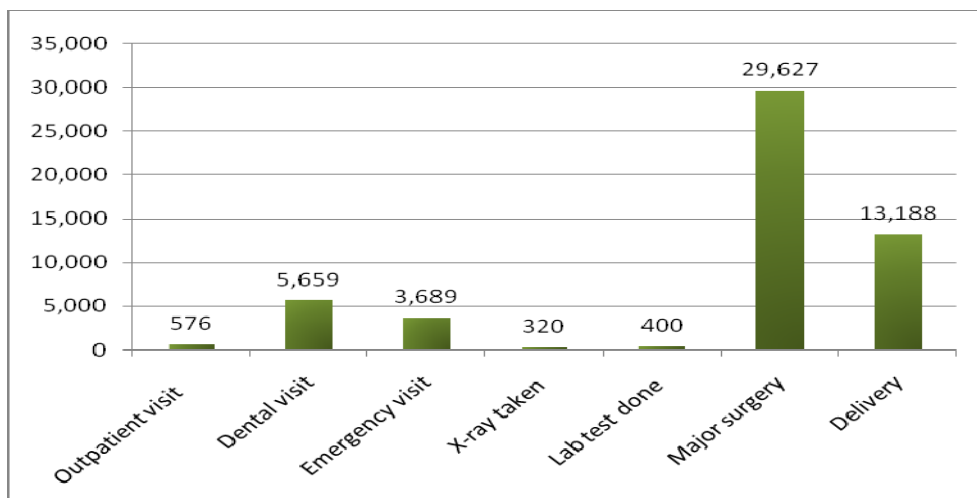
Table 10 shows that the hospital has almost fully utilized pediatrics beds. However, other inpatient wards show only 28%-57% of available beds occupied in 2007. Given that the ALOS is in the same level as other hospitals, the Capiz Emmanuel Hospital have been servicing an excess bed capacity in medical, Ob&Gyne, Surgery and Private wards. This is reflected in the unit cost of services which show higher costs for both bed day and discharge for Ob&Gyne, Surgery, Medical and Private wards.

Figure 4: Weighted average unit costs of key inpatient specialties-Capiz Emmanuel Hospital, in pesos



The unit cost per bed day at Ob&Gyne ward is higher than cost results of surgery and medical wards. Among other things, it can be partially related to lower level of Ob&Gyne discharges and high unit cost for delivery (Figure 5).

Figure 5: Weighted average unit cost of other clinical services-Capiz Emmanuel Hospital, pesos



At Capiz Emmanuel hospital, we estimated patient level average resource costs of 15 pneumonia, 7 acute bronchitis, 20 normal single delivery, 10 senile cataract, and 13 asthma cases. Table 11 displays the average unit cost per patient of five disease categories.

Table 11: Unit cost of selected disease categories-Capiz Emmanuel Hospital, in pesos

Unit cost components	Pneumonia, organism unspecified	Acute bronchitis	Single Spontaneous Delivery	Senile Cataract	Asthma
Direct costs					
Medicines and supplies cost	4,974	2,561	3,868	6,602	4,451
Diagnostics cost	768	545	257	195	483
Clinical staff cost	4,276	4,184	7,432	8,357	3,718
Indirect costs					
Overhead costs	4,869	4,956	2,830	1,826	4,213
Depreciation of capital assets	1,003	900	654	432	926
Average cost per patient	15,890	13,146	15,040	17,413	13,792
ALOS	2.7	2.7	1.6	1.0	2.3

Average cost per patient is much higher than patients treated at the public hospitals shown in the next section.

Figure 6: Cost structure of selected disease categories-Capiz Emmanuel Hospital, percent

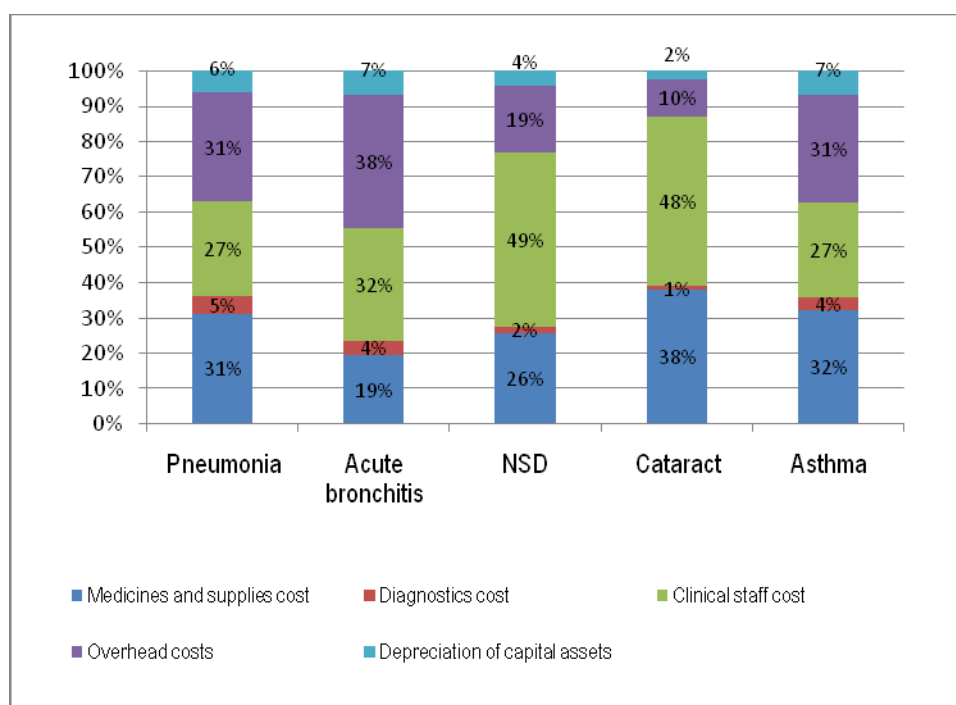


Figure 6 shows that medicines, supplies cost and labor costs are largest cost items at this hospital.

5.3 Public tertiary hospitals

The study covered 6 tertiary public hospitals in five provinces of three island groups. Although Pangasinan Medical Center was selected in the final list of hospitals, the collected data was not complete thus omitted from the final analysis.

In this study, most observations, conclusions and recommendations are therefore focused to exclusively to tertiary public hospitals.

5.3.1 Total cost

Table 12 gives the overall distribution of the total cost by main service areas or structures of hospitals.

Table 12: Distribution of hospital total cost by major service areas-Tertiary public hospitals, percent

Name of Hospitals	Inpatient services	Outpatient services	Emergency	Ancillary Services	Administrative services	Total Cost
D.O. Plaza Hospital	34%	9%	5%	28%	24%	100%
Roxas Memorial Provincial Hospital	35%	7%	8%	34%	15%	100%
Quirino Memorial Medical Center	46%	5%	4%	29%	16%	100%
Region I Medical Center	38%	5%	5%	32%	20%	100%
Davao Regional Hospital	43%	7%	7%	26%	18%	100%
Average	39%	7%	6%	30%	19%	100%
<i>Std Dev</i>	<i>(5%)</i>	<i>(2%)</i>	<i>(2%)</i>	<i>(3%)</i>	<i>(4%)</i>	

On average, tertiary public hospitals spend around 80% of their total cost for clinical services such as inpatient, outpatient, ancillary⁴ and emergency services and 20% for administrative services. This is observed to be in the higher range when compared to cost data in some other countries.

Table 13 shows the cost breakdown of the total hospital costs by major economic line items.

Table 13: Hospital cost breakdown by major line items-Tertiary public hospitals, percent

Name of the hospitals	Personnel services cost	Drugs and medical supplies cost	Running cost	Capital cost	Total cost
D.O. Plaza Hospital	58%	18%	9%	15%	100%
Roxas Memorial Provincial Hospital	45%	27%	12%	16%	100%
Quirino Memorial Medical Center	38%	29%	20%	13%	100%
Region I Medical Center	43%	29%	17%	11%	100%
Davao Regional Hospital	35%	34%	22%	8%	100%
Average	44%	27%	16%	13%	100%
<i>Std Dev</i>	<i>(9%)</i>	<i>(6%)</i>	<i>(5%)</i>	<i>(3%)</i>	

⁴ Ancillary refers to Diagnostic imaging, laboratory, operating room, delivery room, and physical therapy services.

The personnel services and drugs/medicine medical supplies cost is the two major resources in the hospital service delivery business. Therefore, as one can expect, the staff cost is the largest cost item in all hospitals. Drug and medical supplies and, personnel services costs took the largest (71%) share in total hospital costs in studied hospitals. This is in line with other study⁵, which showed that 64% of total hospital budget was allocated to Personnel services, 28% for MOOE and 8% for capital costs.

Table below shows the allocation of hospital revenues in 2007. For five tertiary hospitals, the biggest contributor is the government general revenue (50%). PhilHealth funded only 25% of the total revenue whereas items such as out-of pocket payment, income from rent and trust fund take 25%.

Table 14: Hospital revenue structure-Tertiary public hospitals, percent

Hospital name	National and local budget	PhilHealth	Hospital business income (OOP, rent income, trust fund etc...)	Total
D.O. Plaza Hospital	71%	23%	5%	100%
Roxas Memorial Provincial Hospital	61%	31%	7%	100%
Quirino Memorial Medical Center	28%	11%	62%	100%
Region I Medical Center	57%	28%	15%	100%
Davao Regional Hospital	32%	30%	38%	100%
Average	50%	25%	25%	100%

5.3.2 Key medical service output statistics

In this section, we will show some key service statistics that can help to partially explain variations in inpatient unit costs for discharge and bed day. These statistics include average length of stay (ALOS) and bed occupancy rate (BOR). The Appendix 4 shows more detailed picture of unit cost and service indicators of all hospitals.

⁵ Philippine Hospital study, World Bank 2008

Table 15: Service indicators by inpatient specialties-Tertiary public hospitals

	D.O. Plaza Hospital	Roxas Memorial Provincial Hospital	Quirino Memorial Medical Center	Region I Medical Center	Davao Regional Hospital	Average	Std Dev
ALOS							
Medicine	2	5	8	4	5	5	(2)
Obstetrics&Gynecology	3	5	4	4	3	4	(1)
Pediatrics	3	5	7	6	6	6	(2)
Surgery	3	6	9	3	6	5	(2)
AVERAGE	2.8	5.2	7.0	4.5	4.8	4.9	
Bed Occupancy rate							
Medicine	66%	99%	105%	88%	58%	83%	(21%)
Obstetrics&Gynecology	103%	76%	212%	98%	89%	115%	(55%)
Pediatrics	110%	90%	175%	96%	84%	111%	(37%)
Surgery	55%	106%	70%	101%	62%	79%	(23%)
Private	73%	14%	85%	95%	36%	61%	(34%)
AVERAGE	81.4%	77.2%	129.4%	95.5%	65.8%	89.8%	

The average length of stay in selected hospitals is comparable with that of national average data⁶. On average, the ALOS for medical cases is 5 days; Obstetrics and gynecology 4 days; Pediatrics 6 days; and Surgery cases 5 days respectively. The Quirino Memorial Medical Center in central Manila showed much higher ALOS as well as higher bed occupancy rates than the hospitals in other provinces. This could be probably due to the complexity and severity of care provided by this hospital.

The bed occupancy rate shows the extent of hospital bed utilization during reporting year. There is clear excess utilization of Obstetrics&Gynecology and Pediatrics beds in tertiary public hospitals.

5.3.3 Unit costs of key hospital services

Tables below show the summary of unit costs per discharge, per bed day, per outpatient visit, per emergency visit and per ancillary services. In order to make comparisons more reliable, we have weighted average costs. Weighted average cost shows the average unit costs for all hospitals in the sample. Weighted average unit cost is calculated by taking sum of the unit costs of each specific hospital multiplied by respective annual output numbers and divides it by the total number of outputs for all hospitals.

Tables 16 and 17 below present the unit costs per discharge and bed day for major wards of hospital inpatient department.

⁶ A Study of Philippine Hospital Management Administrative system, 1995, Hospital in Philippines, 2008, World Bank

Table 16: Unit cost per discharge by inpatient specialties-Tertiary public hospitals, in pesos

Name of Hospitals	Medicine	Ob&Gyne	Pediatrics	Surgery
D.O. Plaza Hospital	3,318	6,899	4,246	5,079
Roxas Memorial Provincial Hospital	5,385	11,661	7,777	7,271
Quirino Memorial Medical Center	20,070	10,704	11,676	25,893
Region I Medical Center	6,002	8,963	8,686	5,530
Davao Regional Hospital	11,527	7,839	8,345	15,690
Weighted average cost	9,499	9,180	8,746	11,447
<i>Std Dev</i>	<i>(6,763)</i>	<i>(1,970)</i>	<i>(2,652)</i>	<i>(8,926)</i>

On average, the unit cost per discharge at Medical ward is 9,499P, Obstetrics and Gynecology ward 9180P, Pediatrics ward 8,746P and 11,447P at Surgery ward respectively. One can observe a fair amount of variance in the cost per discharge across hospitals. For example, the unit cost of discharge is highest at QMMC located in central Manila compared to provincial hospitals. Higher costs are also related to higher BOR showing that beds are occupied most of the time thus requiring more resources for service delivery. At D.O.Plaza hospital, unit cost per discharge (4,885P) is lower but the BOR is higher (81.4%). This can be related to more efficient way of service delivery compared to, for example, Davao Regional Hospital where unit costs are comparatively high (10,850P) and same time lower BOR (65,8%).

Table 17: Unit cost per bed day by inpatient specialties-Tertiary public hospitals, in pesos

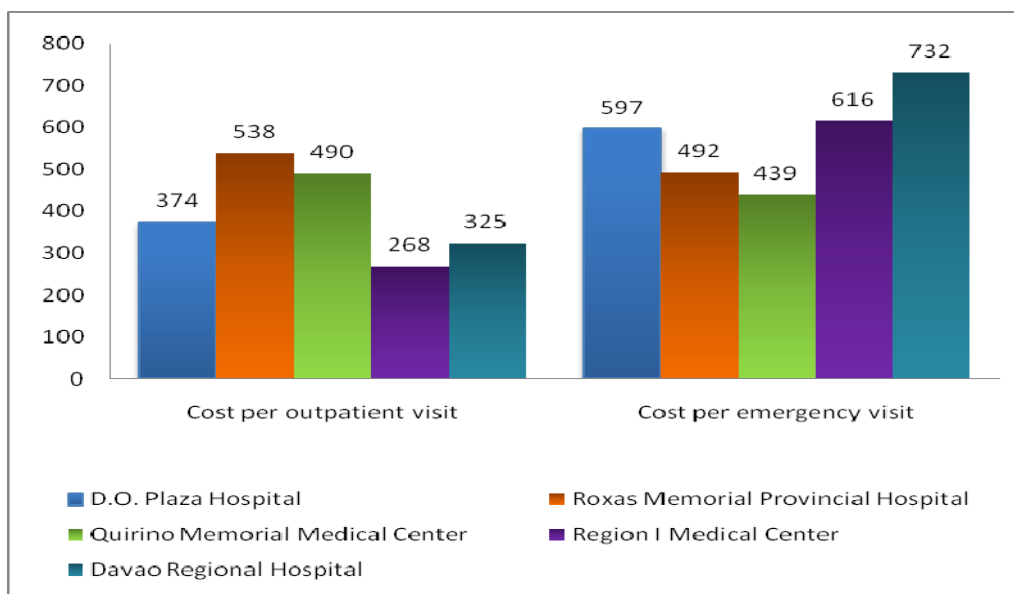
Name of Hospitals	Medicine	Ob&Gyne	Pediatrics	Surgery
D.O. Plaza Hospital	1,577	2,491	1,351	1,968
Roxas Memorial Provincial Hospital	1,100	2,417	1,469	1,256
Quirino Memorial Medical Center	2,412	2,709	1,563	3,009
Region I Medical Center	1,363	2,045	1,353	1,648
Davao Regional Hospital	2,236	2,327	1,446	2,658
Weighted average cost	1,910	2,399	1,461	2,282
<i>Std Dev</i>	<i>(565)</i>	<i>(243)</i>	<i>(89)</i>	<i>(720)</i>

The costs per inpatient bed day for tertiary public hospitals range from 2,399P at Obstetrics&Gynecology ward to 1,461P at Pediatrics ward.

The weighted average unit costs for both discharge and bed day at tertiary public hospitals have shown not more than 30% variations compared to mean value across most inpatient specialties. This result should be taken as good sign for reliability and robustness of estimated results.

Figure 7 shows the average unit costs of outpatient and emergency visits.

Figure 7: Unit cost per outpatient services-Tertiary public hospitals, in pesos



On average, the unit cost per outpatient and emergency visits amount to 378P and 552P respectively. Relatively high unit costs per outpatient visit (Roxas Memorial Hospital) and per emergency visit (Davao Regional Hospital) are partially associated with lower level of annual service outputs.

Table 18: Unit cost of key ancillary services-Tertiary public hospitals, in pesos

Hospital name	Per X-ray taken	Per lab test done	Per major surgery	Per delivery
D.O. Plaza Hospital	392	67	8,176	2,764
Roxas Memorial Provincial Hospital	388	155	9,314	6,813
Quirino Memorial Medical Center	515	57	9,810	3,894
Region I Medical Center	199	69	7,885	2,897
Davao Regional Hospital	269	60	8,551	2,962
Weighted average cost	352	64	8,891	3,392
Std Dev	(122)	(41)	(800)	(1707)

The weighted average cost per X-ray taken is relatively homogenous across most hospitals. The QMMC is showing the highest unit cost per X-ray taken. For the unit cost of laboratory test, one can observe fairly reasonable variance across public tertiary hospitals having a big standard deviation due to the performance at Roxas Memorial Provincial Hospital. The average weighted cost of Operating room major surgery is 8,891P and the standard deviation is pretty low. The unit cost of delivery cost ranges from 2,800P to 6,800P at public tertiary hospitals. The high variance was explained partially due to high unit cost of delivery at Roxas memorial hospital which had lower level of annual number of deliveries.

5.3.4 Cost of specific disease categories

For the bottom-up costing purpose, we sampled 85 pneumonia⁷, cases, 21 acute bronchitis cases, 94 normal single delivery cases, 58 senile cataract cases and 67 asthma cases at tertiary public hospitals. As described in the Methodology section, the cost of one patient or case was calculated through collection of various direct and indirect costs.

Table 19: Unit cost of selected disease categories-Tertiary public hospitals, in pesos

Unit cost components	Pneumonia		Acute bronchitis		NSD		Cataract		Asthma	
Direct costs										
Medicines and supplies cost	2,545	27%	1,478	18%	1,227	18%	6,105	41%	2,062	25%
Diagnostics cost	561	6%	409	5%	369	5%	691	5%	557	7%
Clinical staff cost	1,597	17%	1,353	16%	1,310	19%	4,287	29%	1,651	20%
Indirect costs										
Overhead costs	2,531	27%	1,818	22%	1,683	24%	1,275	9%	1,947	23%
Depreciation of capital assets	812	9%	776	9%	728	10%	1,962	13%	848	10%
Average total cost	8,047	86%	5,834	71%	5,316	77%	14,319	96%	7,065	84%
Std Dev	(2,513)		(1,321)		(592)		(1,303)		(2,611)	

On average, except for cataract case, the direct costs take about 60% of the total cost of treating a patient. Due to special clinical service delivery characteristics of cataract case, the direct cost takes 80% of the total unit cost. The cost of cataract case is observed to be fairly similar across tertiary public hospitals, showing little cost variances.

As mentioned earlier in this report, the reason for selecting two costing methodologies was to validate the accuracy of the results. Following table shows for each of the disease categories, unit costs estimated by using the cost data derived from the top-down approach. For this purpose, types and quantities of services for treating each of diseases were defined in consultation with doctors. These statistics were then multiplied by unit cost figures came out of top-down costing methodology to obtain total cost per disease category.

Table 20: Unit cost of disease categories using top down costing method-Tertiary public hospitals, in pesos

Disease category	First referral visit		Ward stays		Lab Tests		Diagnostic images		Major Surgery		Delivery		Total cost
	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	
Pneumonia	1	399	4	5,726	3	245	1	353					6,723
Acute Bronchitis	1	399	3	4,295	2	163		0					4,857
NSD	1	399	2	1,599	1	82		0			1	3,866	5,946
Cataract	2	798	1	1,471	4	327	1	353	1	8,747			11,695
Asthma	1	399	3	4,295	2	163	1	353					5,210

⁷ Refers to Pneumonia, organism unspecified

The comparison of the results is shown in the table 21. It reveals a positive picture that the variances of unit costs per specific disease categories are relatively small when costs are estimated using both top-down and bottom-up approaches.

Table 21: Comparative display of unit costs by disease categories and costing approaches-Tertiary public hospitals, in pesos

Costing approaches	Pneumonia	Acute Bronchitis	NSD	Cataract	Asthma
Bottom-up costing	8,047	5,834	5,316	14,319	7,065
Top-down costing	6,723	4,857	5,946	11,695	5,210
Differences	1,324	977	-629	2,624	1,855

More precisely, the international studies⁸ which assessed the comparability of costing approaches have shown that average percentage of difference of unit costs between the top-down and bottom-up approach ranged 5%-20%.

⁸ Wordworth S & Ludbrook A: Comparability of costing across countries: Does the approach matter?, Health Economics Research Centre, University of Oxford & Aberdeen, Vertrees.J, Cost Accounting in the Hospital – The Top-down Approach: A Case Mix Perspective. Paper presented during the 1st International Case mix Conference 2003. Auditorium of HUKM Cheras Kuala Lumpur

6 LIMITATIONS

There are several areas of limitations on this study. First of all, due to time and resource constraints, this study was not designed to cover a representative size of hospitals⁹. In addition, the study mainly selected public tertiary hospitals. Therefore, sample size and composition does not give full representation of hospital sector in the country.

In developing as well as developed nations, issues related to hospital level data has long been recognized as a major obstacle to any costing studies with its implication on the accuracy of results. Thus, the second limitation of this study relates to availability and reliability of hospital level data required for costing of hospitals services/outputs. As noted in the previous section, data collection efforts were tedious and survey team encountered issues with availability and reliability of hospital level data. Several important observations needed to be spelled out:

- The current format in which information is kept at the hospital level is less than optimal to analyze and monitor the cost of services.
- Information was not always available at the desired level of detail. As example, data gaps existed in accounting costs by cost centers, registration of utilization of ancillary services, like laboratory tests and x-ray tests by cost centers. Other key information such as information on capital asset was difficult to find, even at the private tertiary hospital. The data on drug and medical supplies was also a challenge. In general, government DOH retained hospitals in general had better administrative records.
- Because of how the hospital information systems are organized, cost data are not always available from routine statistics. There is an emphasis on tracking expenditures by line items for purposes of reporting to individual payer or financier such DOH, LGU etc. There is far less emphasis on creating data needed to improve the performance of a health facility.
- We also observed that there was a lot of variance in the availability of information across similar hospitals and even within one hospital.

These kinds of problems took a lot of time and efforts to resolve during data collection, data cleaning, and data analysis. Therefore, data validation was one of the key challenges that we faced during this study.

Other limitations are related to issues such as time constraints by the hospital side as well as by the surveyors. The data collection took place with assistances of hospital staff while they were performing their routine duties. Therefore, as one can imagine, this was an additional task to them with little or no incentives. Moreover, since PhilHealth staffs were mobilized as data collectors, we had to manage the exercise as such that it did not take too much time and efforts from their routine assignments back at the central office. Therefore, in order to minimize the workload to hospitals and surveyors, time duration for data collection for such an extensive exercise had to be limited to maximum of 3 days at each site.

Lastly, one need to mention the issue of under-accounting of some cost data. For example, despite attempts to cover all possible staff and their respective service costs,

⁹ There are 1522 Philhealth accredited public and private hospitals.

data was calculated based on official roster provided by hospitals. Not all staff involved in service delivery and not all professional fees paid to doctors are captured, as there is no information available at hospitals. In addition, the overhead cost figures are based on actual resources spent as found in the financial statement of the hospitals. In other words, despite attempts to account all possible costs, the study accounted total costs based on actual hospital level data. Moreover, same kind of observation can be made on the bottom-up costing or patient level costing part of this study. The Patient Charts did not always contain all necessary information. This was particularly the case of medical supplies used for patients. Although prescribed drugs were stated, the actual utilization was not recorded on the Patient charts, hence we had to use some proxy approaches based on the available information. This approach might have resulted in underestimation of actual utilizations of key resources like medicines. These types of observations were also mentioned during interviews with hospital staff. Some key staff such as finance, human resources and administrative officers claimed for example, that the hospitals do not have full management leverage over their doctors. It is largely due to the facts that their professional fees are either paid by PhilHealth or by the patients and hospitals do not know how much they were getting. In summary, it should be noted however, that issues of cost under-accounting might have affected the absolute amounts of unit cost figures however will not change the relative cost weights between different cases and inpatient specialties.

7 CONCLUSIONS

The study provided opportunities to have hospital cost information that was necessary for starting up the case based payment system for PhilHealth.

Costs were estimated on key health services. In the total cost breakdown, personnel cost is highest cost category. Labor cost is relatively high in the range, compared to other countries. Thus, given the strong leverage that the professional associations have upon decision makers, the levels of staffing can only increase and, probably will not go down. Therefore, it is a fairly good assumption to consider personnel costs as fixed in the medium term, which could imply that any increase in the utilization levels at the hospital will result equivalent increases in productivity.

The weighted average unit costs for both discharge and bed day at tertiary public hospitals have shown reasonable variations across most inpatient specialties which should be taken as good sign for reliability and validity of estimated results. On average, unit costs per inpatient discharge at tertiary public hospitals were estimated to be 9,499P for Medical ward, 9,180P for Ob&Gyne ward, 8,746P for Pediatrics ward and 11,447P for Surgery ward respectively (Table 22). Unit cost per be day is 1,910P for Medical ward, 2,399P for Ob&Gyne ward, 1,461P for Pediatrics ward, and 2,282P for Surgery ward.

Table 22: Average unit costs of inpatient specialties at tertiary public hospitals, in pesos

Unit costs	Average of all inpatient specialties	Medicine	Obstetrics& Gynecology	Pediatrics	Surgery
Per Discharge	9,502	9,499	9,180	8,746	11,447
<i>Std Dev</i>	<i>(1,193)</i>	<i>(6,763)</i>	<i>(1,970)</i>	<i>(2,652)</i>	<i>(8,926)</i>
Per Bed day	2,065	1,910	2,399	1,461	2,282
<i>Std Dev</i>	<i>(423)</i>	<i>(565)</i>	<i>(243)</i>	<i>(89)</i>	<i>(720)</i>

As expected, there are variances in unit costs of services. Within the available data collected through this costing study, one can provide following explanations for unit cost variances: 1/ service utilization rates and level of outputs, 2/ differences in patient complexity and 3/ average length of stays. In this sense, what we learn about the sources of cost variations, that are what drives cost, may be helpful in identifying ways to improve the performance of service delivery.

- In general, results show that as the number of discharges, bed days, visits increase for a particular service, the unit cost tends to be relatively less. To run a typical medical ward, some costs are fixed (and will have to be incurred in any case) irrespective of the number of inpatients. These fixed costs include for instance, personnel cost and capital costs. Therefore, the more discharges, inpatient days in a ward the lower the average fixed costs per inpatient day will be. Wards with more inpatient days and a high bed occupancy rate will therefore tend to have lower average costs per inpatient day. This might be some of the reason why the costs per inpatient day at private hospital is higher than public

hospitals and why within public hospitals pediatrics ward has lower average cost than others.

- Patient population with increasingly complex and severe conditions requires more and/or expensive drugs, diagnostic services and clinical expertise and sophisticated equipment. This could be for instance the case of Quirino Memorial Medical Center and Davao Regional Hospital where average cost per patient is higher than others.
- Hospital length of stays also appears to be affecting the unit cost results. For example, in the case of D.O.Plaza hospital lower costs per discharge as oppose to Roxas Memorial Hospital for example could be partially explained by length of stays.

Further, other key service cost estimates show that weighted average unit cost per outpatient visit: 378P; per emergency visit: 552P; per X-ray taken: 352P; per lab test done: 64P; per major surgery: 8,891P; and per delivery: 3,392P respectively. As noted, costs variations were also to some extent explained by level of productivity of each hospitals. This means that higher unit costs were result of lower number of annual outputs such as number of deliveries done and x-rays performed.

The detailed investigation of 480 Patient Charts enabled us to estimate individual patient/case level cost for selected key common disease categories that most claimed from the PhilHealth. On average, average costs of cases at tertiary public hospitals ranged at 8,047P for pneumonia-organism unspecified; 5,834P for acute bronchitis; for normal single delivery 5,316P; senile cataract 14,319P; and 7,065P respectively. The direct cost takes about half of the total unit cost while the overhead cost takes approximately 40% at tertiary hospitals. In relation to this, when comparing results of the average unit cost per disease categories within hospitals, we observed relatively high cost of providing services at tertiary hospitals than secondary level facilities. Therefore, further consideration should be given to examining where resources are most appropriately allocated for same diagnosis. For example the cost of a normal single delivery is 4,071P at secondary hospital compared to cost of same service at tertiary hospital (5,316P). Unless there are clear clinical advantages to providing the service at tertiary hospital level, funding for this service should be directed more to the level where it is more optimal and efficient.

8 USES OF COSTING STUDY RESULTS

Based on findings and conclusions we suggest that outputs of this study could be used for several key purposes. However, one should note that for reasons outlined in Section 6, the results should be used with fair caution.

First, results could be used as inputs to the efforts exerted in hospital payment reforms at PhilHealth. As said above, case based payment system pays hospitals on the basis of case mixes with more or less similar resource utilization. A case can be defined as hospital stay or inpatient discharge or complete episode of care. Unit cost data and resulting cost weight information of medical services from this study can serve as basis for establishing the case rates to pay hospitals.

The study raised key elements to improve the payment rate setting or pricing of medical services by PhilHealth. The method utilized to estimate inpatient departmental level cost data is the classical top-down process which takes into consideration the entire set of direct and indirect costs borne by the hospital. Despite limitations of data availability and capturing the economic cost of doctor's service and other inputs, it is a useful contribution to assess the financial and clinical activities in the hospital and key cost components as well as ratios of utilization of different resources. Therefore the decision to establish case based payment rates can depend partly on this data (tables below) and also more importantly on the PhilHealth's policy considerations. Policy considerations could include aspects such as:

- PhilHealth annual budget ceiling
- Hospital performance improvement initiatives and
- Financial protection for patients

Indeed, these types of studies were the basis for the national cost weights developed by the Federal Government in the early 1990s in the USA, Australia, and Canada as well some developing countries like Mongolia. In this regard, PhilHealth could take into account following data on average unit costs and resulting figures on cost weights of disease categories. The cost weights show relative resource consumption of specific case in relation to average case.

Table 23: Cost weights of disease categories at tertiary public hospitals

Case types	Cost weights	Cost per case					Total cost per disease category
		Direct			Indirect		
		Medicines and supplies cost	Diagnostics cost	Clinical staff cost	Overhead costs	Depreciation of capital assets	
Pneumonia	0.85	2,545	561	1,597	2,531	812	8,047
Acute bronchitis	0.61	1,478	409	1,353	1,818	776	5,834
NSD	0.56	1,227	369	1,310	1,683	728	5,316
Cataract	1.51	6,105	691	4,287	1,275	1,962	14,319
Asthma	0.74	2,062	557	1,651	1,947	848	7,065
Average cost		9,502					

In 2007, the current PhilHealth average values per claim for studied disease categories were as below:

Table 24: Comparison of unit cost figures and PHIC average value per claim

Unit costs	Pneumonia	Acute Bronchitis	NSD	Cataract	Asthma
Bottom-up costing	8,047	5,834	5,316	14,319	7,065
Top-down costing	6,723	4,857	5,946	11,695	5,210
PHIC AVPC-tertiary hospitals	6,301	4,695	4,373	19,376	5,106
Hospital charges ¹⁰	7,450	n/a	6,800	23,628	6,400
Differences (cost-PHIC claim)	1,746	1,139	943	-5,057	1,959
Differences (charges-cost)	-597		1,484	9,309	-665

Except for Senile cataract case, unit cost figures are consistently higher than the actual average claim rates set by PhilHealth. The average value per claim shows the PhilHealth reimbursement rate for paying hospitals for the services under these conditions. It is claimed that PhilHealth rates are set, largely based on PhilHealth annual ceilings or estimated budget cap. Thus, claim rates will not necessarily be based on cost figures. However, when hospital charges are compared with unit costs and PhilHealth average value per claim, patient charges show higher rates for NSD and Cataract. It could be explained by the fact that hospital charges reflect cost as well as excess of income or profit margins. Hospitals are funded from different sources such as user fees and national/local government budget allocations, PhilHealth reimbursement and others. They fund different types of services and sometimes different expense items. Therefore costs reflect all total expense items used for the delivery of services and thus can be cross subsidized by different sources.

Furthermore, in addition to examining disease specific cost data and cost weights, the following cost weights data which reflects all types of medical cases can be useful for PhilHealth case-mix payment system.

Table 25: Cost weights of inpatient specialties at tertiary public hospitals

	Per discharge at wards of:				Per bed day at wards of:			
	Medicine	Ob&Gyne	Pediatrics	Surgery	Medicine	Ob&Gyne	Pediatrics	Surgery
Cost weights	1.00	0.97	0.92	1.20	0.92	1.16	0.71	1.10
Average cost for all specialties	9,502				2,065			

¹⁰ Hospital charges data from QMMC and R1MC

Second, once the case based payment system starts, hospitals should identify their own unit costs to be able to plan for effective negotiations with PhilHealth. At few hospitals unit costing exercises have already been started and facilities use cost data to set patient charges. For example, QMMC have estimated the cost of services like X-ray or OR services and approves the rates on the basis of cost information. This kind of efforts should be encouraged.

Third, for case based payment, it is important to calculate national average costs and cost weights on a routine basis. In this regard, PhilHealth as one of the major public corporation who provide substantial portion of hospitalization benefits should have plans on more strategic approach to case based costing issue. Issues to consider here include 1/ making methodologies universal and standard, 2/ more efforts to improving the hospital cost data, and possibly creating incentives for hospitals to develop their hospital information system and lastly 3/ improving PhilHealth central and provincial staff capacity in costing. At initial stage, data collection should not be an expensive task. Therefore, as commonly practiced in other countries with case based system, the costing methodology should start from top-down approach which is recognized to be cheap, fast and also accurate and use the bottom-up method for issues such as validation of outliers, obtain patient specific cost data for priority health conditions etc. In this regard, this report can serve as a good reference and background for understanding and initiating the related efforts.

Forth, the outputs of this study can be used to for hospitals financial management, especially at hospitals involved in this study. The hospitals can use the collected and compiled data as well as the estimated cost information as basis for identifying areas of inefficiencies by comparing the costs and outputs with other similar facilities, for planning and contracting internally with various departments, for setting or revising current patient charges of different medical and ancillary services etc among others. Therefore, it is advised that the team leader of each data collection team should send data sets to respective hospitals involved in this study.

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10 APPENDIXES

Appendix 1: Terms of Reference

- a. To know the current cost to provide services in public and private health facilities by:
 - Departments (cost centers),
 - Type of resources (PS, MOOE, CO),
 - Per unit products (inpatient day, Radiology Exam, lab tests, etc.)
 - Per case (20 leading cases of confinement and 20 top surgical procedures),
 - Per eventual DRG groups (to be discussed during inception phase),
 - Other perspective that actually PhilHealth is using to reimburse services (to be decided during inception phase);

- b. To know final prices (PhilHealth reimbursements + user fees) faced by patients per:
 - Unit products
 - Cases (Top 20 causes of confinement and surgical procedures)
 - Other categories to be discussed in the inception phase

- c. To have better understanding of providers behavior (incentives and disincentives), in order to discount eventual reactions to new payment schemes;

Appendix 2: Initial study samples and final list of hospitals

Island groups	Initial selection of hospitals by the consultant in discussion with PHIC staff					Final selection of hospitals for the costing study by PHIC staff				Remarks
	Provinces	Type of ownership	Primary hospitals	Secondary hospitals	Tertiary hospitals	Provinces	Type of ownership	Secondary hospitals	Tertiary hospitals	
LUZON	Ilocos Norte	Public		Bangui District Hospital	Mariano Marcos Memorial Hospital and Medical Center	Pangasinan	Public		R1 Medical Center	Instead of Ilocos Norte the selection came down to Pangasinan based on final selection criteria
		Private		Gaot General Hospital			Private		Pangasinan Medical Center	
	Manila	Public	University of Philippines health services		Quirino memorial Medical Center	Manila	Public		Quirino memorial Medical Center	
		Private					Private	Mother Regina Hospital		We were not able to get data from Mother Regina hospital
VISAYAS	Capiz	Public	Senator Gerardo Roxas District Hospital	Baylan District Hospital	Roxas Memorial provincial hospital	Capiz	Public		Roxas Memorial provincial hospital	Final selection was based on the recommendation by the Provincial PHIC office
		Private			Capiz Emmanuel hospital		Private		Capiz Emmanuel hospital	
MINDANAO	Davao Del Norte	Public		Kapalong District Hospital	Davao Regional Hospital	Davao Del Norte	Public	Kapalong District Hospital	Davao Regional Hospital	
	Misamis Occidental	Public	Medicare community hospital	Misamis University Medical Center		Agusan Del Sur	Public	Bunawan District Hospital	D.O.Plaza Hospital	Due to access and time constraints Agusan Del sur was selected
		Private		Faith Hospital	Medina General Hospital					
	Total		3	6	6			3	7	

Appendix 3: Study team

Benefits Development and Research Department

1. Dr. Giovanni Roan, Medical Specialist IV
2. Abigail Estrada, Senior Social Insurance Specialist
3. Agnes Abigail Calces, Senior Social Insurance Specialist
4. Dominador Tacsuan, Senior Social Insurance Specialist
5. Daryl S. Romero, Social Insurance Specialist
6. Rona R. Cacatian, Social Insurance Specialist
7. Rey Verdolaga, Development Management Officer II
8. Donna Celedonio, Development Management Officer I
9. Mario

Actuary Department

1. Yolanda de Leon, Actuarial Associate and Case-Mix Costing Team Leader

Department of Health Informatics System

1. Elizabeth Acuin, Social Insurance Specialist
2. Julita Presbitero, Senior Social Insurance Specialist
3. Adeline Amano, Senior Social Insurance Specialist

Accreditation Department

1. Melinda Camba, Senior Social Insurance Specialist

Appendix 4: Unit costs and clinical service statistics, all hospitals

Hospital name	Cost center	Number of beds	Number of discharges	Cost per discharge	Number of bed days	Cost per bed day	ALOS	Bed Occupancy rate
D.O. Plaza Hospital	Medicine	32	3,641	3,318	7,661	1,577	2.1	66%
	Obstetrics&Gynecology	15	2,033	6,899	5,630	2,491	2.8	103%
	Pediatrics	21	2,677	4,246	8,416	1,351	3.1	110%
	Surgery	18	1,409	5,079	3,637	1,968	2.6	55%
	Private	57	4,288	5,011	15,279	1,406	3.6	73%
	AVERAGE	29	2,810	4,911	8,125	1,759	3	81.4%
	Weighted average cost			4706		1628		
Roxas Memorial Provincial Hospital	Medicine	31	2,299	5,385	11,252	1,100	4.9	99%
	Obstetrics&Gynecology	23	1,325	11,661	6,393	2,417	4.8	76%
	Pediatrics	22	1,366	7,777	7,233	1,469	5.3	90%
	Surgery	26	1,745	7,271	10,101	1,256	5.8	106%
	Private	14	144	17,745	720	3,549	5.0	14%
	AVERAGE	23	1,376	9,968	7,140	1,958	5	77.2%
	Weighted average cost			7,806		1,504		
Capiz Emmanuel Hospital	Medicine	26	1,001	13,963	3,921	3,565	3.9	41%
	Obstetrics&Gynecology	8	612	26,037	1,677	9,502	2.7	57%
	Pediatrics	16	1,519	10,873	5,533	2,985	3.6	95%
	Surgery	18	427	32,868	1,863	7,533	4.4	28%
	Private	40	1,771	14,117	6,938	3,604	3.9	48%
	AVERAGE	22	1,066	19,572	3,986	5,438	4	53.9%
	Weighted average cost			16,035		4,288		
Quirino Memorial Medical Center	Medicine	81	3,719	20,070	30,951	2,412	8.3	105%
	Obstetrics&Gynecology	47	9,190	10,704	36,308	2,709	4.0	212%
	Pediatrics	63	5,397	11,676	40,320	1,563	7.5	175%
	Surgery	87	2,585	25,893	22,243	3,009	8.6	70%
	Private	16	739	38,408	4,966	5,715	6.7	85%
	AVERAGE	59	4,326	21,350	26,958	3,082	7	129.4%
	Weighted average cost			15,319		2,458		
Region I Medical Center	Medicine	63	4,581	6,002	20,177	1,363	4.4	88%
	Obstetrics&Gynecology	78	6,343	8,963	27,801	2,045	4.4	98%
	Pediatrics	73	3,982	8,686	25,566	1,353	6.4	96%
	Surgery	60	6,579	5,530	22,077	1,648	3.4	101%
	Private	26	2,213	7,342	9,032	1,799	4.1	95.2%
	AVERAGE	60	4,740	7,305	20,931	1,642	5	95.5%
	Weighted average cost			7,240		1,639		
Davao Regional Hospital	Medicine	105	4,277	11,527	22,048	2,236	5.2	58%
	Obstetrics&Gynecology	87	8,405	7,839	28,316	2,327	3.4	89%
	Pediatrics	103	5,498	8,345	31,737	1,446	5.8	84%
	Surgery	110	4,205	15,690	24,819	2,658	5.9	62%
	Private	50	1,752	14,813	6,547	3,964	3.7	36%
	AVERAGE	91	4,827	11,643	22,693	2,526	5	65.8%
	Weighted average cost			10,482		2,230		
Bunawan District Hospital	Medicine	28	1,994	2,856	5,840	975	2.9	57%
	Obstetrics&Gynecology	8	1,852	2,147	5,177	768	2.8	177%
	Pediatrics	6	1,483	2,372	4,468	787	3.0	204%
	Surgery	8	380	12,449	1,132	4,179	3.0	39%
	Private							
	AVERAGE	13	1,427	4,956	4,154	1,677	3	119.3%
	Weighted average cost			3,139		1,078		
Kapalong District Hospital	Medicine	9	1,182	3,612	2,151	1,199	1.8	65%
	Obstetrics&Gynecology	2	628	4,236	319	2,720	0.5	44%
	Pediatrics	9	971	3,187	1,772	1,129	1.8	54%
	Surgery	5	129	8,868	173	4,766	1.3	9%
	Private							
	AVERAGE	6	728	4,975	1,104	2,454	1	43.1%
	Weighted average cost			3,838		1,421		

Appendix 5: Detailed average unit costs, by disease category and by hospitals, pesos

D.O.P	Pneumonia	% of total cost	Acute bronchitis	% of total cost	Normal Single Delivery	% of total cost	Asthma	% of total cost
Medicines and medical supplies cost	1,155	23%	1,130	23%	1,982	36%	1,227	27%
Diagnostics cost	215	4%	395	8%	156	3%	208	5%
Clinical staff cost	1,328	26%	1,231	25%	1,173	21%	1,153	26%
Overhead costs	1,781	35%	1,571	32%	1,463	26%	1,399	31%
Depreciation of capital assets	543	11%	573	12%	782	14%	525	12%
Total	5,022	100%	4,900	100%	5,556	100%	4,512	100%

RMPH	Pneumonia,	% of total cost	Asthma	% of total cost	Normal Single Delivery	% of total cost	Catar act	% of total cost
Medicines and medical supplies cost	4,162	45%	1,948	31%	1,744	34%	5,839	39%
Diagnostics cost	717	8%	475	8%	413	8%	525	4%
Clinical staff cost	1,472	16%	1,518	24%	1,437	28%	5,215	35%
Overhead costs	2,053	22%	1,288	20%	814	16%	440	3%
Depreciation of capital assets	882	9%	1,056	17%	770	15%	2,831	19%
Total	9,286	100%	6,285	100%	5,178	100%	14,850	100%

CEH	Pneumonia,	% of total cost	Acute bronchitis	% of total cost	Normal Single Delivery	% of total cost	Catar act	% of total cost	Asthma	% of total cost
Medicines and medical supplies cost	4,974	31%	2,561	19%	3,868	26%	6,602	38%	4,451	32%
Diagnostics cost	768	5%	545	4%	257	2%	195	1%	483	4%
Clinical staff cost	4,276	27%	4,184	32%	7,432	49%	8,357	48%	3,718	27%
Overhead costs	4,869	31%	4,956	38%	2,830	19%	1,826	10%	4,213	31%
Depreciation of capital assets	1,003	6%	900	7%	654	4%	432	2%	926	7%
Total	15,890	100%	13,146	100%	15,040	100%	17,413	100%	13,792	100%

QMMC	Pneumonia,	% of total cost	Asthma	% of total cost	Normal Single Delivery	% of total cost	Catar act	% of total cost
Medicines and medical supplies cost	2,673	23%	3,130	29%	1,078	24%	5,805	41%
Diagnostics cost	388	3%	453	4%	58	1%	542	4%
Clinical staff cost	2,621	23%	2,728	25%	771	18%	4,476	32%
Overhead costs	4,711	40%	3,135	29%	2,092	47%	1,507	11%
Depreciation of capital assets	1,250	11%	1,256	12%	407	9%	1,831	13%
Total	11,643	100%	10,702	100%	4,406	100%	14,161	100%

R1MC	Pneumonia,	% of total cost	Acute bronchitis	% of total cost	Normal Single Delivery	% of total cost	Catar act	% of total cost
Medicines and medical supplies cost	2,821	39%	1,826	27%	655	11%	6,325	50%
Diagnostics cost	470	7%	424	6%	191	3%	134	1%
Clinical staff cost	1,273	18%	1,474	22%	1,872	31%	3,328	26%
Overhead costs	1,737	24%	2,065	31%	2,203	37%	1,271	10%
Depreciation of capital assets	849	12%	978	14%	1,092	18%	1,539	12%
Total	7,149	100%	6,768	100%	6,014	100%	12,597	100%

DRH	Pneumonia,	% of total cost	Asthma	% of total cost	Normal Single Delivery	% of total cost	Catar act	% of total cost
Medicines and medical supplies cost	1,916	27%	1,941	29%	677	12%	6,451	41%
Diagnostics cost	1,015	14%	1,093	16%	1,025	19%	1,562	10%
Clinical staff cost	1,290	18%	1,206	18%	1,297	24%	4,129	26%
Overhead costs	2,374	33%	1,965	29%	1,842	34%	1,883	12%
Depreciation of capital assets	538	8%	556	8%	588	11%	1,645	10%
Total	7,133	100%	6,760	100%	5,428	100%	15,670	100%

BDH	Pneumonia,	% of total cost	Asthma	% of total cost	Normal Single Delivery	% of total cost	Acute bronc hitis	% of total cost
Medicines and medical supplies cost	1,111	17%	1,071	16%	319	8%	996	18%
Diagnostics cost	614	10%	850	13%	547	14%	626	11%
Clinical staff cost	1,726	27%	1,808	27%	1,304	34%	1,742	31%
Overhead costs	2,695	42%	2,560	39%	1,572	41%	1,937	35%
Depreciation of capital assets	280	4%	304	5%	75	2%	235	4%
Total	6,425	100%	6,593	100%	3,816	100%	5,537	100%

KDH	Pneumonia,	% of total cost	Asthma	% of total cost	Normal Single Delivery	% of total cost
Medicines and medical supplies cost	1,855	24%	1,471	28%	841	19%
Diagnostics cost	1,459	19%	1,034	20%	178	4%
Clinical staff cost	810	11%	500	9%	781	18%
Overhead costs	2,922	38%	1,924	36%	1,864	43%
Depreciation of capital assets	598	8%	343	7%	662	15%
Total	7,645	100%	5,271	100%	4,326	100%