Cambodia Hospital Costing and Financial Management Study

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Acronyms

AOP	Annual Operational Plan
BOR	Bed Occupancy Rate
CBHI	Community-Based Health Insurance
CENAT	National Center for Tuberculosis and Leprosy Control
CMS	Central Medical Store
CPA	Complementary Package of Activities
DPHI	Department of Planning and Health Information
FFS	Fee-for-Service
GOC	Royal Government of Cambodia
HCP	Health Coverage Plan
HEF	Health Equity Fund
HSSP2	Second Health Sector Support Program
HIP	Health Insurance Project
HIS	Health Information System
KHR	Cambodian Riel
IPD	Inpatient Department
MBPI	Merit Based Performance Incentive
MEF	Ministry of Economy and Finance
MOH	Ministry of Health
MOLVT	Ministry of Labour and Vocational Training
NCHADS	National Center for HIV/AIDS, Dermatology and STD
NGO	Non Governmental Organization
OD	Operational District
OOP	Out-of-Pocket
OPD	Outpatient Department
PBB	Program Based Budget
PHD	Provincial Health Department
POC	Priority Operating Cost
RH	Referral Hospital
PH	Provincial Hospital
SDG	Service Delivery Grant
SHI	Social Health Insurance
SOA	Special Operating Agency
USD	United States Dollar

Executive Summary

There are numerous provider payment mechanisms currently operating within the Cambodian public hospital system, including:

- Budget line-items from the state Program Based Budget (PBB);
- Case-based payments from the Health Equity Fund (HEF) program;
- Capitation, case-based, and fee-for-service (FFS) payments from various community-based health insurance (CBHI) schemes;
- Performance-based payments from the Second Health Sector Support Program (HSSP2) budget;
- Output-based midwifery payments for facility deliveries; and
- NGO/Donor subsidization of user fees and provision of other operational support; and
- User charges and other out-of-pocket (OOP) spending.

These varied hospital financing and performance-based contracting arrangements have contributed to a complex provider payment system complete with financing silos and fragmented and uncoordinated financial management. The Royal Government of Cambodia (GOC) is exploring the expansion of its current case-based payment system and the transition from FFS payments to standardized case payments. This costing study was commissioned to aid the provider payment reform effort by providing unit cost estimates for hospital services. The study was also conducted to meet requirements for updated costing estimates specified in the National Charter on Health Financing (*Prakas* 296)[1] and Component HCF 5.3 of the HSSP2 program. The study purpose was to document all sources of funding to hospitals and describe their associated uses. Additionally, the aim was also to estimate the average cost per discharge, inpatient day, and outpatient visit for all hospital departments.

The sample included 10 public hospitals from six provinces, covering three Complementary Package of Activity (CPA)[2] levels and including eight hospitals operating under a Special Operating Agency (SOA). Total hospital expenditures were estimated for labor cost, drug and medical supply cost, and other operating cost; fixed costs were excluded from the analysis. Average unit costs were calculated employing a top-down costing methodology. Cost and utilization data from 2010-2011 informed the analysis. Rather than relying solely on official reports, the team gained an in-depth understanding of all available data sources and their reliability, often triangulating from alternate sources across hospitals to construct a consolidated income statement.

Key findings related to hospital funding and sources of funds include:

- **Overall Funding:** On average, hospital funding doubled between (BASIC, 2003)levels 1 and 2, and quadrupled between CPA levels 2 and 3. The average funding of the CPA 1 hospitals was $380,000, compared with $763,000 for CPA 2 hospitals, and $3,219,000 for CPA 3 hospitals. The key predictors of overall funding were CPA level and SOA status. Hospital funding was much lower for the non-SOA hospitals compared to their SOA counterparts at the same CPA level.

[1] Ministry of Health. *The National Charter on Health Financing in the Kingdom of Cambodia*. Phnom Penh: Ministry of Health; 1996.

[2] The classification of referral hospitals is described in the *National Guidelines on Complementary Package of Activities for Referral Hospital Development from 2006 to 2010*. Classification is based on the number of staff and physicians, number of beds, medicines and medical equipment, and clinical service offerings.

Across the hospitals, funding in cash ranged from 29% to 56% of overall funding, with funding in kind (primarily drugs and medical supplies) ranging from 44% to 71%.

- **Government Funding:** Including PBB funds and in kind drug and medical supply, the Government share of total hospital funds reached about 70% on average at each CPA level. Other than CPA level and SOA status, there were no clear factors (e.g., population served, staff size, beds, discharges) that explained differences in PBB funding levels. Drugs and medical supplies provided in kind through the Central Medical Store (CMS) comprised almost half of overall hospital funding at each CPA level. Government provision of in kind drugs and medical supplies did not correspond with the size of the hospitals' catchment population or with utilization.

- **HSSP2 Funding:** HSSP2 funding represented a small but important input to hospitals, ranging from 9% to 29% of funding in cash for those hospitals operating under an SOA arrangement.

- **NGO/Donor Funding:** NGO/Donor support varied significantly, from a low of $13,000 at one hospital to a high of $751,000 at another. NGO/Donor contributions – primarily in kind drugs and medical supplies – contributed from 4% to 24% to hospital funding. On average, CPA 1 and 2 funding was comparable at close to $50,000; CPA 3 funding was 11 times higher at $550,000.

- **User Fee Funding:** On average, revenue from user fees (OOP, HEF, CBHI) doubled from CPA levels 1 to 2 (from $57,000 to $118,000), and almost quadrupled from CPA levels 2 to 3 (from $118,000 to $426,000). Similarly utilized hospitals, however, received dramatically different levels of funding from user fees. OOP payments were the most important source of user fee revenue for 7 of the 10 hospitals. On average, the percentage share of user fee revenue from OOP payments increased by CPA level, from 42% for CPA 1 hospitals, to 47% at CPA 2 hospitals, and 60% at CPA 3 hospitals. This corresponded with a decrease in the percentage share of user fee revenue from HEF at higher CPA levels.

Key findings related to hospital uses of funds include:

- **Labor Cost:** Labor cost assumed less than one-third of overall cost on average, ranging from 17% to 34% across the hospitals. Spending on labor varied across the facilities, from a low of $82,000 to a high of $769,000. User fee incentives contributed a significant amount to staff compensation at close to one-third of labor cost on average. Government salaries and allowances also contributed considerably to staff labor cost, assuming from 16% to 43% of total labor cost across the hospitals. Service Delivery Grants (SDG) to SOA hospitals also contributed substantially to staff compensation, covering close to 30% of all labor cost for the CPA 1 hospitals and around 20% for the CPA 2 and CPA 3 hospitals.

- **Drug and Medical Supply Cost:** This cost category comprised the largest share of overall cost, nearing 60% for CPA 1 and 2 hospitals and 70% for CPA 3 hospitals on average. The total cost of drugs and medical supplies ranged from

$155,000 to $2,672,000 across the hospitals. Centrally procured drugs and medical supplies distributed through CMS assumed the majority of cost, ranging from 63% to 92% of total drug and medical supply cost. In fact, CMS supplied 90% of the total cost of drugs and medical supplies for the sampled hospitals.

- **Other Operating Cost:** Spending on other operating expenses comprised the smallest share of overall cost, ranging from 7% to 18% across the hospitals. Spending varied from $40,000 to $413,000 among the hospitals. Within each CPA level, spending was highest for the following cost items: electricity, patient food, fuel, office supplies, and building maintenance.

Key findings related to hospital unit costs include:

- On average, the cost per hospital discharge was $66 for the CPA 1 hospitals, $103 for the CPA 2 hospitals, and $177 for the CPA 3 hospitals. Averaging across all levels, the cost per hospital discharge was $146. However, there was significant variation in the cost per discharge across the hospitals, ranging from a low of $56 to a high of $230.

- Variability in unit cost estimates for inpatient days was also evident; however, the range narrowed from a low of $12 to a high of $29. On average, the cost per inpatient day was $15 for the CPA 1 hospitals, $20 for the CPA 2 hospitals, and $27 for the CPA 3 hospitals. Averaging across all levels, the cost per inpatient day was an estimated $25.

- The cost per outpatient visit – including general and specialty visits – varied from a low of $5 to a high of $28. On average, the cost per outpatient visit was $14 for the CPA 1 hospitals, $8 for the CPA 2 hospitals, and $16 for the CPA 3 hospitals. The sample average unit cost was $14.

- The unit cost results of hospital departments demonstrate great variability. Removing in kind drug and medical supply cost effectively smoothed some of the volatility in the cost estimates. The variation in unit cost estimates may also be explained by many other factors, such as differences in price, case mix, services, productivity, and utilization. Cost differences may exist due to staffing (both quantity and skill level), supply of drugs, and availability of more advanced medical equipment. Additionally, inherent differences between facilities – such as the clinical characteristics of their departments, geographic location, historical NGO/Donor involvement, and others – may also contribute to cost variation.

The following activities are recommended to ensure the study results inform policy and programmatic decisions:

- **Harmonization of financial management and reporting systems across ministries and donors to eliminate silos and improve accountability.** This effort could include the implementation of standardized accounting practices across hospitals with corresponding tools and templates. This effort could also

include initiation of standardized costing templates in order to continually monitor costs, update payment rates, and benchmark facility performance.

- **Improvement of allocative efficiency through establishment of transparent allocation formulas based on clearly defined outputs.** The Government and development partners should revisit allocation formulas so that they not only account for facility level and geographic location, but also utilization, catchment population, and other operational statistics.

- **Initiation of efforts to alter the cost structure of hospitals so that it tracks closer to that observed in other countries.** This initiative would include shifting the cost structure so that labor cost comprises a greater share and drug and medical supply cost a reduced share of total cost. Competitive drug procurement and international price benchmarking offer potential opportunities to achieve this shift.

- **Exploration of the variation in unit costs through follow-up costing studies.** This activity could include medical record reviews to determine the proportion of medical and surgical patients within each department and to document the frequency of discharges and their typical use of drugs, medical supplies, and ancillary services.

- **Establishment of payment rates for a case-based provider payment mechanism.** The unit cost estimates and relative cost weights from this study could serve as a cost basis for a reformed payment mechanism. In addition to the technical rate setting exercise, policy considerations for the payment system should also be determined, including the size of the hospital pool, social protection priorities, and hospital quality and performance improvement initiatives.

1. Background and Objectives

Cambodia is facing the challenge of how to pay hospitals to ensure access to services, quality of care, and efficiency within budgetary and fiscal constraints. Over the last decade, the Royal Government of Cambodia has increased overall health spending, which is now greater than 11% of its recurrent budget. Along with its development partners, the Government has introduced new hospital financing and performance-based contracting arrangements, including:

- Health equity funds (HEFs) that provide coverage of user fees for the poor;
- Output-based payments intended for midwives to encourage facility deliveries; and
- Service Delivery Grants (SDGs) that include salary top-ups and operating expense budgets for Special Operating Agency (SOA)-designees.

Independent of these Government-initiated payment methods, several social health insurance (SHI) schemes contract directly with facilities, providing an additional funding stream to hospitals. Similarly, Donors/NGOs and National Programs also provide direct support to hospitals. The coexistence of these numerous initiatives has contributed to hospital financing silos and fragmented and uncoordinated financial management. Additionally, out-of-pocket (OOP) spending remains the primary method of payment for health care, leading to household catastrophic health expenditures and placing an undue burden on the poor.

The National Charter on Health Financing[3] (*Prakas* 296) of 1996 provided a framework for the financing of hospitals and established the legal basis for the introduction of user fees. While the ministerial regulation defined the formula for spending user fee revenue and the process for approving new user fees, it included limited guidance regarding the criteria and method for calculating or setting new user fees. The annex to *Prakas* 296 described the Charter as a rolling process and specified the need for its periodic revision based on analysis of routine information and special studies.

In addition to this requirement to update the Charter, the Second Health Sector Support Program (HSSP2) stipulates the costing of the Complementary Package of Activities (CPA)[4] on a regular basis, specified in Component HCF 5.3. The development of a hospital financing strategy is also a HSSP2 condition to continue SDGs for provincial hospital SOAs.

Recognizing the complex financing system that had evolved over recent years and responding to the requirements of *Prakas* 296 and Component HCF 5.3, the Ministry of Health (MOH) Department of Planning and Health Information (DPHI) commissioned a study to estimate the costs associated with delivering the CPA. The intention of the study was to better understand the financial position of public hospitals, factoring in funds management by different ministries, donors with different funding instruments, nonstandard user fee schedules, and distinct SHI schemes.

Furthermore, the Government is planning to reform the current provider payment system, exploring moving from a fee-for-service (FFS) to a case-based hospital payment system.

[3] Ministry of Health. *The National Charter on Health Financing in the Kingdom of Cambodia*. Phnom Penh: Ministry of Health; 1996.

[4] The classification of referral hospitals is described in the *National Guidelines on Complementary Package of Activities for Referral Hospital Development from 2006 to 2010*. Classification is based on the number of staff and physicians, number of beds, medicines and medical equipment, and clinical service offerings.

With this policy objective in mind, updated unit cost estimates of hospital services were desired to inform payment system design efforts. Several studies were conducted in Cambodia over the last decade to estimate hospital unit costs,[5] with the most recent study examining data from 2007. The need for updated costing of hospital services was based on the assumption that capacity and utilization changed and the new health financing arrangements impacted costs.

The primary objective of this study was to estimate the costs of operating CPA 1-3 hospitals and generate unit cost estimates for hospital departments. Prior studies estimated unit costs for a consolidated set of departments. As such, unit cost estimates for all departments were desired to support provider payment reform efforts.

A hospital financing strategy which links costs to their different funding sources currently does not exist. Secondary objectives of the study included documenting all hospital sources and uses of funds and describing how hospitals use these funds to support service delivery and operations management. Lastly, the study was commissioned to inform the revision of the National Charter on Health Financing, focusing on provider payment reform efforts and the health equity fund (HEF) benefit package.

[5] Fabricant S. *Cost Analysis of Essential Health Services in Cambodia*. MOH/WHO Health Sector Reform Phase III Project. WHO/USAID/POPTECH. 2002.

Fabricant S, Kanha S, and K Thavary. *Cost Analysis (Part 2) of Essential Health Services in Cambodia.* MOH/WHO Health Sector Reform Phase III Project. 2003.

Collins D, Chhuong CK, and K Reth. *Scaling Up Child Survival Interventions in Cambodia: Service Delivery Costs*. The BASICS Project/USAID. 2008.

Collins D, Gupta P, and E Sovannarith. *Cost Projections For The Complementary Package of Activities for Referral Hospitals*. The BASICS Project/USAID. 2009.

2. Study Scope

To define the parameters of the study, certain decisions were made regarding the inclusion and exclusion of facilities, services, units of analysis, cost categories, and perspective. The table below presents the study bounds, and each of these areas is then discussed in turn.

Area	Study Inclusions	Study Exclusions
Facilities	Government hospitals (CPA Levels 1-3)	National hospitals, health centers, PHDs, OD offices, private providers
Services	All hospital inpatient and outpatient departments	Individual patients, disease categories, and interventions
Units of Analysis	Average cost per discharge, per inpatient day, and per outpatient visit	Unit cost per ancillary service (this cost is included in the department units of analysis
Cost Categories	Recurrent costs (labor, drug and medical supply, other operating)	Fixed costs, training incentives/sitting fees and per diems, patient OOP drug purchases, and unofficial payments
Perspective	Government, hospital, SHI schemes, and NGO/Donor	Society, patient

- **Facilities:** This study only related to CPA 1-3 hospitals and not the national hospitals as they are semi-autonomous Public Administrative Establishments, following different accounting and financial management practices than their CPA counterparts. To support provider payment reform efforts but out of scope for this study, a potential companion Operational District (OD) and health center costing study is under consideration.

- **Services:** Rather than cost individual patients or disease categories (e.g., pneumonia, asthma, normal delivery), the study costed entire departments. Several factors contributed to this decision. Specifically, costing departments:
    - Suits a context where hospital data is primarily available by department and not a more disaggregate level;
    - Permits a broader focus through cost estimation of the entire hospital and all its services; and
    - Ensures all hospital expenditures are accounted for and assigned fully to the departments; and
    - Facilitates study implementation as it can require a lower commitment of time and resources.

- **Units of Analysis:** Some studies report ancillary service costs separately from the unit costs of discharges, inpatient days, and outpatient visits. For example, they estimate the average cost per lab test or per x-ray. For the purpose of this study, ancillary service costs were included in the unit costs of discharges, inpatient days, and outpatient visits. The provider payment model under consideration would bundle the cost of lab tests, pharmaceuticals, surgeries, and other ancillary exams with these unit costs in the payment rates, thus separate costing of ancillary services was not considered necessary.

- **Cost Categories:** The study focused on recurrent costs only and not fixed costs, as investment costs for facility construction and equipment are not readily available and MOH accounts are not comprehensive of all NGO/Donor and Government capital asset

funding.[6] Further, depreciation costs are carried in Ministry of Economy and Finance (MEF) asset books and are not typically subject to control by the MOH or hospitals. Recurrent costs associated with capital assets (e.g., minor repairs, maintenance supplies) were included as these costs are paid by hospitals from their operating budget.

Additionally, training incentives/sitting fees and per diems were not documented. These payments likely represent a significant cost to NGOs/Donors and certainly boost the wages of hospital staff. However, the feasibility of estimating these expenditures was low as incentives are paid in cash directly to individuals.

Further, patient OOP spending on drugs and unofficial payments were not factored into cost estimates. A household study is under consideration to estimate these expenditures in order to inform the provider payment rate setting. In light of these exclusions, it is important to recognize that a partial cost profile is presented and the study results underestimate unit costs.

- **Perspective:** The perspective of the cost analysis – the point of view for which costs were estimated – encompassed multiple stakeholders: Government, hospitals, SHI schemes, and NGOs/Donors. This multi-stakeholder perspective was required to examine all sources and uses of funds. More central to an economic analysis, this study considered neither costs to the individual patient, nor costs to society at large.

3. Methodology

3.1. Costing Methodology

While many methodologies exist for costing health services, there is no singular cost-accounting method best suited for every country context or study perspective.[7] Ultimately, the choice of method depends on the study objective and scope, data availability, and tradeoffs between desired accuracy and operational feasibility.

Top-down costing, also known as step-down cost accounting, was employed for the study. This method separates relevant department expenditures from readily available data sources, such as accounts and budgets from the MOH or hospitals. Step-down accounting is used to allocate the total costs of the Administrative and Ancillary departments to the Clinical departments. Average costs are then estimated for discharges, inpatient days, and outpatient visits. Top-down costing was particularly ideal for this study because the hospitals in Cambodia generally have clearly defined departments and most CPA 3 hospitals and some CPA 2 hospitals track expenditures at the department level.

In contrast, bottom-up costing provides detailed cost estimates of individual patients or particular disease categories. While this technique may be useful for establishing prices for fee schedules, international evidence has found that it is ineffective for developing provider

[6] Johnston T and Özaltin E. *More Health for the Money: Cambodia Health Public Expenditure Review 2010.* The Royal Government of Cambodia and The World Bank. December 2011.

[7] Mogyorosy Z and P Smith. The main methodological issues in costing health care services: A literature review. Centre for Health Economics, University of York. 2005.

payment rates. As it does not account for total facility expenditures, bottom-up costing tends to overestimate the cost of each disease category, thus surpassing the overall budget. Further, bottom-up costing requires a narrower scope of study on a defined set of disease categories as it can be labor intensive to implement.

The key advantage to the top-down approach is that it documents total hospital expenditures and allocates those expenditures to hospital departments. This method facilitates a broader scope of study through inclusion of all departments. Top-down costing can also be less resource intensive due to reliance on existing data, and as such, the lower time and budgetary requirements also permit a broader scope. The multi-stakeholder perspective and significant data collection and validation requirements associated with an analysis of all sources and uses of funds required a methodology with greater implementation feasibility.

Additionally, top-down costing yields relatively accurate results (i.e., accurate *relative* unit costs), which are sufficient to inform provider payment rate setting. However, the key disadvantage to this approach is that cost estimates are averages constructed from aggregate data, and these averages reflect the quality, consistency, and transparency of the data captured in accounts and budgets. The steps that comprise this methodology are described in detail in the section on Data Collection, Processing, and Analysis.

3.2. Study Orientation

The study design was retrospective in nature, looking backwards to estimate costs that had already occurred by study initiation. Due to this orientation, the study relied almost entirely on secondary data, leveraging historical utilization, financial, and administrative records.

3.3. Time Period

Due to irregular funding cycles, late disbursements of the Government budget, and major payment lags for some expense items, one year of data was collected. The full year of data also accounted for any seasonal variation in utilization, potentially impacting cost.

During the pre-test of the methodology at Kampong Cham PH, the hospital director, Dr. Meas Chea, emphasized the importance of documenting the significant uptick in utilization (and assumedly expense) at his facility in early 2011. To account for any recent swings, the time horizon selected for the study represented the most recent year for which data were available at study initiation: July 1, 2010 – June 30, 2011. This period covered the third and fourth quarters of 2010 and first and second quarters of 2011.

This period appeared operationally feasible as facilities reported revenues and expenditures monthly, quarterly, and annually, implying that any consecutive four-quarter period would be adequate. However, spanning two calendar years contributed to several challenges due to the schedule irregularity in Government budget procurement and disbursements, namely:

- The process for Government budget disbursements changed between 2010 and 2011. In 2010, there were eight disbursement cycles of unequal spacing. In 2011, there were four cycles technically corresponding to quarter periods, although funding did not always arrive on time in actuality. In 2010, the eight rounds covered approximately 30% of Government budget expenditures; the remaining expenditures

were declared only in the year-end report, primarily related to procured items (e.g., uniforms, office supplies) and PHD- and OD-covered expenses (e.g., electricity, fuel). To account for 2010 funding, total expenditures for the full year were halved to estimate an amount for the last six months. This same practice was followed for 2011 expenditures for the hospitals not operating under an SOA.

- The process for disbursements to SOA hospitals experienced an additional change between 2010 and 2011. While these hospitals received disbursements from and oversight by PHDs and ODs in 2010, disbursements in 2011 were delivered directly to provincial hospitals, granting them increased autonomy for decision making on operational expenditures. This budget was delivered in full across the four rounds, without PHD or OD oversight on expenditure decisions. Thus, 2011 expenditures from the first and second quarterly reports were captured for the study.

3.4. Methodology Pre-test

Prior to implementing the study, the research team conducted several hospital visits to qualitatively understand their sources and uses of funds, budget disbursement schedules, and data availability and quality. The team met with hospital and OD administrators and accountants representing the following hospitals during the design phase of the study.

Hospital	Level	Province	Operational District
Anlong Veng RH	CPA 1	Oddar Meanchey	Samroang
Chamkar Leu RH	CPA 1	Kampong Cham	Chamkar Leu - Stueng Trang
Kralanh RH	CPA 2	Kralanh	Siem Reap
Samroang PH	CPA 2	Oddar Meanchey	Samroang
Sot Nikum RH	CPA 2	Sot Nikum	Siem Reap
Battambang PH	CPA 3	Battambang	Battambang
Kampong Cham PH	CPA 3	Kampong Cham	Kampong Cham - Kampong Siem
Siem Reap PH	CPA 3	Siem Reap	Siem Reap

The information gleaned from these hospital visits informed the data collection plan and associated instruments. The team then piloted the study methodology in collaboration with Kampong Cham PH to test the feasibility of the study design and enhance the quality and efficiency of the larger study. Kampong Cham PH was selected for the pre-test due to its complexity of services, strong stakeholder involvement, and its proximity to the research team to facilitate multiple data collection visits.

Conducting the pre-test in one hospital at the highest CPA level was limited in that it was not representative of the entire planned sample. However, the multiple and extensive visits to one hospital yielded a wealth of information on financial reports, funding streams, and disbursement processes that may not have been obtained with a larger pre-test design.

The research team conducted the pre-test over the period of August 1, 2011 – September 30, 2011, including three separate data collection visits at the hospital and PHD for a total onsite duration of 13 days. There were several modifications made to the study following completion of the pre-test, including:

- Revision of the secondary data collection instrument;

- Collection and inclusion of additional data sources following their discovery at subsequent hospitals; and
- Alterations to the analytic model.

The team also visited Kampong Cham PH following completion of the larger study to collect additional data. Due to later attainment of more comprehensive data, a complete data set was collected from Kampong Cham PH and hence included in the analysis. Thus, although the pre-test hospital, Kampong Cham PH is considered one of the official sampled sites.

3.5. Sample

The costing study relied on a purposive sample of hospitals, stratified by level of facility, and then selected through a convenience sampling approach. The hospitals were selected primarily due to their contractual and capacity-building relationships with the study sponsors. Counting the one pre-test hospital, 10 hospitals were selected for inclusion in the sample. The sample was comprised of referral hospitals in all three CPA categories, including three CPA 1 hospitals (of 33), three CPA 2 hospitals (of 28), and four CPA 3 hospitals (of 18). The sample represented 13% of the hospitals in the CPA population. For comparison purposes, the sample included eight hospitals operating under SOA arrangements and two without these performance-based contracts.

In addition to CPA level, the sample selection criteria included:

- Higher utilization;
- More adequate resourcing;
- Data availability and better perceived data quality;
- Accessibility to reach; and
- Political support and stakeholder involvement within the facility.

The national hospitals were excluded from the study as they are semi-autonomous Public Administrative Establishments. The national hospitals have different financial management and reporting requirements compared with their CPA counterparts. Additionally, they generate revenue from other sources and have greater autonomy to set user fees rates.[8]

Generalization of the study results should be exercised with caution as these 10 hospitals may not be representative of all public hospitals in Cambodia. A larger sample size was not possible due to the labor intensity of documenting all sources and uses of funds, and the large data requirements of the multi-stakeholder costing perspective. However, the selection criteria were chosen so that the results would illustrate revenues and expenditures for some of the better functioning hospitals in the country. The 10 hospitals selected to participate in the study are listed in the below table, along with their key operating statistics.

[8] Johnston T and Özaltin E. *More Health for the Money: Cambodia Health Public Expenditure Review 2010*. The Royal Government of Cambodia and The World Bank. December 2011.

Table 1. Hospital Key Operating Statistics

Facility	Province	Operational District	Population Served	SOA Start	HC Onsite	Staff	Doctors	Beds	Dis-charges	IPD Days	ALOS	BOR	Surgical Activity	OPD Visits
CPA 1 Hospitals														
Ang Roka RH	Takeo	Ang Roka	140,155	Jul-09	Yes	33	4	60	4,124	15,573	3.8	71%	0	16,556
Bakan RH	Pursat	Bakan	127,430	N/A	Yes	41	2	64	2,856	13,072	4.6	56%	0	1,527
Choeung Prey RH	Kampong Cham	Choeung Prey-Batheay	200,675	Jan-10	Yes	44	9	70	4,148	19,998	4.8	78%	0	7,731
CPA 2 Hospitals														
Kirivong RH	Takeo	Kirivong	230,990	Jul-09	Yes	54	4	84	6,378	35,541	5.6	116%	602	19,286
Memot RH	Kampong Cham	Memot	137,141	Jul-09	Yes	57	7	95	6,484	26,401	4.1	76%	377	22,472
Samroang RH	Oddar Meanchey	Samroang	201,609	Jan-10	Yes	52	6	84	4,708	28,714	6.1	94%	197	13,319
CPA 3 Hospitals														
Battambang PH	Battambang	Battambang	1,092,075	N/A	No	325	38	270	11,813	75,923	6.4	77%	2,489	57,123
Kampong Cham PH	Kampong Cham	Kg Cham-Kg Siem	1,750,248	Jan-10	Yes	259	39	260	17,000	103,422	6.1	109%	2,709	51,465
Siem Reap PH	Siem Reap	Siem Reap	965,936	Jan-10	No	261	38	230	12,677	100,167	7.9	119%	3,171	54,564
Takeo PH	Takeo	Daun Keo	955,126	Jun-10	Yes	229	35	250	12,215	72,916	6.0	80%	3,410	31,419

Notes: Utilization data is presented for the entire study period, July 2010 – June 2011. Some adjustments were made to the reported HIS utilization in cases of erroneous hospital reporting. Definitions are presented in the section on Data Collection, Processing, and Analysis.

3.6. Ethical Approval

His Excellency Professor Eng Huot approved this project and issued a formal letter to the PHDs, OD offices, and hospitals to request their cooperation. Ethical approval was not pursued as the study design was limited to collecting secondary data sources and seeking clarification as necessary from staff about these reports. It was believed that no harm could come to staff through solely providing official reports and hospital operational data. Ethical approval was later sought to continue costing activities to support provider payment reform efforts. These activities may include household interviews with patients, reviews of medical records, and interaction with hospital staff to seek their opinion on clinical services and costs. The protocol was submitted to the National Ethics Committee for Health Research and was approved on April 20, 2012. These planned activities are not described in this report but are intended to complement this costing study.

4. Data Collection, Processing, and Analysis

4.1. Data Collection Approach

The data collection team was comprised of the author, three data collection supervisors, and four public health consultants. A designated representative from each hospital also participated by facilitating data collection and ensuring data needs were met. Prior to the hospital site visits, a three-day training was convened in Phnom Penh, attended by the data collection team, hospital representatives, four data entry clerks, and technical advisors from MOH DPHI. The purpose of the training was to:

- Provide an overview of the costing study;
- Discuss team roles and responsibilities;
- Present sample data sources and reports;
- Review the data request in detail;
- Discuss potential data limitations and data collection challenges; and
- Determine the hospital visit schedule and data collection logistics.

The data collection period spanned from October 17, 2011 – February 3, 2012. Each hospital was visited at least twice, with some hospitals visited three or four times. Typical durations of each visit were two days for CPA 1 hospitals, four days for CPA 2 hospitals, and five days for CPA 3 hospitals. Each team was comprised of two data collectors, one supervisor to support data collection efforts in an advisory capacity, and the designated hospital representative. The team brought a scanner and photocopier on the site visits to copy the vast quantity of paper-based reports, journals, and registers.

The research team collected data from hospital departments, OD offices, and PHDs. The intention was to identify and cost the full range of resources used to provide services, from all sources. Appendix A presents the minimum data request list. This tool served as a flexible data collection "instrument" that was able to accommodate the following:

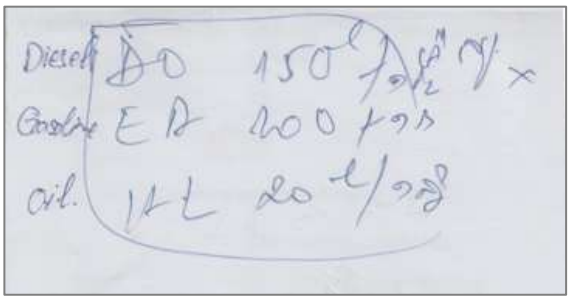
- Variability in financing mechanisms and reporting requirements by funding source;
- Separate bookkeeping for each funding source with no consolidated income statement;
- Unique accounting and financial management practices across hospitals, supported by nonstandard tools and templates;

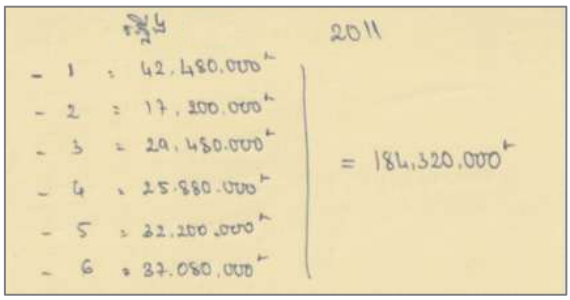
- Hospital discomfort in providing original sources for data considered sensitive (e.g., mission expense, electricity);
- Discrepancies in numbers across different reports; and
- Hospital failure to track and report certain expenses.

In light of the challenges related to data availability and quality, the research team opted against having hospitals complete a complicated questionnaire. Solely relying on official budgets or historic expenditure reports was not an agreeable option either for obtaining quality data. Many hospitals completed unique reports for internal management purposes that provided greater detail than included in their official reports; the submitted reports tended to present only a partial picture of their financial situation. Further, discrepancies between official reports due to errors in their completion required exploration of more disaggregated data sources, such as cash books and invoices. The results of this study, therefore, deviate at times from the hospital financial position presented to MOH and MEF.

The objective was to acquire the most reliable data possible, which required using alternate sources across hospitals – a fixed outcome versus fixed process approach. The team "met hospitals where they were" by gaining in-depth understanding of all their data sources, and triangulating these sources to construct a consolidated income statement. The requirement for such extensive data was to effectively capture all sources and uses of funds. Significant data validation and adjustments to reported data were required, primarily due to conflicting reports, missing data, or confusing financial flows. To aid this validation process, following data analysis the author developed semi-structured interviews to guide conversations with relevant hospital, OD, and PHD staff. The research team then visited the hospitals again to reconcile report discrepancies, clarify accounting and financial management processes, and seek additional data.

In addition to reporting errors, there were also data items that were missing or unavailable at the hospitals, ODs, and PHDs. The validation interviews aided in estimating missing data, such as the examples below of unreported fuel and electricity expenses for which invoices were not available. Missing data was typically related to shared expenses between hospitals, ODs, and PHDs and lack of coordination between these entities for accurate reporting.





Data that were unavailable applied primarily to hospital support from NGOs/Donors. Documentation on their contributions was rarely available at the facilities, thus a list of the organizations that had supported each hospital was generated and the author corresponded with them to obtain data on their contributions. The results presented in this report likely underrepresent the full picture of NGO/Donor financing as several organizations were unresponsive and the hospitals may not have recalled all incidences of NGO/Donor support. However, the contributions from external organizations greatly enhanced cost estimates.

4.2. Data Sources

Examples of the data sources leveraged for this study are presented below.

Data Sources	Sample Data Sources
Financial Data Sources	Historical MOH, MEF, and HSSP2 reports, budgets, planning documents
	Historical cash books, general ledgers, and journals unique to each hospital
	Purchase requests, payment vouchers, treasury disbursements, invoices
	Fee schedules, memoranda of understanding, third party payment reports
Staffing Data Sources	Staff lists (government, contract, casual, expatriate, student)
	Staff work time assignment by department
	Staff compensation reports
Utilization Data Sources	Health Information System (HIS) hospital reporting forms (HO2)
	Utilization tracking documents unique to each hospital
	HEF operator utilization reports, CBHI schemes utilization reports
	Ancillary department test, exam, and surgery registers
	Drug and medical supply consumption records
NGO/Donor Data Sources	Funding records and hospital activity reports from NGOs/Donors
	Interviews and correspondence with NGOs/Donors

Data on cost and utilization were necessary to generate unit cost estimates. The data sources for each of the three cost components and for facility utilization are described below.

- **Labor Cost.** There were many payment instruments in place to compensate hospital staff, each with a different reporting format. The main compensation types were: salaries; allowances (e.g., location, hazardous work, family, etc.); overtime; incentives; and other performance bonuses. Compensation was tallied for the year studied for all staff that received payments during that year. The complete list of labor cost inputs is presented below along with their associated funder and main source for obtaining the data.

Labor Cost Item	Funder	Main Data Source
Government salary and allowance	GOC	Monthly salary and allowance report
Non-government salary	GOC	MOH Expense Report; PHD salary file
Overtime	GOC	Overtime report
Midwife incentives	GOC	Facility delivery and midwife report
Mission expense	GOC	MOH Expense Report; Mission report
User fee and HEF incentives	User Fees	User fee and HEF incentive report
User fee other incentives	User Fees	User fee cash book (from 39%)
Temporary staff payments	User Fees	User fee cash book (from 39%)
Mission expense	User Fees	User fee cash book (from 39%)
SDG incentives	HSSP2	SDG incentive report
SDG mission expense	HSSP2	HSSP2 running cost report
National Program/POC incentives	NGO/Donor	Interviews with chiefs of departments
NGO/Donor salary and incentives	NGO/Donor	Interviews with NGOs/Donors
Preceptor payments	Other	Facility general ledger

In addition to the above labor cost items, there was also "free" labor provided at no cost to the facilities. For example, expatriate clinicians provided patient care at one hospital with an NGO covering their salaries and wages. To account for this "free" labor, local wages of comparably qualified government employees were used as a proxy for the labor cost of these staff. Regarding the "free" labor of medical and nursing students and the occasional volunteer providers, this cost was not captured as it was assumed to be a small input to hospitals and the data were not readily available.

- **Drug and Medical Supply Cost.** The cost of drugs and medical supplies included not only expenditures on pharmaceuticals, but also medical consumables, oxygen, and laboratory tests and reagents. Expenditures associated with both drugs and medical supplies purchased "in cash" and supplied "in kind" were costed.

  The data collected to estimate this cost were obtained from three sources: 1) Invoices stored by hospital Pharmacies; 2) Line-item entries recording Program Based Budget (PBB) expenditures in the hospital MOH Expense Report, which; and 3) Correspondence with NGOs/Donors regarding their contributions. The invoices filed at Pharmacies included those from Central Medical Store (CMS) deliveries, local retail pharmacy purchases, National Program (i.e., NCHADS, CENAT) direct supply, and sometimes NGO/Donor direct supply. The complete list of inputs into drug and medical supply cost is presented below, along with the funders and relevant data sources.

Drug/Medical Supply Cost Item	Funder	Main Data Source
In Cash Purchases		
Drugs from retail pharmacies	GOC	MOH Expense Report – PBB code 6572 (Donors and Allowances)
Reagents from retail pharmacies	GOC	MOH Expense Report – PBB code 6171 (Research and Experimentation)
Oxygen from retail pharmacies	GOC	MOH Expense Report – PBB code 607 (Medical Equipment and Supplies)
Drugs/medical supplies and oxygen from retail pharmacies	User Fees	Invoices at hospital Pharmacy
In Kind Supply		
Drugs/medical supplies from CMS	GOC	Invoices at hospital Pharmacy
Drugs/medical supplies from CMS	NGO/Donor	Invoices at hospital Pharmacy
Drugs/medical supplies from PHD to supplement CMS delivery	GOC	Invoices at hospital Pharmacy noting distribution from PHD Pharmacy
Drugs/medical supplies provided direct to hospitals	National Program	Invoices at hospital Pharmacy
Drugs/medical supplies provided direct to hospitals	NGO/Donor	Invoices at hospital Pharmacy; interviews with NGOs/Donors

All invoices were tallied and compared with MOH Expense Report line-times to calculate total facility drug and medical supply cost. The declared value of drug supply on invoices was used as a proxy for expenditures over the one-year period. Quality facility data tying drug consumption to supply and cost did not exist; as such, all drug supply received in kind over the study period was used for expenditure estimates with the assumption that the supply was also used during that period.

CMS supply and its related cost was straightforward to determine for CPA 3 hospitals as the invoices were specifically targeted to those facilities. CMS supply to CPA 1 and 2 hospitals was more challenging to estimate as OD pharmacies received bulk deliveries for their district and managed distribution among hospitals and health centers. The OD pharmacies prepared unique invoices unbundling the bulk CMS quantity for individual hospitals. Therefore, using unit price from the CMS invoices provided to the OD and the supplied quantity from the OD invoices provided to the hospitals, it was possible to estimate cost for CPA 1 and 2 hospitals.

- **Other Operating Cost.** Hospital records on other operating (recurrent) expenditures were the weakest of the three cost components. This category included expenses on items such as utilities; fuel and lubricants; patient food; office supplies; telecommunication fees; cleaning supplies; minor repair and maintenance of buildings, vehicles, furniture, and equipment; etc. These data were obtained from the MOH Expense Report, HSSP2 running cost report, various cash books tied to different funding sources, and reports from supporting NGOs/Donors. These cost items are noted below.

Cost Item	Funder	Main Data Source
In Cash Purchases		
Other operating expense	GOC	MOH Expense Report; cash books; unique hospital expenditure trackers
Other operating expense	GOC	MOH Expense Report; procurement invoices
Other operating expense	User Fees	User fee cash book; MOH Health Financing Report (D3)
Other operating expense	HSSP2	HSSP2 running cost report
In Kind Supply		
Other operating expense	NGO/Donor	Interviews with and reports from NGOs/Donors

- **Utilization.** The monthly hospital reporting form (HO2) submitted to the MOH HIS supplied utilization data on discharges, inpatient days, and outpatient visits for the CPA 1 and 2 hospitals. HO2 utilization reporting corresponded with the Clinical departments operated by hospitals at these CPA levels. IPD utilization was obtained for the following departments: Medicine, Surgery, Pediatric, Maternity, Gynecology, Others (Emergency or Small Surgery), and Tuberculosis. The relevant OPD utilization data recorded on the HO2 included Referral Consultations and Dental Activities.

  Use of the HO2 report for CPA 3 utilization was not ideal due to HO2 reporting only by the aggregate departments noted above. Hospital-specific utilization tracking reports were used instead as they provided more detail than the department groupings of the HO2. The HO2 supplied certain CPA 3 data for the study, including population served, physiotherapy visits, and surgeries.

  Adjustments were made to reported utilization in the event of erroneous hospital reporting or more reliable records from supporting Donors/NGOs. For example, a downward adjustment was made to reported Referral Consultations at one hospital as the staff counted all triaged patients – both IPD and OPD – in this total. In another example,

health center patients were removed from the reported Referral Consultations total. At another hospital, Ophthalmology utilization was only available from a supporting NGO.

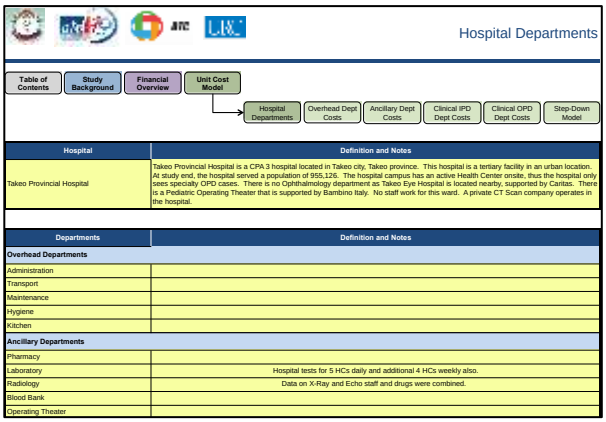
The collection of HIV/AIDS OPD visit volume proved to be a challenge. Due to its special treatment as a National Program, utilization reporting followed a distinct process from that required by the HIS. To estimate HIV/AIDS visits, the research team either counted entries in the department register or interviewed the department chief. In other cases of missing utilization data (particularly for OPD visits), interviews with department chiefs were the best means of estimating utilization.

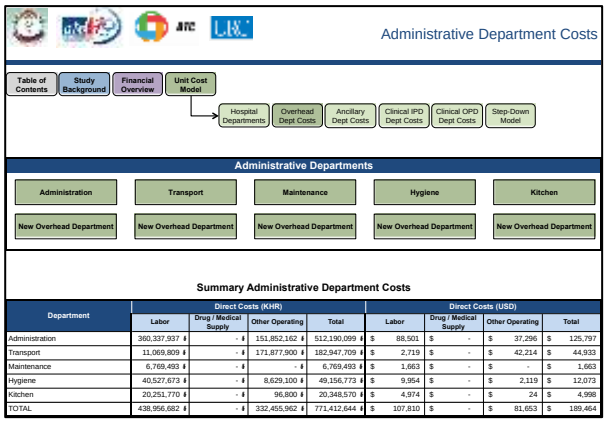
Definitions of the utilization metrics used follow:

- **Population Served:** Population size of hospital catchment area
- **Beds:** Official beds, including Tuberculosis wards
- **Discharges:** Inclusive of the four types tracked by the HIS – authorized, unauthorized, referrals out, and deaths
- **Inpatient Days:** Effective Hospitalization Days, calculated by the movement report of service
- **Outpatient Visits:** Referral Consultations, including new cases referred by health centers, new cases self-referred at the hospital, and return cases. Although reported separately by hospitals, this study also treated the following as outpatient visits: Dental, ENT, HIV/AIDS, Ophthalmology, and Physiotherapy.
- **Surgical Activities:** Includes only major surgical interventions

4.3. Data Processing and Analysis

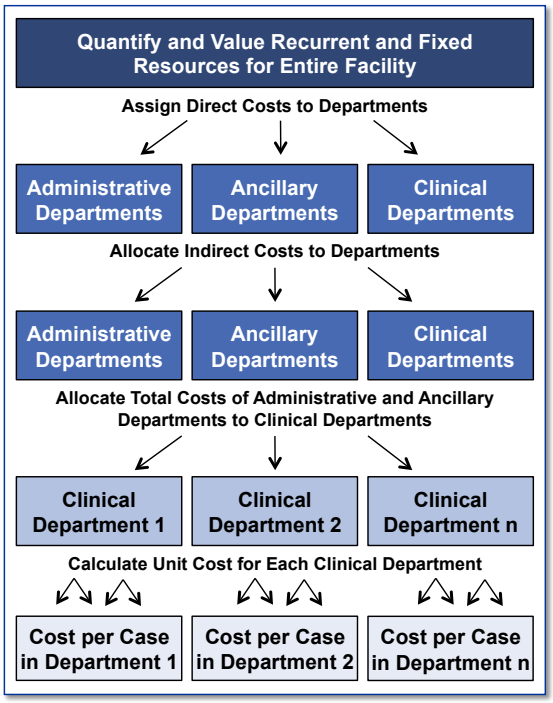
Once collected, a team in Phnom Penh processed the data using Excel spreadsheets uniquely developed for this study. Due to the sheer volume of data entry from hard copy sources, it was necessary to institute a data entry checking system. Following task completion by the data entry clerks, a clerk that had not worked on a particular assignment conducted a line-by-line review of the completed work to ensure its accuracy. The author managed the overall data entry process; the Khmer-native data collection supervisors fielded any questions regarding the content of reports and confirmed correct translation of materials. Illustrated below, an original model was developed to record facility revenues and expenditures, track expenditures to departments, and perform the step-down cost accounting.





4.4. Step-down Cost Accounting

A description of the step-down cost accounting methodology follows, with additional clarification on the data used. The costing sequence[9] is depicted in the image below.



Step 1. Identification of Hospital Departments

All departments that corresponded with the organizational structure of the facilities were identified for costing. The department structure across hospitals varied and the clinical characteristics of the same departments at different hospitals varied. For example, the General Medicine departments across facilities differed as some hospitals cared for HIV/AIDS patients in this department while others cared for them outside of General Medicine. Thus the General Medicine departments had a different patient profile. In-depth conversations with administrative and service delivery staff were required to best understand the departments within facilities. The departments costed, along with their more commonly used French names, are described in Appendix B.

The departments were classified into three tiers prior to costing:

1. **Administrative:** Departments that provided overhead support services to other departments
2. **Ancillary:** Departments that provided diagnostic and clinical support services to clinical departments
3. **Clinical:** Departments that provided direct patient care and either discharged patients or conducted outpatient visits

For the purpose of cost allocation, additional departments were created that were not formally established at the facility level. These departments included Hygiene, Kitchen, Maintenance, and Transportation. Typically subsumed under the Administration department, these departments were kept distinct for more accurate costing. By separating out their expenditures on labor (e.g., cleaners, cooks, mechanics, drivers) and other recurrent items (e.g., cleaning supplies, cooking gas, fuel and oil) from those of the Administration department, these expenditures could be allocated to the other departments using a more refined approach than the one suitable for the Administration department.

In cases where IPD and OPD departments were combined (e.g., ENT, Ophthalmology), these departments were also separated and expenditures estimated for each to permit separate costing of discharges, inpatient days, and outpatient visits.

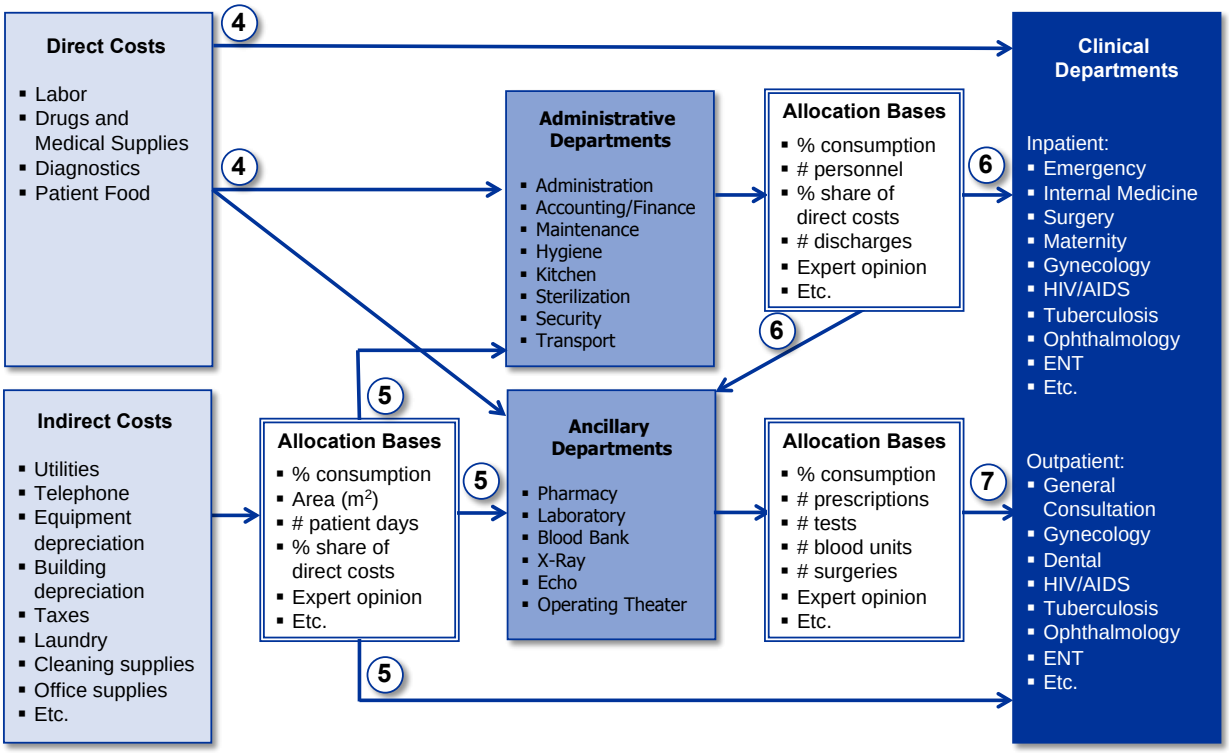
[9] Adapted from: *Designing and implementing health care provider payment systems: how-to manuals*. Eds. Langenbrunner JC, Cashin C, and O'Dougherty S. The International Bank for Reconstruction and Development/The World Bank. 2009.

Step 2. Measurement of Units of Service Volume

The units of service are the utilization outputs of the departments for which cost data are desired – discharges, inpatient days, and outpatient visits. Utilization was obtained for the entire year of the study for all hospital departments.

Step 3. Calculation of Total Facility Costs

Recurrent costs – both "in cash" and "in kind" – were determined for all sources of funding and classified by three cost components: labor costs, drug and medical supply costs, and other operating costs. The cost flow data model[10] below describes the following Steps 4-7 in the cost-accounting exercise.



Step 4. Assignment of Direct Costs to Departments

Direct costs are those costs that can be directly assigned to specific departments. Direct costs typically include labor costs, drug and medical supply costs, and patient food. Those costs classified as direct differed by the extent to which hospital reports budgeted and tracked expenditures by department. Assignment to departments was common at the CPA 3 hospitals, less common at the CPA 2 hospitals, and not practiced at the CPA 1 hospitals. For this study, drug and medical supply costs were rarely tracked to departments and patient food was never tracked to departments. However, some facilities tracked other operating costs by

[10] Adapted from: *Design, Implementation and Results of a Hospital Cost Accounting*. Presentation prepared by Jerry La Forgia (The World Bank), Wladimr Tabora (São Paulo Health Secretariat), Eliane Verdade, (consultant to the São Paulo Health Secretariat). 2011.

department, such as maintenance, cleaning supplies, office supplies, and others. Assignment of direct costs by cost component is described below.

- **Labor Cost.** Hospital staff lists were obtained and total compensation was tallied for individual staff members. As staff worked across multiple departments within hospitals, a grid listing the staff and all departments was created to determine the work time allocation of staff. The hospital administrator completed the grid by noting the time allocation of staff members for each department. The percent time assigned to each department was then multiplied by the staff's total compensation to proportionally allocate wages across departments. See below for a sample of the assignment grid.

Kampong Cham Staff Worktime Allocation

#	Staff Name	Direction	Account	Admin	Cleaner	Driver	Engineer	Cooker	Bloc	Pharmacy
1	មាស ជា	80%							20%	
2	ម៉ី មុន្នីប៊ុនិម	40%								
3	ឈិន ស៊ុំណាត	40%							30%	
4	ឈន ម្រីយ៉ាប៉ាត្រិច	40%								
5	សៅ ភ័ន្ធនី	100%								
6	ច្រឹង ផារិទ្ធ	40%								
7	មៀច លីមហួរ	100%								
8	ឡុយ មាលីនី			100%						
9	សំ សុផាន			60%			40%			
10	ស៊ុយ គីមសាន			100%						
11	ថៃ្ម សុផាន់ណា		50%	50%						
12	យន់ សុខា					100%				
13	ទូច សុខ						100%			
14	មាន សុភ័ក្រ						100%			
15	សួន ស្រ៊ីម						100%			

- **Drug and Medical Supply Cost.** Some hospitals tracked drug and medical supply purchases from their user fee budgets by department, allowing direct assignment. Supply from National Programs or NGOs/Donors (either through CMS or direct to hospitals) could also be traced directly to departments. For example, NCHADS deliveries through CMS could be traced to the HIV/AIDS department. (For an estimate of the share to allocate to the IPD or OPD department, the chief of the HIV/AIDS department or hospital Pharmacy was consulted.) In many cases, NGOs/Donors supported specific departments, such as Médecins Sans Frontières (MSF) donating to the Tuberculosis department. Cost allocation for all other drugs and medical supplies that could not be traced to departments is described in Step 5 below.

2. **Other Operating Cost.** Most CPA 3 and some CPA 2 hospitals tracked these expenses by department for their user fee budget purchases. In those cases, this cost was assigned directly. The same process was followed when NGOs/Donors provided materials in kind to specific departments. For all other cases where expenses could not be traced to departments, this cost was allocated as indirect. Step 5 below describes this allocation.

Step 5. Allocation of Indirect Costs to Departments

Indirect costs are those that cannot be directly assigned to departments. They are spread across departments using an "allocation basis," which estimates departmental use of the resources included in the indirect costs. The table below notes the allocation basis used for assignment of indirect costs to departments. Expert opinion was sought in some cases to provide a better basis for allocation than could be generated from the costing literature or data available from the hospitals.

Category	Indirect Cost Item	Allocation Basis	Department Allocation
Drug and Medical Supply Cost	Drugs and medical supplies	% consumption	Estimated using 3-month sample of consumption and unit price data
	Oxygen	% consumption (expert opinion)	Obtained by consultation with medical experts
Other Operating Cost	Utilities (electricity, water, generator)	% consumption (expert opinion)	Obtained by consultation with hospital construction experts
	Patient Food/ Materials	# of inpatient days	Calculated for study period (July 2010 - June 2011)
	Cleaning Supplies	# of inpatient days	Calculated for study period (July 2010 - June 2011)
	Office Supplies	# of staff (headcount)	Provided for study end (June 2011) by hospital administrator
	Uniforms	# of staff (headcount)	Provided for study end (June 2011) by hospital administrator
	Staff Food/Drink	# of staff (headcount)	Provided for study end (June 2011) by hospital administrator
	Building/Landscape Maintenance	% usage (expert opinion)	Obtained by consultation with hospital construction experts
	Office Equipment Maintenance	# of staff (headcount)	Provided for study end (June 2011) by hospital administrator
	Technical Equipment Maintenance	% usage (expert opinion)	Obtained by consultation with hospital construction experts

- **Drug and Medical Supply Cost.** An estimation technique using departmental drug consumption was employed to apportion cost. All hospitals but one (Memot RH) recorded the quantity of drugs and medical supplies dispensed by the Pharmacy department to each Ancillary and Clinical department. The CPA 3 hospitals followed a sophisticated process for drug and medical supply tracking, recording consumption by ward and noting the item description, code, formula, dose, and quantity. This Logistics Management Information System (LMIS), developed by the USAID-funded Reproductive and Child Health Alliance (RACHA), is used to monitor and manage the national drug-supply system. CPA 1 and 2 hospitals also tracked consumption by department, but their systems were home grown, ranging from sophisticated Excel spreadsheets to paper-based tracking.

  To estimate consumption, a minimum of three months of data was used for all hospitals but Choeung Prey RH, where reliance on a one-month sample was necessary due to the difficulty in deciphering handwritten consumption records. For Memot RH, the average department consumption of its CPA 2 peer hospitals was used as a proxy for its consumption.

  The quantity of each item used was matched with its declared value on CMS invoices (or retail pharmacy invoices if not supplied by CMS) to estimate the total department cost of the item. Departmental costs were estimated for the sample, and their percentage share of the total sample cost calculated. This share was then used to allocate the annual expenditures on drugs and medical supplies to the departments. Below are sample templates used to estimate departmental share of drug and medical supply cost from the consumption sample.

Kirivong Drug Consumption

#	Code	Description	Consultation	Surgery	Medicine	Pediatrics	Pneumo	Maternity
1	AA0010	Acetyl Salicylic Acid	1029	36	801	0	4	63
2	AA0020	Aluminium Hydroxide	8546	1070	6893	203	1510	132
3	AA0030	Aminophylline	130	0	332	0	285	0
4	AA0040	Amoxycillin						
5	AA0050	Amoxycilline						
6	AA0060	Amoxycilline						
7	AA0061	Amoxycilline						
8	AA0070	Ampicilline						
9	AA0080	Atenolol						
10	AA0090	Bromexine						

Kirivong Drug Unit Cost

#	Code	Description	OD Value	Consultation	Surgery	Medicine	Pediatrics	TB	Maternity
1	AA0010	Acetyl Salicylic Acid	126.40 ฿	130,066 ฿	4,550 ฿	101,246 ฿	- ฿	506 ฿	7,963 ฿
2	AA0020	Aluminium Hydroxide	41.18 ฿	351,924 ฿	44,063 ฿	283,854 ฿	8,360 ฿	62,182 ฿	5,436 ฿
3	AA0030	Aminophylline	232.20 ฿	30,186 ฿	- ฿	77,090 ฿	- ฿	66,177 ฿	- ฿
4	AA0040	Amoxycillin dry powder 60ml	12,020.00 ฿	1,310,180 ฿	84,140 ฿	12,020 ฿	1,202,000 ฿	- ฿	504,840 ฿
5	AA0050	Amoxycilline/ Clavulnic Acide	730.58 ฿	- ฿	- ฿	- ฿	- ฿	- ฿	- ฿
6	AA0060	Amoxycilline 250mg	640.80 ฿	2,568,967 ฿	356,926 ฿	210,823 ฿	608,119 ฿	422,928 ฿	478,678 ฿
7	AA0061	Amoxycilline 500mg	1,210.50 ฿	8,739,810 ฿	3,982,545 ฿	3,261,087 ฿	318,362 ฿	4,748,792 ฿	7,892,460 ฿
8	AA0070	Ampicilline	340.20 ฿	10,206 ฿	28,577 ฿	18,371 ฿	- ฿	5,103 ฿	1,195,803 ฿
9	AA0080	Atenolol	375.10 ฿	175,922 ฿	26,257 ฿	414,110 ฿	- ฿	4,501 ฿	3,751 ฿
10	AA0090	Bromexine	33.56 ฿	83,799 ฿	1,510 ฿	11,947 ฿	19,263 ฿	189,245 ฿	571 ฿

- **Other Operating Cost.** There were many line-items from both the government and user fee budgets that could not be directly traced to departments using hospital reports. Some of these items, however, logically belonged to one of the overhead departments, thus an allocation basis was deemed unnecessary. These items included:
  - Taxes and support payments to ODs and PHDs – Administration department
  - Visitor reception, meetings, trainings, ceremonies, publicity, and telecommunication fees – Administration department
  - Fuel, lubricants, and vehicle repair – Transportation department
  - Cooking gas – Kitchen department

  For all other line-items, allocation bases were identified to apportion these costs, as presented in the table above. For example, utilities expense was allocated to departments based on expert opinion from hospital construction and maintenance experts. The most commonly used allocation basis for utilities is either kilowatt-hours (resource use) or meters squared (floor area). Since these data were not available, the experts developed a departmental allocation basis informed by the CPA level and organizational structure of each hospital and considering other factors such as department bed count and utilization.

  Regarding patient food expense, the choice of inpatient days as an allocation basis was logical as meals are a support service provided to inpatients only. Expenditures were spread to IPD departments based on their utilization in days as a percent of total days. While also using inpatient days to allocate cleaning supply expense restricted assignment to the IPD departments, the research team felt this was justified as these departments require a higher volume of hygiene services. For office supplies, the allocation basis selected to apportion cost followed a standard costing methodology – number of staff. To allocate this cost, staff headcount by department was calculated for study end (June 2011) as an estimate of hospital staff size at any given point in time. For the remainder of indirect costs, the same principle of balancing data availability, expert opinion, and intuition was used to select the various allocation bases.

  Determining how to allocate nonclassified expense was less clear. Some hospitals aggregated many expenses into an "other" category. This expense was reported as such by hospitals and could not be analyzed without an audited receipt review, which was out of scope for this study. This expense was allocated to the Administration department in all cases but one, where it was assigned to the Maintenance department at the hospital accountant's direction. Other expense comprised a small share of overall hospital cost – from <1% to 3% across the hospitals – thus its impact on unit costs was limited.

The Art & Science of Cost Accounting
➢ The allocation basis is a proxy for determining the proportion of indirect costs and Administration and Ancillary department costs to assign the various departments. There is no perfect allocation basis for apportioning cost. The optimum basis varies depending on data availability, data quality, and other study and country contextual factors. ➢ Simplicity of approach was preferred in selecting an allocation basis; however, the tradeoff between accuracy and feasibility was considered. The allocation bases were reviewed and consensus was reached by the study sponsors on the most appropriate basis for assigning costs. For consistency and comparability, the same allocation basis was applied across all facilities.

Step 6. Selection of Allocation Basis for Administrative Department Costs

After allocating total costs (direct and indirect) to departments, Administrative department costs were allocated to the Ancillary and Clinical departments. Similar to the allocation of indirect costs, an allocation basis was defined to assign these costs. The table below notes the allocation basis used for assignment of Administrative department costs to the Ancillary and Clinical departments.

Department	Allocation Basis	Department Allocation
Administration	# of staff (headcount)	Provided for study end by hospital administrator
Maintenance	% usage (expert opinion)	Obtained by consultation with construction experts
Kitchen	# of inpatient days	Calculated for study period (July 2010 - June 2011)
Hygiene	# of inpatient days	Calculated for study period (July 2010 - June 2011)
Transportation	# of discharges	Calculated for study period (July 2010 - June 2011)

As referenced above, the selection of an allocation basis required some logic behind it. For example, the choice of staff headcount as an allocation basis for Administration department costs was rational, as the primary responsibility of that department is to manage staff in the other departments of the hospital. While many costing studies apportion Maintenance department costs by using a department's percentage share of total direct cost, the research team chose instead to consult with hospital construction and maintenance experts in Cambodia to form an allocation basis. These experts reviewed the organizational structure and other factors of each hospital to determine the percent of maintenance cost to allocate to each department.

The choice of inpatient days as an allocation basis for Kitchen department costs was logical, as the workload of cooks in addition to use of cooking gas serviced inpatients alone, thus these expenditures were appropriately spread to IPD departments based on their daily utilization. Similarly, Hygiene department costs included the labor of cleaners and expenditures on cleaning supplies. While using inpatient days for allocation restricted cost assignment to the IPD departments, this was considered justified as those departments required a higher volume of hygiene services. Lastly, the choice of discharges as an allocation basis for the Transportation department was selected as the workload of drivers in addition to ambulance use was related to the number of discharges (transfers) of departments.

Step 7. Selection of Allocation Basis for Ancillary Department Costs

An allocation basis was also defined to assign Ancillary department costs to the Clinical departments. Each Clinical department's use of ancillary services was estimated using a three-month sample of ancillary registers that listed the patients that had used their services and those patients' departments. The three months selected (unless data were unavailable for those months) were October 2010, February 2011, and May 2011. In the absence of registers that noted patients' departments, estimated usage was obtained through consultation with the Ancillary department chiefs. The table below notes the allocation basis used for assignment of Ancillary department costs.

Department	Allocation Basis	Department Allocation
Pharmacy	% consumption	Estimated using procurement unit price data and 3-month sample of consumption data
Laboratory	# of tests	Estimated using 3-month sample of Lab register data
Blood Bank	# of blood units	Estimated using HIS consumption data or 3-month sample of Blood Bank register data
X-Ray/Echography	# of x-rays/ # of echos	Estimated using 3-month sample of X-Ray/Echo register data
Operating Theater	# of surgeries	Estimated using 3-month sample of Operating Theater register data
Emergency	# of discharges	Calculated for study period (July 2010 - June 2011)

For example, the Laboratory register noted the patients that had received lab tests in addition to the departments where the test was ordered. Total Laboratory department costs were allocated to Clinical departments based on those departments' use of lab services, represented by total test volume. This method is somewhat limited in that it weighs all tests the same. Differences in the cost of test supplies or differences in labor cost related to staff time or skill level required of certain tests were not accounted for in the allocation based on total volume. The data available, however, did not permit a more nuanced analysis.

Untangling IPD and OPD Costs

- Each hospital had a different arrangement for their OPD services. Key differences were related to the presence (or absence) of a health center on the hospital grounds, and the provision of OPD services at a registration/triage/consultation area versus at the IPD departments.
- The former primarily impacted hospital OPD specialization and overall utilization. The latter impacted expenditure reporting. It was more difficult to separate OPD expenses from the IPD department in hospitals where the services were co-located. Interviews with department chiefs provided the best means for determining the share of expenditures to assign to the IPD versus OPD service.
- For example, hospitals provided both IPD and OPD co-located ENT services. As IPD and OPD utilization cannot be weighted the same, dividing department expenses between the two services was necessary to estimate the cost per discharge, per inpatient day, and per outpatient visit. The team interviewed the chief of ENT to request estimates of the percent of time staff treated IPD versus OPD patients, and estimates of the differences in drug and medical supply consumption of IPD versus OPD patients. Expenditures on labor and drugs and medical supplies were then split accordingly. Other operating cost was allocated fully to IPD based on the assumption that these patients consumed the vast majority of cost items in this category.

Step 8. Completion of Step-down Cost Accounting

Using the allocation bases, costs from the Administrative and Ancillary departments were "stepped-down" to the Ancillary and Clinical departments, resulting in total cost per Clinical department. See below for an illustration of this step.

Hospital Department	Department Cost			Administration Step-Down Allocation					Ancillary Step-Down Allocation						Total Clinical Department Cost
	Direct	Indirect	Total	Admin	Transport	Maint	Hygiene	Kitchen	Pharm	Lab	X-Ray	Echo	Blood	Theater	
Hospital Totals	**$ 1,000,000**	**$ 800,000**	**$ 1,800,000**	$ 132,141											
Administration	$ 112,006	$ 20,134	$ 132,141	**236.00**	$ 42,691										
Transport	$ 38,913	$ 1,819	$ 40,731	$ 1,960	**16,000**	$ 26,449									
Maintenance	$ 9,586	$ 14,343	$ 23,929	$ 2,520	$ -	**74%**	$ 40,563								
Hygiene	$ 18,386	$ 8,633	$ 27,019	$ 12,878	$ -	$ 666	**$ 98,845**	$ 12,787							
Kitchen	$ 6,798	$ 2,295	$ 9,093	$ 2,800	$ -	$ 894	$ -	**$ 98,845**	$ 111,093						
Pharmacy	$ 94,970	$ 8,204	$ 103,174	$ 4,759	$ -	$ 3,159	$ -	$ -	**89%**	$ 125,357					
Laboratory	$ 71,743	$ 32,495	$ 104,238	$ 7,279	$ -	$ 4,159	$ -	$ -	$ 9,681	**3,429**	$ 31,469				
X-Ray	$ 9,858	$ 14,887	$ 24,745	$ 3,360	$ -	$ 2,199	$ -	$ -	$ 1,166	$ -	**883**	$ 11,381			
Echography	$ 5,179	$ 2,516	$ 7,695	$ 1,400	$ -	$ 1,263	$ -	$ -	$ 1,023	$ -	$ -	**466**	$ 22,760		
Blood Bank	$ 9,892	$ 8,120	$ 18,012	$ 2,520	$ -	$ 929	$ -	$ -	$ 1,299	$ -	$ -	$ -	**2,110**	$ 148,733	
Operating Theater	$ 52,177	$ 71,078	$ 123,254	$ 9,519	$ -	$ 1,997	$ -	$ -	$ 9,409	$ 4,554	$ -	$ -	$ -	**1,050**	
Emergency	$ 54,435	$ 102,271	$ 156,706	$ 7,279	$ 5,070	$ 1,431	$ 3,591	$ 1,280	$ 13,721	$ 23,747	$ 4,898	$ 2,387	$ 5,409	$ -	$ 225,519
Surgery	$ 77,360	$ 114,988	$ 192,349	$ 12,878	$ 8,805	$ 1,692	$ 10,053	$ 3,326	$ 17,982	$ 14,529	$ 4,267	$ 2,209	$ 2,403	$ 86,223	$ 356,715
ICU	$ 54,611	$ 95,234	$ 149,844	$ 10,358	$ 2,401	$ 1,321	$ 2,995	$ 732	$ 19,057	$ 17,210	$ 4,858	$ 443	$ 1,295	$ -	$ 210,517
Medicine	$ 49,838	$ 60,753	$ 110,592	$ 12,038	$ 8,005	$ 1,845	$ 6,195	$ 1,659	$ 10,141	$ 18,538	$ 4,519	$ 4,461	$ 7,405	$ -	$ 185,398
OB/GYN	$ 92,117	$ 88,447	$ 180,564	$ 13,438	$ 9,872	$ 2,196	$ 6,684	$ 2,255	$ 10,617	$ 21,109	$ 4,322	$ 526	$ 2,330	$ 62,510	$ 316,424
Pediatrics	$ 61,784	$ 88,120	$ 149,905	$ 12,598	$ 6,404	$ 1,697	$ 4,571	$ 1,375	$ 7,554	$ 14,087	$ 2,406	$ 162	$ 1,701	$ -	$ 202,460
HIV/AIDS	$ 94,856	$ 43,646	$ 138,501	$ 7,559	$ 800	$ 333	$ 2,846	$ 1,068	$ 5,189	$ 8,310	$ 4,029	$ 668	$ 834	$ -	$ 170,137
TB	$ 85,492	$ 22,016	$ 107,508	$ 6,999	$ 1,334	$ 666	$ 3,628	$ 1,091	$ 4,255	$ 3,271	$ 2,171	$ 524	$ 1,382	$ -	$ 132,830
Hospital Totals	**$ 1,000,000**	**$ 800,000**	**$ 1,800,000**	**$ 132,141**	**$ 42,691**	**$ 26,449**	**$ 40,563**	**$ 12,787**	**$ 111,093**	**$ 125,357**	**$ 31,469**	**$ 11,381**	**$ 22,760**	**$ 148,733**	**$ 1,800,000**

Step 9. Calculation of Unit Costs

The total cost of each Clinical department included the direct and indirect costs originally assigned to the departments, in addition to the allocated Administrative and Ancillary department costs. To calculate unit cost, the total cost of each Clinical department was divided by its units of service, to arrive at average cost per discharge, per inpatient day, or per outpatient visit.

Step 10. Calculation of Relative Cost Weights

Cost is a function, reflecting decisions – both rational and irrational – made by financiers and providers. As such, it should be emphasized that "real cost" is a flawed concept. Therefore, in addition to calculating absolute unit costs, relative costs were computed to make better comparisons across departments and facilities and aid provider payment rate setting. Department unit costs were divided by the overall hospital unit cost to arrive at the department's cost relative to the average. The hospital average had a relative cost weight of 1.00 and the various departments had costs weights higher or lower to this reference.

5. Results

5.1. Introduction

It is important to issue some caveats related to interpretation of these results. The findings of historical costing studies reflect the quality of the utilization and financial data sources that inform them. While sources were extensively reconciled and extrapolation methods employed to close gaps in unreported data, these results should still be interpreted with caution. The research team was informed anecdotally that funding amounts were not always correctly represented in official reports; the amount of funding reaching service delivery level may have been lower than documented in these reports. Further, potentially inflated values on invoices, particularly those for drugs and medical supplies, may skew the results.

All results are presented in United States dollars. The foreign exchange rate,[11] 1 US dollar = 4,071.56 riels, was based on the historical average exchange rate over the study period. For readability, the results are rounded to the nearest thousand in the text.

The results are first presented in tabular form, followed by graphical. The charts present results by CPA level, with green CPA 1 charts presented first, followed by purple CPA 2 charts, and finally blue CPA 3 charts. Each chart presents results for individual hospitals within the CPA level, in addition to the average across hospitals within the same level. The charts on the left present results in absolute dollars, the charts on the right by the percentage share of each component part. The scales of the absolute chart vertical axes represent thousands ('000s) of dollars, chosen to best graphically present the results within an individual chart. When comparing charts across CPA levels, it is important to note the difference in scales.

5.2. Hospital Sources of Funds

5.2.1. Total Hospital Funding

Hospital funding is presented for both in cash and in kind funding. Funding in cash includes all hospital inputs from the following funding streams:

- User fees, including revenue from self pay OOP, HEF, CBHI, and private CT scanner companies operating in hospitals;
- Government (GOC) funds from PBB budgets;
- HSSP2 pooled and counterpart SDG grants for incentives and running cost;
- NGO/Donor and National Program cash provision to hospitals; and
- Other funding sources, including parking fees, café sales, and payments from medical and nursing school students.

Funding in kind includes:

- Government (GOC) drug and medical supply provided through CMS to hospitals;
- NGO/Donor and National Program drug and medical supply provided through CMS to hospitals;

[11] Rates published by OANDA Corporation (http://www.oanda.com/).

- NGO/Donor and National Program drug and medical supply provided direct to hospitals; and
- NGO/Donor general supply provided direct to hospitals.

The key predictors of overall hospital funding – in cash and in kind – were CPA level and SOA status. On average, hospital funding doubled between CPA levels 1 and 2, and quadrupled between CPA levels 2 and 3. The average annual funding of the CPA 1 hospitals was $380,000, compared with $763,000 for CPA 2 hospitals, and $3,219,000 for CPA 3 hospitals.

Funding was much lower for the non-SOA hospitals – Bakan RH and Battambang PH – compared with their SOA counterparts at the same CPA level. Considering in cash funding, the percentage difference between funding of the CPA 1 SOA and non-SOA hospitals was 19%; the difference for the CPA 3 SOA and non-SOA hospitals ranged from 9% to 25%.

Across the sample, in cash funds ranged from 29% to 56% of overall hospital funding. The share of in kind funds[12] ranged from 44% to 71% of overall funding, indicating that hospitals heavily relied on supply in kind for their daily operations. Between the CPA 1 and 2 hospitals, there was significant variation in the share of funding received from in cash and in kind sources. In contrast, all the CPA 3 hospitals received similar shares of their funding in cash (approximately one-third) and in kind (approximately two-thirds).

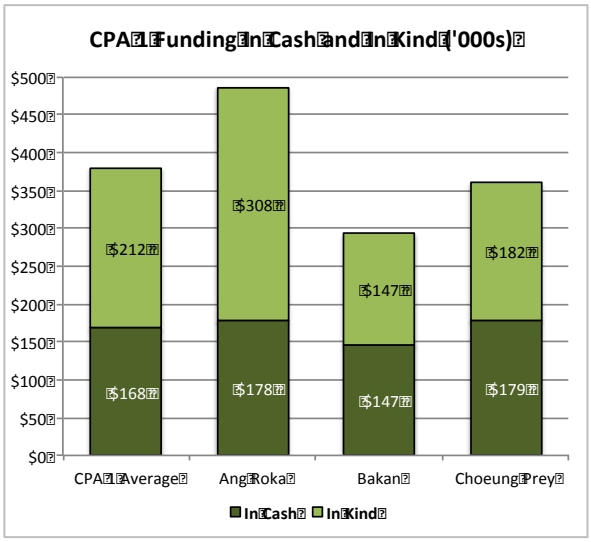
In kind funding was predominately for drugs and medical supplies, with small general supply contributions from NGOs/Donors such as office supplies and phone cards. On average, funding in kind as a share of overall hospital funding increased with each subsequent CPA level due to significant Government and NGO/Donor contributions of drugs and medical supplies to higher level hospitals.

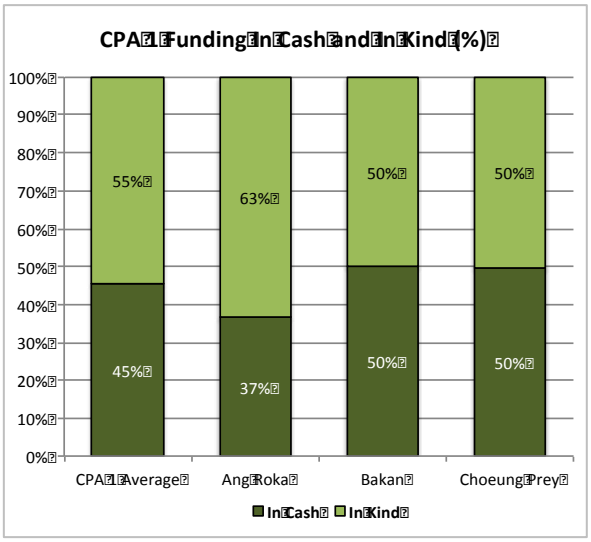
Table 2. Total Hospital Funding

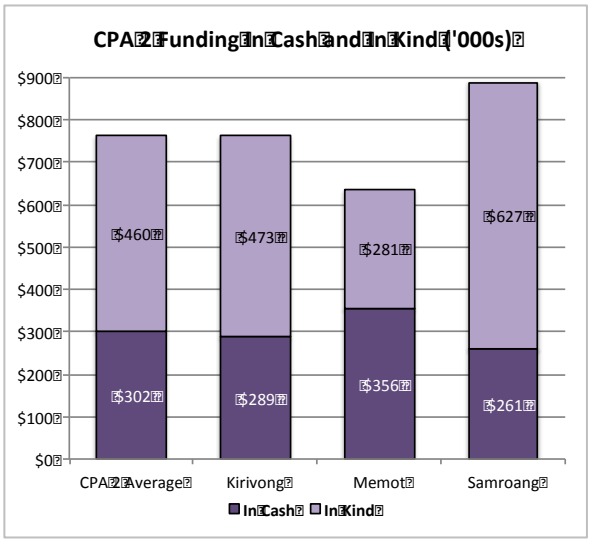
Type	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
In Cash	$178,365	$147,102	$179,133	$289,194	$356,100	$261,442	$968,169	$1,238,290	$1,245,120	$1,058,401
In Kind	$308,374	$146,588	$181,543	$473,029	$280,986	$627,387	$1,493,448	$2,405,110	$2,578,380	$1,888,100
Total	**$486,739**	**$293,691**	**$360,676**	**$762,223**	**$637,086**	**$888,829**	**$2,461,617**	**$3,643,401**	**$3,823,500**	**$2,946,501**

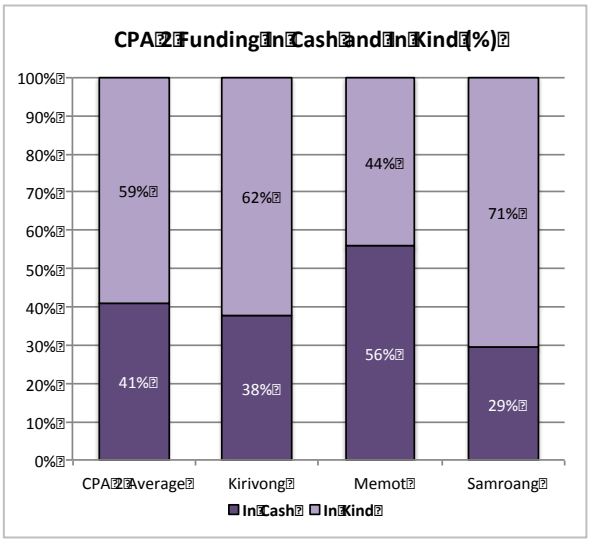
[12] The share of in kind funding is likely understated, as ODs and hospitals did not typically distinguish in their PBB reports between the two Government funding types. Some in kind general supplies (e.g., uniforms, office supplies, fuel) may be inadvertently represented in the results as cash.

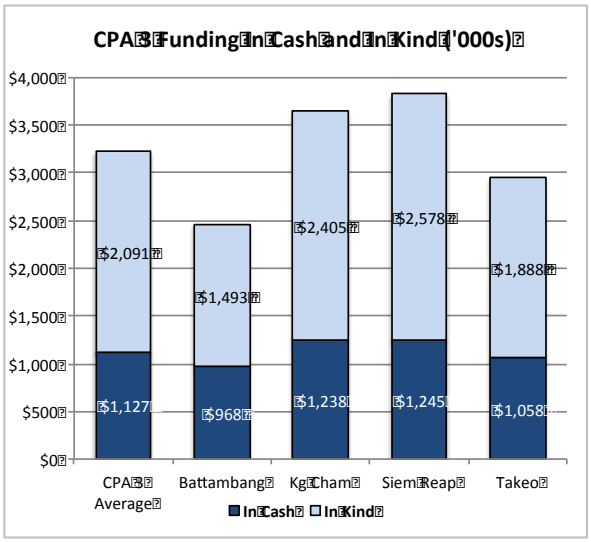
Figure 1. Total Hospital Funding

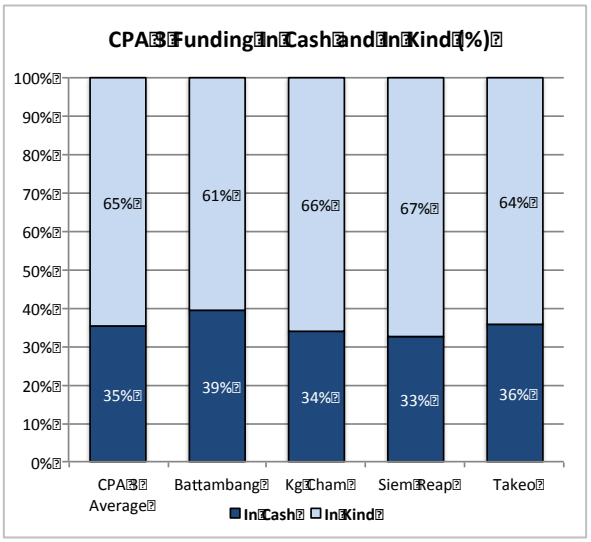












5.2.2. Sources of Funds – Summary

The following funding sources contributed to hospital revenue, including both in cash and in kind sources:

- **User Fees:** Revenue from self pay OOP, HEF, CBHI, and private CT scanner companies operating in hospitals
- **Government (GOC):** Including in cash funds from PBB budgets and in kind supply provided through CMS
- **HSSP2:** Pooled and counterpart SDG grants for incentives and running cost
- **NGO/Donor:** NGO/Donor and National Program cash provision to hospitals and in kind drugs and medical supplies and general supplies provided direct to hospitals or through CMS
- **Other Funds:** Parking fees, café sales, and payments from medical and nursing school students

Each of these sources of revenue is discussed in turn, with more detail provided in the subsequent sections on funding in cash and in kind.

- **User Fee Funds:** Revenue from user fees comprised a small share of overall hospital revenue, ranging from 7% to 27% at individual hospitals. On average, user fee revenue doubled from CPA levels 1 to 2 ($57,000 to $118,000), and almost quadrupled from CPA levels 2 to 3 ($118,000 to $426,000).

- **Government Funds:** GOC was the largest funder of all 10 hospitals, with its contributions to overall revenue ranging from 49% to 83% across hospitals. On average, GOC covered close to 70% of hospital revenue at all CPA levels. On average, drugs and medical supplies provided in kind through CMS comprised almost half of overall hospital revenue at each CPA level, while PPB funding comprised about one-fifth of revenue. For individual hospitals, GOC CMS supply contributed from 34% to 66% to overall revenue and PBB funding contributed from 13% to 37%.

- **HSSP2 Funds:** SDG grants represented 3% to 9% of total revenue for those hospitals operating under an SOA arrangement.

- **NGO/Donor Funds:** The NGO/Donor share of overall hospital funding ranged from 4% to 24%. The level of support varied across the hospitals, ranging from $13,000 at Bakan RH to $751,000 at Kampong Cham PH. NGOs/Donors were involved with hospitals at each CPA level, although they more heavily supported CPA 3 hospitals. On average, CPA 1 and 2 funding was comparable at close to $50,000; CPA 3 funding was 11 times higher at $550,000. Two hospitals received heavy subsidization through direct support of certain departments – Tuberculosis at Kampong Cham PH and Pediatrics at Takeo PH.

- **Other Funds:** Other funds contributed less than 1% to total revenue at each hospital. CPA 1 and 2 hospitals generally did not benefit from revenue from parking, cafés, or students. Kirivong RH was an exception, generating a small amount of revenue from both parking and a café. Two of the CPA 3 hospitals reported other funds. Kampong Cham PH received parking and café revenue, and Takeo PH collected parking, café, and student training fees. As hospitals retained only 25% of parking and café revenue after taxes, this income contributed negligibly to hospital operations. During data

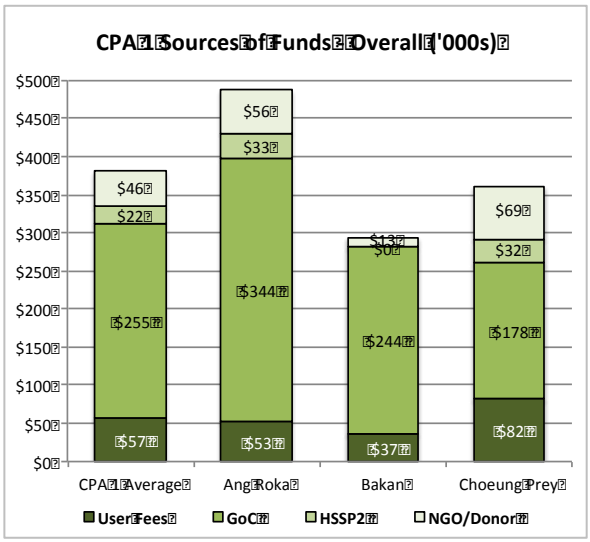
collection, the research team observed that some hospitals collected revenue that they did not declare from parking or cafés. This revenue was either treated unofficially to avoid taxes, or reflected special arrangements with staff that did not benefit the overall hospital.

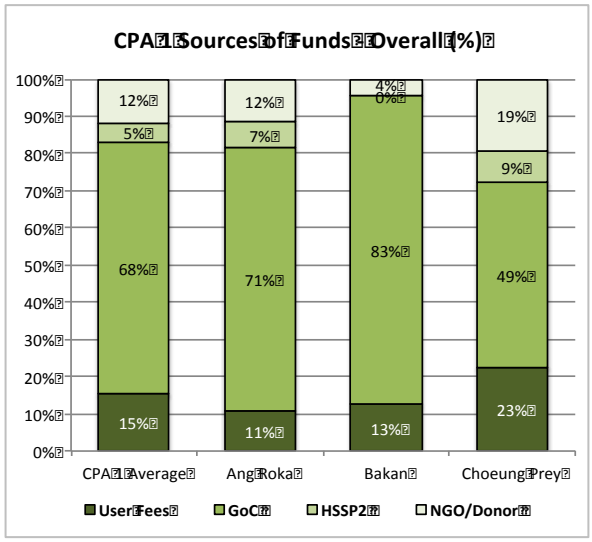
Table 3. Sources of Funds – Summary

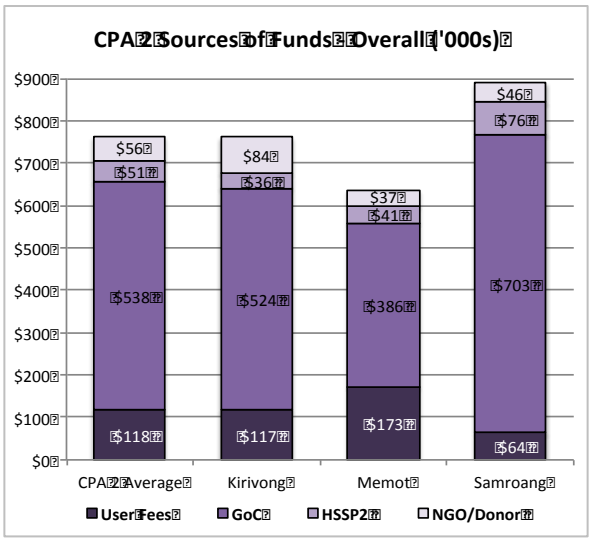
Source	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
User Fee	$52,546	$37,116	$81,718	$116,698	$173,154	$63,988	$306,123	$454,922	$581,629	$359,719
GOC	$344,426	$243,578	$178,302	$524,085	$386,202	$702,915	$1,720,300	$2,309,793	$2,799,908	$1,740,184
HSSP2	$33,498	$0	$31,755	$36,438	$40,509	$76,092	$0	$125,634	$143,815	$139,796
NGO/ Donor	$56,268	$12,996	$68,902	$84,486	$37,221	$45,834	$435,195	$751,246	$298,147	$692,960
Other†	$0	$0	$0	$516	$0	$0	$0	$1,806	$0	$13,842
Total	**$486,739**	**$293,691**	**$360,676**	**$762,223**	**$637,086**	**$888,829**	**$2,461,617**	**$3,643,401**	**$3,823,500**	**$2,946,501**

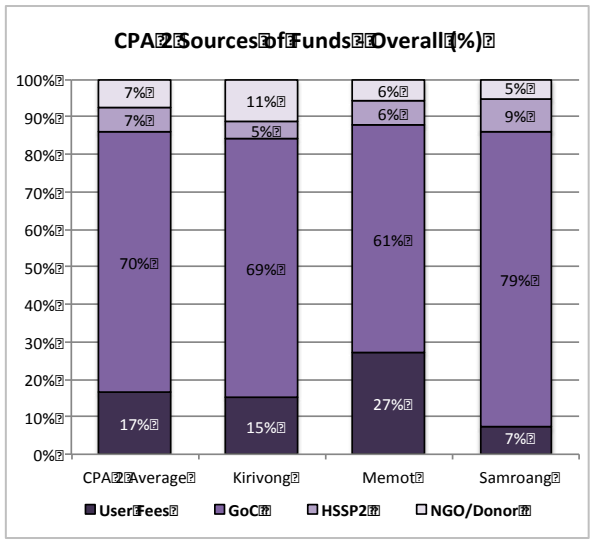
† For presentation purposes, Other Sources is excluded in the charts below as it represents a very small share of overall funding.

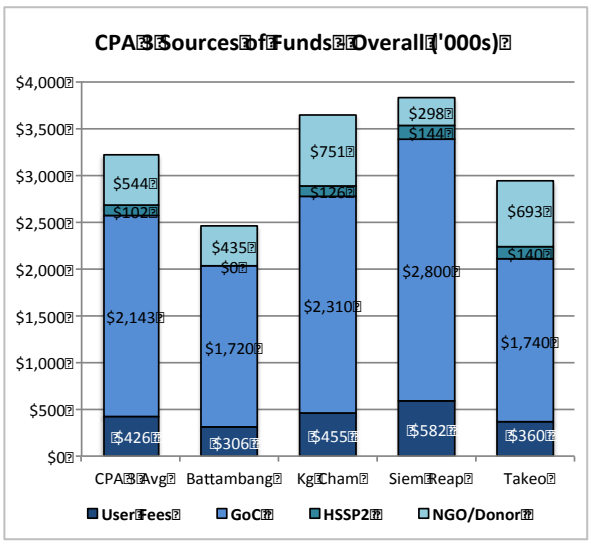
Figure 2. Sources of Funds – Summary

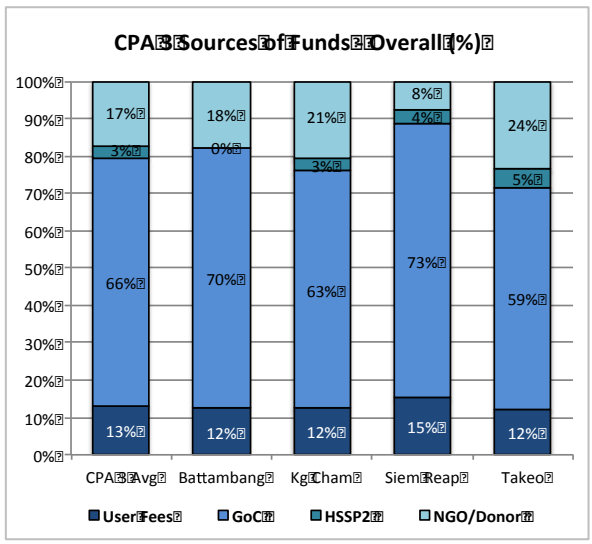












5.2.3. Sources of Funds – In Cash

The sources of revenue in cash to hospitals included:

- **User Fees:** Revenue from self pay OOP, HEF, CBHI, and private CT scanner companies operating in hospitals
- **Government (GOC):** In cash funding from PBB budgets
- **HSSP2:** Pooled and counterpart SDG grants for incentives and running cost
- **NGO/Donor:** In cash funding from NGOs/Donors and National Programs
- **Other Funds:** Parking fees, café sales, and payments from medical and nursing school students

Funding from these sources of revenue in cash is discussed in turn.

- **User Fee Funds:** Revenue from user fees contributed over one-third of revenue in cash to hospitals on average. For individual hospitals, user fee revenues ranged from 24% to 49% of their funding in cash, with no apparent trend by CPA level.

- **Government Funds:** GOC was the largest cash funder for 7 of the 10 hospitals, with contributions to funding in cash ranging from 31% to 74% across the hospitals. PBB funding was greater for non-SOA hospitals; their GOC share of revenue in cash was highest among the sample (i.e., 74% for Bakan and 65% for Battambang).

  Other than CPA level and SOA status, there were no clear factors that explained differences in PBB funding levels. Considering the CPA 1 SOA hospitals, Choeung Prey RH received only 60% of the funding that Ang Roka RH received ($55,000 vs. $92,000), though it served a larger population (200,675 vs. 140,155), employed a larger staff (44 vs. 33), operated more beds (70 vs. 60), and discharged more patients (4,148 vs. 4,124). Further, the three CPA 2 SOA hospitals received comparable amounts of GOC funding in cash; funding differed by only $13,000 between hospitals. However, there were great differences in the catchment population, staff size, number of beds, and utilization across these facilities. However, for the CPA 3 SOA hospitals, GOC funding did seem to logically correspond with hospital operating statistics. Funding for Kampong Cham PH was $90,000 higher (a percentage difference of 17%) than Siem Reap PH or Takeo PH, both hospitals serving smaller populations with fewer beds and lower utilization.

  Lastly, PBB funding per capita for hospital services differed considerably across the facilities. Funding ranged from $0.27 to $0.97 per capita, with no apparent trends by CPA level or SOA status. Inclusive of the entire sample, the PBB budget allocation was $0.49 per capita.

- **HSSP2 Funds:** SOA status was a key differentiator for hospital funding, with SDG grants comprising from 9% to 29% of revenue in cash. SDG grants were particularly important revenue sources for CPA 1 and 2 hospitals, comprising almost 20% of funding in cash for CPA 1 hospitals, and from 11% to 29% for CPA 2 hospitals. SDG grants were also significant for CPA 3 hospitals, contributing from 10% to 13% of their funding in cash.

  Similar to GOC funds, HSSP2 funds were not related to key indicators such as population served, utilization, bed size, or staff headcount. SDG grants provided to

Samroang PH were almost double the grants of Kirivong RH and Memot RH, though Samroang PH lagged behind its CPA 2 counterparts on those key indicators. Although a CPA 2 hospital, Samroang is classified as a provincial hospital in a remote location, factors that augmented its SDG grant. Likewise, Kampong Cham PH's catchment population and utilization dwarfed that of Siem Reap PH and Takeo PH, though its SDG funding was lower. Further, its staff size was similar to Siem Reap PH and far larger than Takeo PH.

The SDG allocation formula was designed to determine grants based on population with a premium designated for remote locations. Across the facilities, per capita SDG grants ranged from $0.07 at Kampong Cham PH to $0.38 at Samroang PH. The SDG grant allocation inclusive of all eight hospitals operating under a SOA was $0.14 per capita.

- **NGO/Donor Funds:** Funding in cash from NGOs/Donors was primarily provided to hospitals for staff incentives, subsidization of patient user fees, and National Program ancillary service payments. NGOs/Donors preferred to provide in kind support to hospitals. Below is the list of organizations that provided cash to hospitals for their operating expenses. Contributions from organizations that provided capacity-building support to hospitals in the form of clinical and management advisory services were not included.

Hospital	Supportive NGOs and Donors
Ang Roka RH	AIDS Health Care Foundation (AHCF), Marie Stopes International
Bakan RH	CENAT (Global Fund), TB Cup
Choeung Prey RH	FHI 360, Marie Stopes International
Kirivong RH	Caritas Takeo Eye Hospital
Memot RH	FHI 360
Samroang PH	Fred Hollows Foundation
Battambang PH	FHI 360, RACHA, UNICEF, CENAT & NCHADS (Global Fund)
Kampong Cham PH	FHI 360, Médecins Sans Frontières (MSF)
Siem Reap PH	ESTHER, Fred Hollows Foundation, SUMH
Takeo RH	Cambodia Health Committee, Handicap Intl, Institut Pasteur du Cambodge, Ospedale Pediatrico Bambino, NCHADS (Global Fund)

- **Other Funds:** Other funds contributed less than 1% to total revenue at each hospital but Takeo PH, where other funds contributed 1.3%. For more information on this source of funds, see the "Sources of Funds – Summary" section.

Table 4. Sources of Funds – In Cash

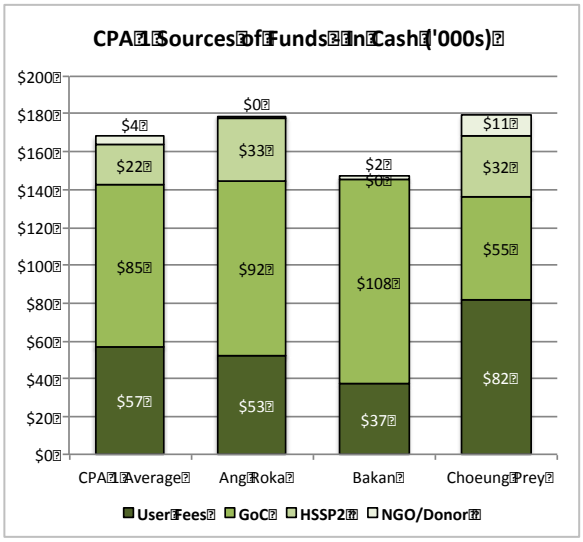
Source	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
User Fee	$52,546	$37,116	$81,718	$116,698	$173,154	$63,988	$306,123	$454,922	$581,629	$359,719
GOC PBB	$92,011	$108,408	$54,743	$129,704	$132,784	$119,833	$630,009	$589,640	$499,336	$498,589
HSSP2	$33,498	$0	$31,755	$36,438	$40,509	$76,092	$0	$125,634	$143,815	$139,796
NGO	$309	$1,578	$10,917	$5,838	$9,654	$1,530	$32,037	$66,288	$20,340	$46,456
Other	$0	$0	$0	$516	$0	$0	$0	$1,806	$0	$13,842
Total	**$178,365**	**$147,102**	**$179,133**	**$289,194**	**$356,100**	**$261,442**	**$968,169**	**$1,238,290**	**$1,245,120**	**$1,058,401**
Pop	140,155	127,430	200,675	230,990	137,141	201,609	1,092,075	1,750,248	965,936	955,126
Staff	33	41	44	54	57	52	325	259	261	229
Beds	60	64	70	84	95	84	270	260	230	250
IPD	4,124	2,856	4,148	6,378	6,484	4,708	11,813	17,000	12,677	12,215
OPD	16,556	1,527	7,731	19,286	22,472	13,319	57,123	51,465	54,564	15,975

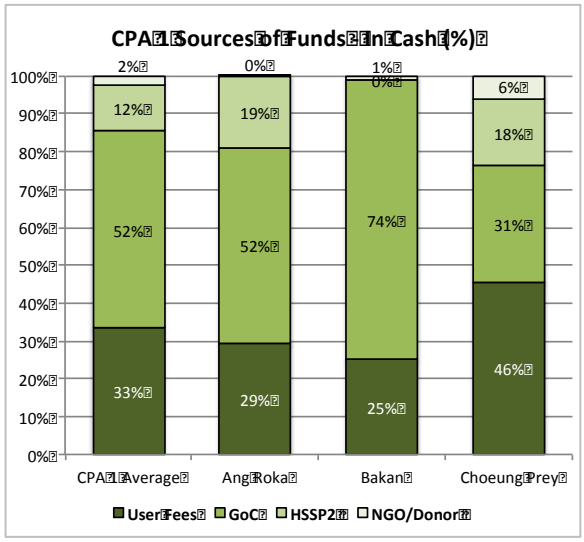
Utilization Notes: Population is presented for the hospital catchment area. Staff includes both health workers and non. Beds are those officially reported. IPD includes authorized and unauthorized discharges, deaths, and transfers out. OPD includes all outpatient visits (general, specialty, dental, and HIV/AIDS).

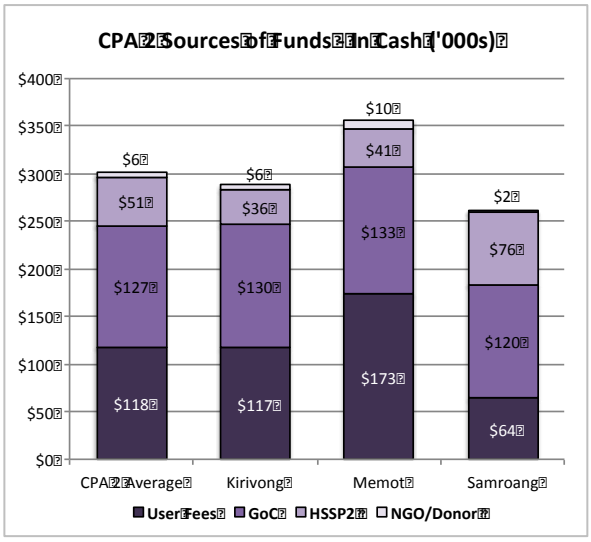
Table 5. Per Capita Funding

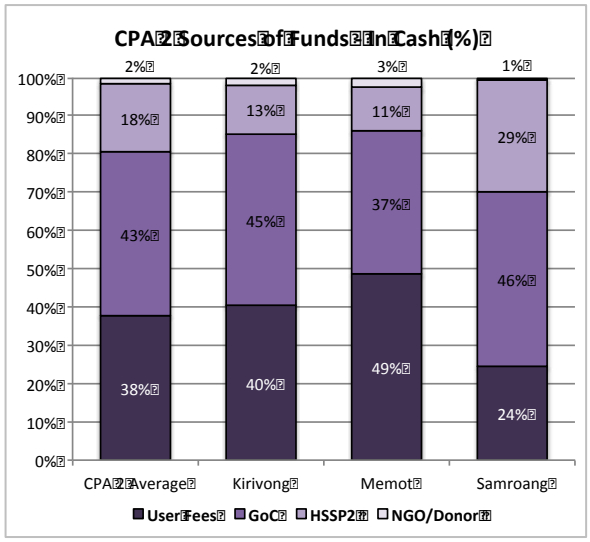
Source	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
GOC PBB	$0.66	$0.85	$0.27	$0.56	$0.97	$0.59	$0.58	$0.34	$0.52	$0.52
HSSP2	$0.24	$0.00	$0.16	$0.16	$0.30	$0.38	$0.00	$0.07	$0.15	$0.15

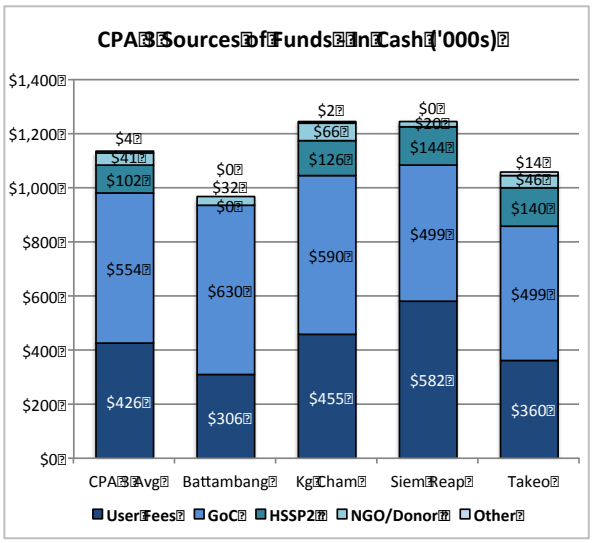
Figure 3. Sources of Funds – In Cash

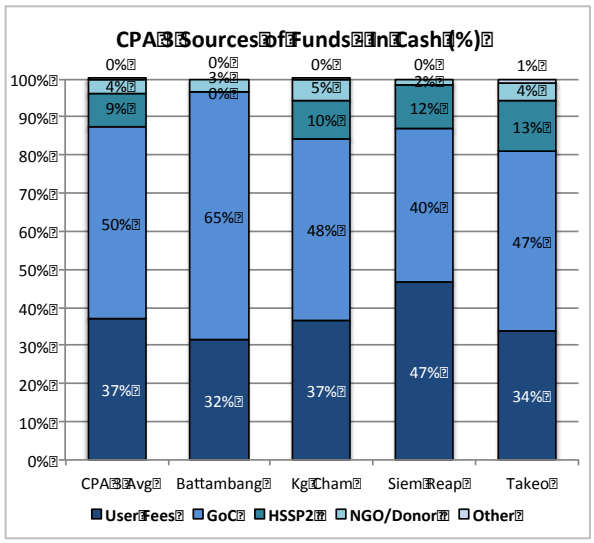












5.2.4. Sources of Funds – In Kind

The sources of revenue in kind to hospitals included:

- **Government (GOC):** In kind drug and medical supply provided through CMS
- **NGO/Donor:** NGO/Donor and National Program in kind drugs and medical supplies and general supplies provided direct to hospitals or through CMS

The key findings regarding in kind funding from the Government and NGOs/Donors are presented below. Generally, in kind support to hospitals should be regarded fully as drugs and medical supplies. Although minor general supply contributions from NGOs/Donors are included as revenue, they comprise less than 1% of in kind funding.

- **Government Supply:** GOC in kind contributions[13] were an important source of support to hospitals, ranging from 66% to 93% of their revenue in kind. Surprisingly, GOC supply did not correspond with the size of the hospitals' catchment population or with utilization. For example, among the CPA 1 hospitals, Choeung Prey RH's population was greater than that of Ang Roka RH (200,675 vs. 140,155) and its IPD utilization was higher (4,148 vs. 4,124 discharges); however, it received almost $130,000 less from GOC in kind. Choeung Prey RH also received $12,000 less GOC supply than Bakan RH, a facility that treated far fewer patients and served a catchment population two-thirds the size of Choeung Prey RH's.

  Regarding the CPA 2 hospitals, Memot RH received far less in kind materials though it had the highest utilization of its peers. Samroang PH, although a provincial hospital, had the lowest utilization and received two times the supply of Memot RH. The supply for CPA 3 hospitals was no different. The highest utilized hospital serving the largest population, Kampong Cham PH, received drugs and medical supplies valued at half a million dollars less than Siem Reap PH. The former hospital discharged 17,000 patients, compared with 12,677 at the latter. Siem Reap PH's OPD utilization was slightly greater than Kampong Cham PH's (54,564 vs. 51,465), but this small difference could not explain the large funding difference. Lacking a link between supply and health facility outputs, further research could explore influencing factors, such as OD allocation to hospitals, OD and hospital Pharmacy requests, and central determinants.

  Lastly, per capita GOC in kind supply differed considerably across the facilities. The declared value of GOC supply through CMS ranged from $0.62 per capita at Choeung Prey RH to $2.89 per capita at Samroang PH, with an average of $1.40 per capita across the sample. As comparison, a 2008 analysis of per capita province

[13] In kind materials from GOC include drugs and medical supplies provided through CMS. Facilities do not differentiate in their reports between revenue in cash or supply in kind that is provincially or centrally procured. As such, the actual GOC in kind figures are likely higher, but captured in this study as cash. Alternatively, the share of GOC revenue in kind may be slightly overstated for CPA 1 and 2 hospitals as the OD invoices to hospitals that reflect CMS supply do not specify the funding source (i.e., "National Budget" or "Other Aid") of the items. An analysis of CMS invoices to CPA 3 hospitals (where funding source is noted) indicated that Other Aid (i.e., NGOs/Donors) supply amounted to 1-2% of the total declared invoice value. For CPA 1 and 2 hospitals, this potential 1-2% is recorded instead as GOC funding.

allocations identified a range from a low of $1.28 for Phnom Penh to a high of $12.40 for Pailin.[14]

- **NGO/Donor Supply:** NGOs/Donors heavily supported hospitals – particularly CPA 3 hospitals – with drugs and medical supplies that were primarily delivered through CMS. Their contributions to total in kind revenue ranged from 7% to 34%. Drugs and medical supplies for HIV/AIDS patients assumed the lion's share of their contributions. HIV/AIDS drugs delivered through CMS from NCHADS (and thus Global Fund to Fight AIDS, Tuberculosis and Malaria) comprised 66% ($1.5M) of total NGO/Donor in kind materials. NGOs/Donors provided an additional 14% ($0.3M) of HIV/AIDS drugs and medical supplies directly to hospitals. The remaining 20% of drugs and medical supplies primarily supported other National Programs and hospital laboratories.

  Below is the list of organizations that provided in kind supply to hospitals. The list of contributors is likely incomplete, as it was necessary to rely on hospital recall of organizational support and the responsiveness of contacted organizations for data on their contributions.

Hospital	Supportive NGOs and Donors
Ang Roka RH	FHI 360, CENAT & NCHADS (Global Fund)
Bakan RH	CENAT (Global Fund), University Research Company (URC)
Choeung Prey RH	CENAT & NCHADS (Global Fund), Marie Stopes International
Kirivong RH	Caritas Takeo Eye Hospital, CENAT & NCHADS (Global Fund)
Memot RH	CENAT & NCHADS (Global Fund)
Samroang PH	Fred Hollows Foundation, CENAT & NCHADS (Global Fund)
Battambang PH	CENAT & NCHADS (Global Fund), Trauma Care Foundation Cambodia, University Research Company (URC), World Health Organization (WHO)
Kampong Cham PH	CENAT & NCHADS (Global Fund), Médecins Sans Frontières (MSF), World Health Organization (WHO)
Siem Reap PH	CENAT & NCHADS (Global Fund), ESTHER, Fred Hollows Foundation, University Research Company (URC)
Takeo RH	CENAT & NCHADS (Global Fund), Phnom Penh Blood Bank Center, World Health Organization (WHO)

[14] Johnston T and Özaltin E. *More Health for the Money: Cambodia Health Public Expenditure Review 2010.* The Royal Government of Cambodia and The World Bank. December 2011.

Table 6. Sources of Funds – In Kind

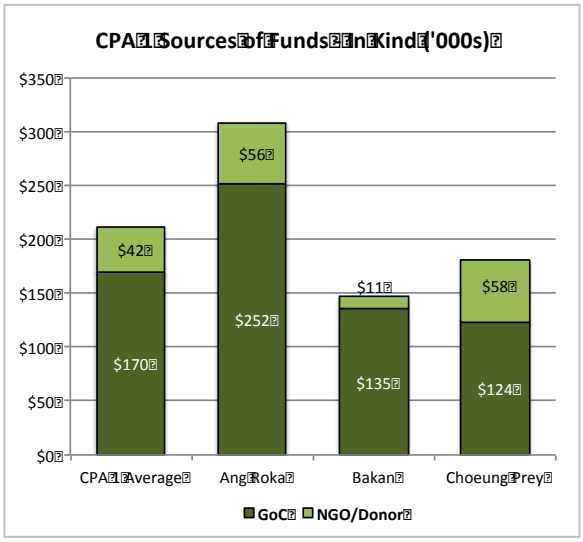
Source	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
GOC	$252,415	$135,171	$123,559	$394,381	$253,419	$583,083	$1,090,291	$1,720,152	$2,300,572	$1,241,596
NGO	$55,959	$11,418	$57,985	$78,648	$27,567	$44,304	$403,157	$684,958	$277,807	$646,504
Total	**$308,374**	**$146,588**	**$181,543**	**$473,029**	**$280,986**	**$627,387**	**$1,493,448**	**$2,405,110**	**$2,578,380**	**$1,888,100**
Pop	140,155	127,430	200,675	230,990	137,141	201,609	1,092,075	1,750,248	965,936	955,126
IPD	4,124	2,856	4,148	6,378	6,484	4,708	11,813	17,000	12,677	12,215
OPD	16,556	1,527	7,731	19,286	22,472	13,319	57,123	51,465	54,564	15,975

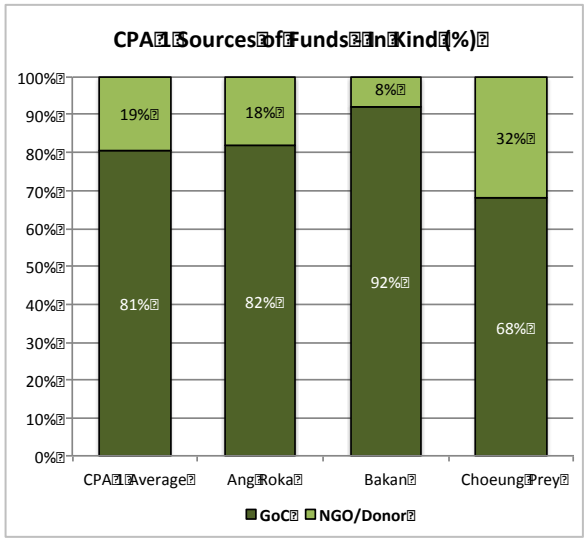
Utilization Notes: Population is presented for the hospital catchment area. IPD includes authorized and unauthorized discharges, deaths, and transfers out. OPD includes all outpatient visits (general, specialty, dental, and HIV/AIDS).

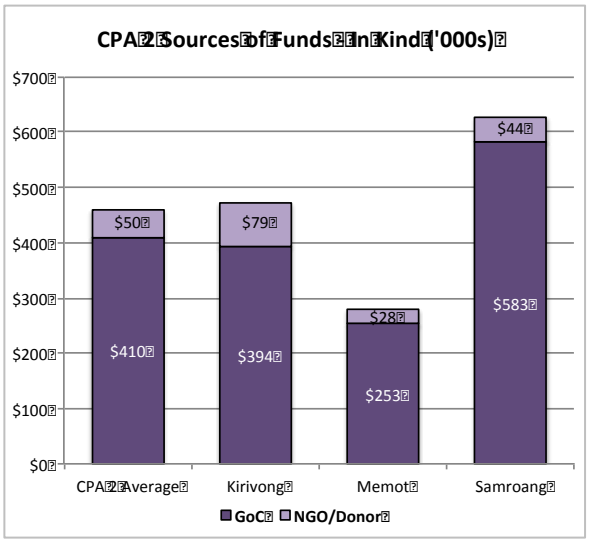
Table 7. Government Drug and Medical Supply Per Capita

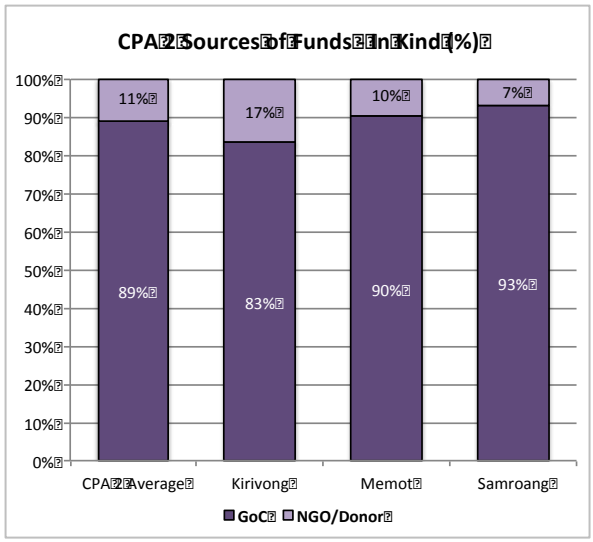
Source	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
GOC	$1.80	$1.06	$0.62	$1.71	$1.85	$2.89	$1.00	$0.98	$2.38	$1.30

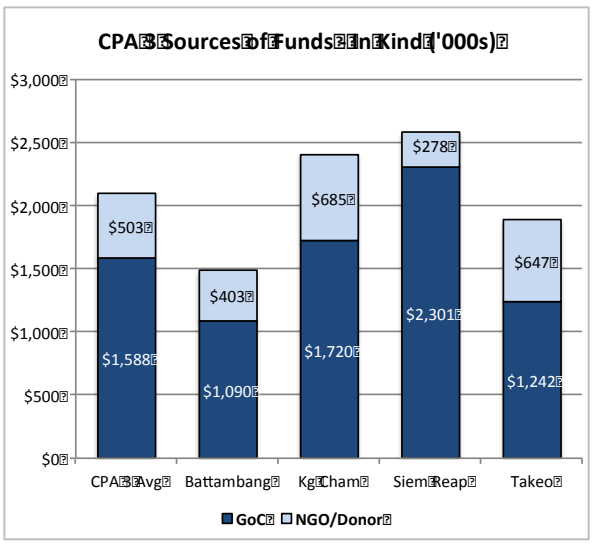
Figure 4. Sources of Funds – In Kind

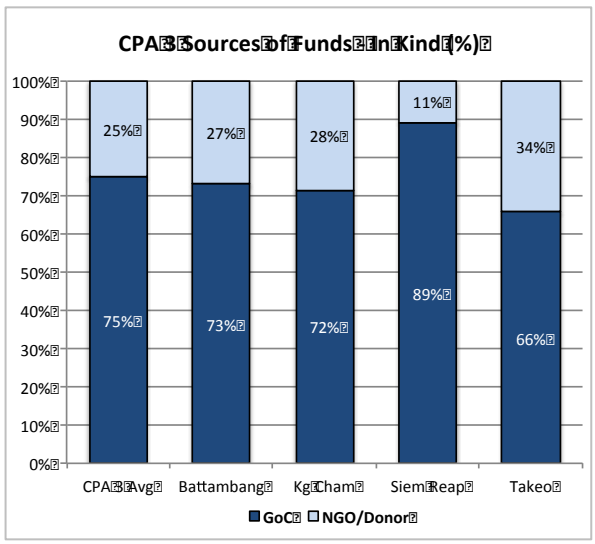












5.2.5. User Fee Revenue

User fee revenue was defined as any input to hospitals for ancillary or direct patient care from the following sources:

- Self pay out-of-pocket (OOP), including payments from private CT scanner companies operating within the hospitals;
- Health equity fund (HEF);
- Community-based health insurance (CBHI); and
- NGO/Donor subsidization.

This study did not attempt to estimate lost revenue from patients receiving discounts or exemptions. These categories of patients primarily included monks, soldiers, orphans, prisoners, HIV/AIDS and TB patients, politically connected people in the community, and hospital staff and their families. Hospitals anecdotally shared that these discounts and exemptions amounted to significant lost revenue.

Overall, similarly utilized hospitals received dramatically different levels of funding from user fees. For example, Ang Roka RH discharged only 24 fewer patients than Choeung Prey RH and conducted two times the OPD visits, but the hospital's user fee revenue was far lower ($53,000 vs. $82,000). Likewise, Kampong Cham PH discharged far more patients than Siem Reap PH (17,000 vs. 12,677) and conducted a comparable number of OPD visits (51,465 vs. 54,564), but Siem Reap PH received $125,000 more revenue from user fees. To better understand the variation, potential factors influencing user fee revenue should be explored, such as fee schedule rates, HEF activity and benefit packages, case mix, and discount and exemption policies. The key findings regarding each component of user fee revenue are presented below.

- **OOP Payments:** Payments from self pay patients contributed from 32% to 75% of facility user fee revenue. OOP payments were the most important source of user fee revenue for 7 of the 10 hospitals. The hospitals where OOP payments did not contribute the largest share to user fee revenue – Bakan RH, Memot RH, and Samroang PH – were more remotely located.

  On average, the percentage share of revenue from OOP payments increased by CPA level, from 42% for CPA 1 hospitals, to 47% at CPA 2 hospitals, and 60% at CPA 3 hospitals. This corresponds with a decrease in the percentage share of user fee revenue from HEF at higher CPA levels. The OOP/HEF payment trend is likely explained by the urban location of and specialization at higher CPA levels, attracting a different mix of patients than the lower level hospitals. For Kampong Cham PH and Takeo PH, OOP revenue included payments from revenue sharing arrangements with private CT scanner companies operating within the hospitals. These services were fully operated by the private companies, with the exception of utilities payments covered by the hospitals. For an $80 scan, hospitals received a $20 cut.

- **HEF Payments:** Contributions from the HEF scheme to overall user fee revenue ranged from 12% to 68%. As referenced above, the size of the HEF share of user fee revenue decreased with higher CPA level hospitals on average. However, within and across CPA levels, there was great variation in the share of user fee revenue collected from HEF utilization. For example, Ang Roka RH and Choeung Prey RH had similar overall utilization, but the former received only $15,000 in HEF payments (28% of

user fee revenue) while the latter received $50,000 (57% of user fee revenue). Similarly, Memot RH utilization was only slightly greater than Kirivong RH utilization, but there was almost a $75,000 difference in HEF revenue between the two facilities. Below is the list of HEF operators supporting the hospitals.

Hospital	HEF Operator
Ang Roka RH	Buddhism for Health (BFH)
Bakan RH	Poor Family Development (PFD)
Choeung Prey RH	Action for Health (AFH)
Kirivong RH	Buddhism for Health (BFH)
Memot RH	Reproductive Health Association of Cambodia (RHAC)
Samroang PH	Cambodian Health Committee (CHC)
Battambang PH	Poor Family Development (PFD)
Kampong Cham PH	Action for Health (AFH)
Siem Reap PH	Action for Health (AFH)
Takeo PH	Cambodian Red Cross (CRC)

- **CBHI Payments:** CBHI schemes operated in six hospitals over the study period, contributing from 5% to 31% of user fee revenue. At the CPA 1 level, only Ang Roka RH contracted with a CBHI scheme, providing the hospital 14% of its revenue. Among the CPA 2 hospitals, 9% of user fee revenue at Kirivong RH and 31% at Samroang PH came from CBHI beneficiaries. CBHI schemes operated in three of the CPA 3 hospitals, contributing 1% of user fee revenue to Battambang PH, 5% to Siem Reap PH, and 7% to Takeo PH. Below is the list of CBHI schemes operating at the hospitals.

Hospital	Active CBHI Schemes
Ang Roka RH	SKY Health Insurance Project
Kirivong RH	Pagoda Based Health Insurance (PBHI), SKY Health Insurance Project
Samroang PH	Cambodian Organization for Assistance to Families & Widows (CAAFW)
Battambang PH	Community Health Organization (CHO)
Siem Reap PH	Angkor Chum OD Cooperative Health Insurance (STSA)
Takeo PH	SKY Health Insurance Project

- **NGO/Donor Payments:** FHI 360 was the primary organization that subsidized user fees at the hospitals. The NGO reimbursed the hospitals for fees associated with ancillary services and OPD visits for HIV/AIDS patients. At Takeo PH, Ospedale Pediatrico Bambino supported pediatrics patients and pregnant and vulnerable women. The NGO funded 98% of the $22,000 of user fee payments from NGOs/Donors. The hospital had the most robust accounting system, with all revenue and expense items documented in a general ledger accounting software[15]. Thus, the hospital captured small payments from several other NGOs/Donors. The accounting

[15] Peachtree Complete Accounting 2010, developed by Sage Accounting for small businesses. Product information is available at: http://na.sage.com/accounting.

systems at the other hospitals were less comprehensive, therefore, it is possible that they also received small additional subsidizations from NGOs/Donors that were undocumented. Below is the list of NGOs/Donors that subsidized user fees.

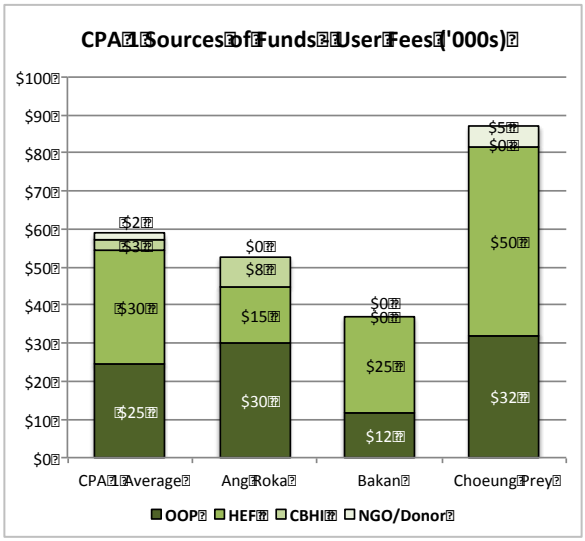
Hospital	NGO/Donor User Fee Subsidization
Choeung Prey RH	FHI 360
Memot RH	FHI 360
Battambang PH	FHI 360
Kampong Cham PH	FHI 360
Takeo PH	Cambodia Health Committee (CHC), Handicap International (HI), Institut Pasteur du Cambodge (IPC), Ospedale Pediatrico Bambino

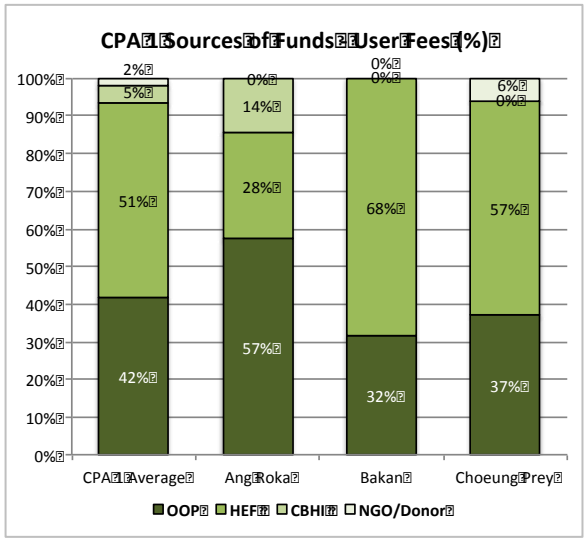
Table 8. User Fee Revenue

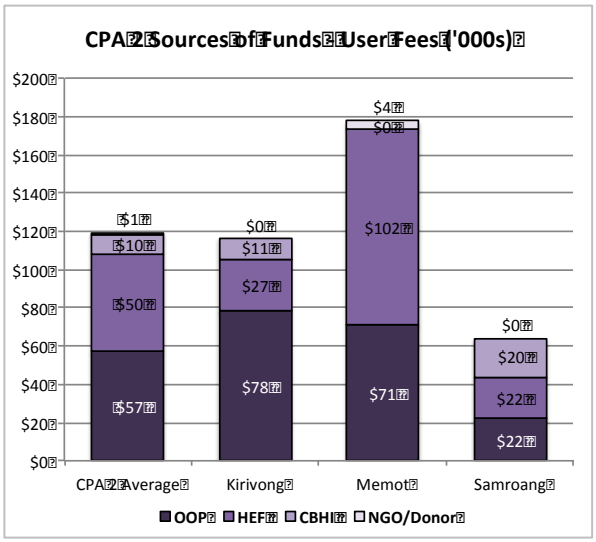
Source	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
OOP	$30,141	$11,694	$32,135	$78,292	$71,246	$21,893	$181,806	$281,511	$302,720	$287,002
HEF	$14,874	$25,423	$49,583	$27,325	$101,908	$22,010	$120,594	$173,411	$250,286	$46,132
CBHI	$7,532	$0	$0	$11,081	$0	$20,084	$3,723	$0	$28,623	$26,585
NGO	$0	$0	$5,133	$0	$4,494	$0	$17,929	$24,708	$0	$22,265
Total	**$52,546**	**$37,116**	**$86,851**	**$116,698**	**$177,648**	**$63,988**	**$324,051**	**$479,630**	**$581,629**	**$381,984**
Pop	140,155	127,430	200,675	230,990	137,141	201,609	1,092,075	1,750,248	965,936	955,126
IPD	4,124	2,856	4,148	6,378	6,484	4,708	11,813	17,000	12,677	12,215
OPD	16,556	1,527	7,731	19,286	22,472	13,319	57,123	51,465	54,564	15,975

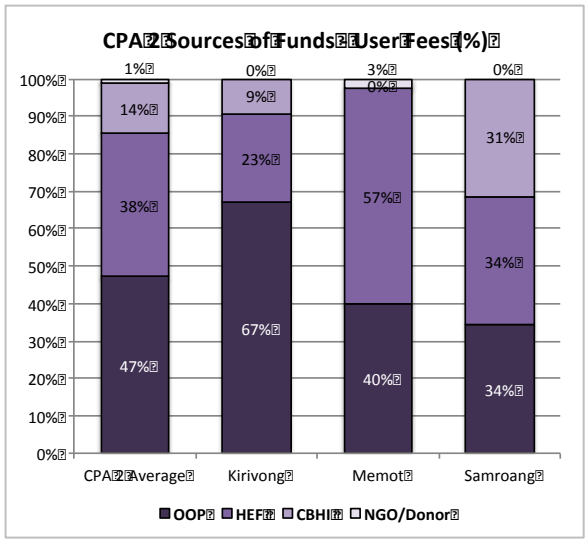
Utilization Notes: Population is presented for the hospital catchment area. IPD includes authorized and unauthorized discharges, deaths, and transfers out. OPD includes all outpatient visits (general, specialty, dental, and HIV/AIDS).

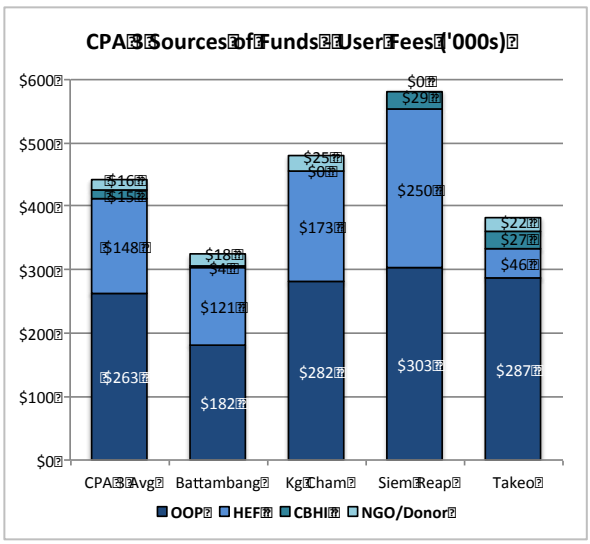
Figure 5. User Fee Revenue

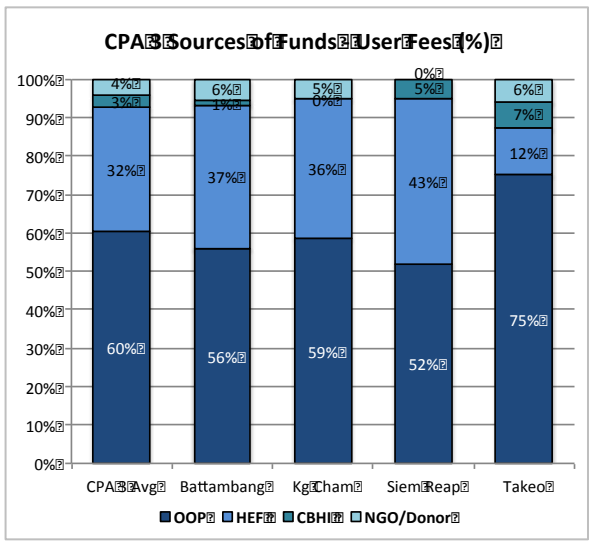












5.3. Hospital Uses of Funds

5.3.1. Hospital Cost Structure

To understand the main drivers contributing to unit costs, it is helpful to first review the overall hospital cost structure. As this study did not included fixed costs, the hospital cost structure pertains to just three categories: labor cost, drug and medical supply cost, and other operating cost. Each category is described in summary below, and in detail in its own respective section.

- **Labor Cost:** Labor cost included payments from all sources for compensation of both government and non-government (temporary or contracted) staff. Labor cost included salaries, allowances, overtime, incentives, and performance-based bonuses. Additionally, labor cost included mission expense and payments to staff from the user fee running cost budget (i.e., 39% of OOP and CBHI and 40% of HEF revenue). Labor cost assumed less than one-third of overall cost, ranging from 17% to 34% across the hospitals. As a share of total cost, labor cost decreased at higher CPA levels, due to the greater share assumed by the cost of drug and medical supplies.

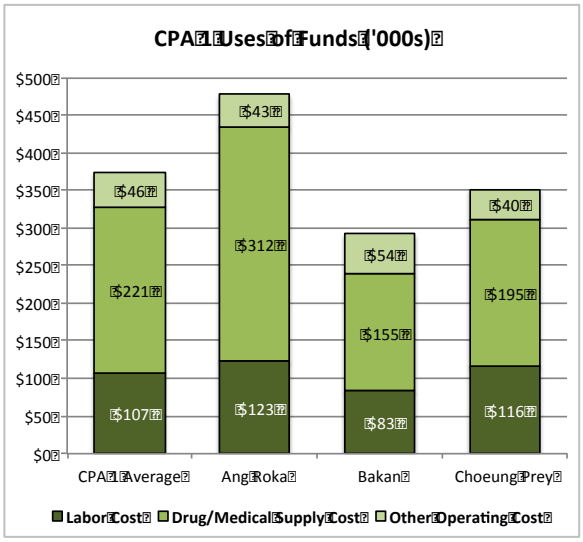
- **Drug and Medical Supply Cost:** This category included in cash purchases and in kind contributions from all sources. Drugs and medical supplies, diagnostic and surgery supplies, and oxygen were included in this category. This category comprised the largest share of overall cost, nearing 60% for CPA 1 and 2 hospitals and 70% for CPA 3 hospitals on average. For specific hospitals, drug and medical supply cost as a share of total cost ranged from 49% to 71%. On average, the cost of drugs and medical supplies for CPA 2 hospitals ($475,000) was twice that of CPA 1 hospitals ($221,000); CPA 3 cost ($2,171,000) was four times that of CPA 2 cost.

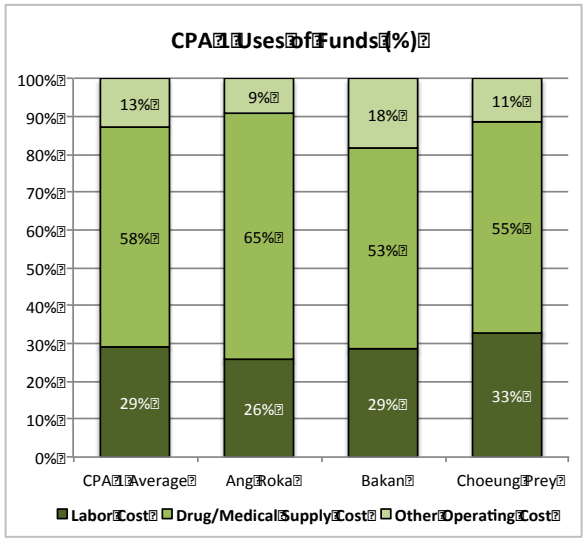
- **Other Operating Cost:** This category included all other operating expenses, such as utilities, patient food, office supplies, motor fuel, minor maintenance projects, taxes, etc. Spending on other operating expenses comprised the smallest share of overall cost, ranging from 7% to 18% across the hospitals. At each CPA level, spending was highest for the following cost items: electricity, patient food, fuel, and office supplies. Interestingly, hospitals with the lowest overall cost tended to spend more of their overall budget on other operating cost. For example, Bakan RH and Memot RH had the lowest costs compared to their CPA level peers, but their other operating costs were far higher (18% and 17% respectively). Similarly at the CPA 3 level, Battambang PH had far lower overall costs but its share of cost designated for other operating items (11%) was higher than Siem Reap PH and Takeo PH.

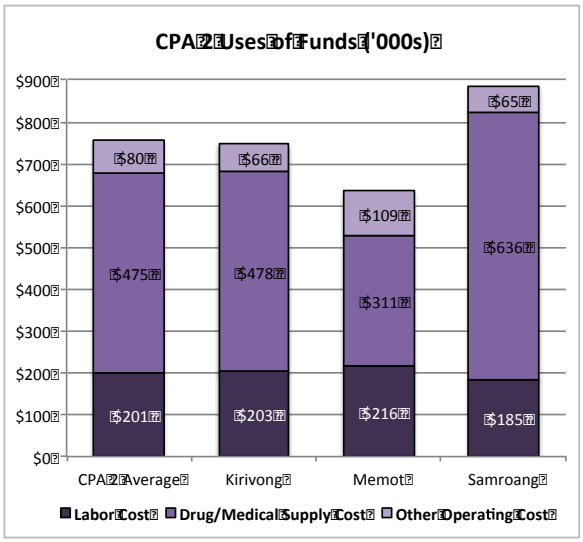
Table 9. Hospital Cost Structure

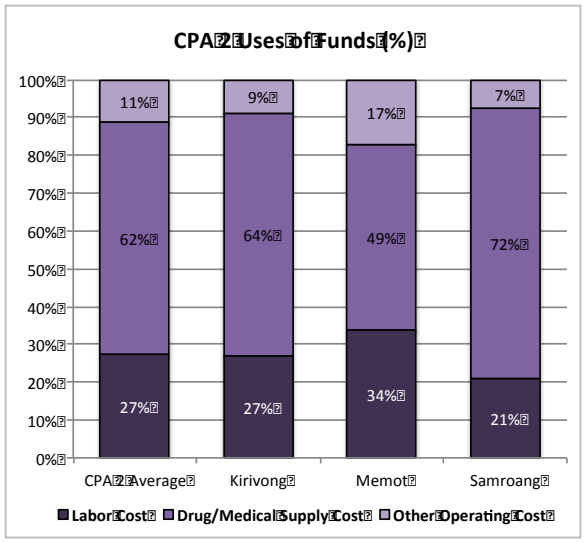
Cost	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
Labor	$122,695	$83,297	$116,136	$202,681	$215,525	$185,206	$658,764	$612,536	$768,643	$763,215
Drug	$312,317	$154,825	$195,135	$478,154	$310,918	$635,800	$1,556,544	$2,514,379	$2,671,617	$1,940,726
OOC	$42,745	$53,837	$40,418	$66,186	$108,809	$65,421	$276,366	$412,762	$354,392	$270,538
Total	**$477,757**	**$291,959**	**$351,688**	**$747,021**	**$635,252**	**$886,427**	**$2,491,675**	**$3,539,677**	**$3,794,652**	**$2,974,479**

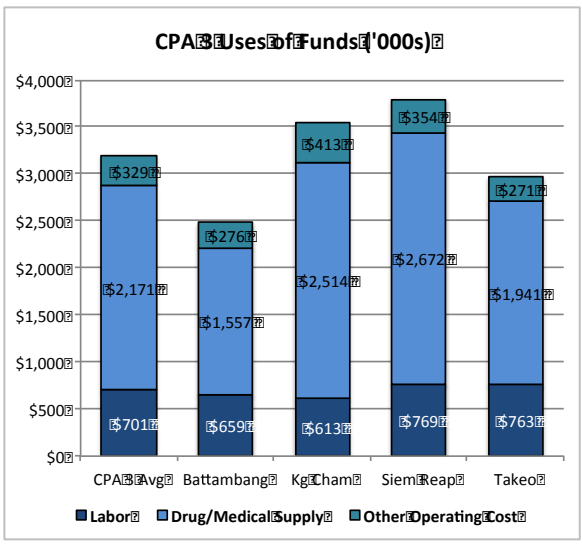
Figure 6. Hospital Cost Structure

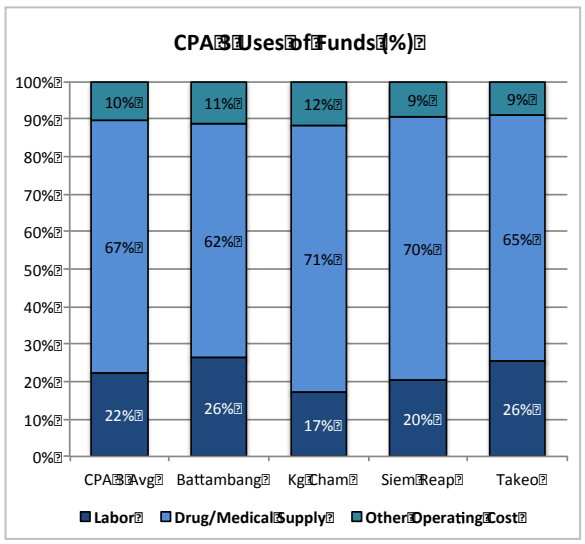












5.3.2. Labor Cost

The following staff compensation types were identified and costed:

- **Government Salary/Allowance:** Base salary plus allowances for special living, location, heavy or hazardous work, rewards, family, grants for sick staff, and death compensation
- **Government Other:** Overtime, midwife incentive, mission expense (transport, per diem, accommodation), and temporary staff (floating/contract) remuneration
- **User Fee Incentive:** Paid from 60% of OOP and HEF revenue, including some CBHI top-ups
- **User Fee Other:** Paid from 39% of OOP and 40% of HEF running cost budget. Includes special performance incentives, grants for staff, floating/contract staff remuneration, and mission expense
- **SDG Incentive:** Performance-based incentives and mission expense paid to staff
- **NGO/Donor:** Base salary plus allowances for non-government staff and incentives for government and non-government staff. Includes National Program Priority Operating Cost (POC) incentives (only relevant for non-SOA hospitals). Also includes wages of qualified nationals as a proxy for expatriate staff working in hospitals
- **Preceptor Payments:** Compensation to instructors of students from International University and Life University seeking training at the hospitals

Generally, larger staff size was not associated with greater labor cost at each CPA level. Of the CPA 1 hospitals, Ang Roka RH had the highest labor cost ($123,000) compared with Bakan RH ($82,000) and Choeung Prey RH ($116,000); however, its personnel headcount (33) was lower than the other two hospitals (41 and 44 respectively). At the CPA 2 level, labor cost correlated with staff size, although the size of the three hospitals was similar. Most distinctive was labor cost for the CPA 3 hospitals. Battambang PH employed the largest staff (325) compared with Siem Reap PH (261) and Takeo PH (229), but its labor cost ($659,000) was markedly lower than its peers ($769,000 and $763,000 respectively).

Payments from the different staff compensation types varied widely between hospitals. For a comparison of monthly staff compensation across facilities and across staff positions and skills, see Appendix D. Overall labor cost results related to these compensation types are discussed below.

- **Government Labor Cost:** Salaries and allowances contributed considerably to overall labor cost, assuming from 16% to 43% of labor cost across the hospitals. As expected, this input for non-SOA hospitals comprised a larger share of their overall labor cost, at 39% for Bakan RH and 43% for Battambang PH. Factoring in the other labor cost inputs also covered by the Government, the share for those hospitals rose to 70% and 65%, contrasting with coverage of 28% to 45% at the SOA hospitals. Following salaries and allowances, overtime payments were the next largest Government contribution to staff compensation at all hospitals other than Kampong Cham PH, which received no overtime payments.

- **User Fee Labor Cost:** At close to one-third of labor cost on average, user fee incentives contributed significantly to staff compensation. Its share of total labor cost varied widely across hospitals, ranging from 22% to 51%. As the user fee spending formula requires a 60% staff incentive payout, it was not surprising that the hospitals

with the highest user fee revenue within each level – Choeung Prey RH, Memot RH, and Siem Reap RH – had the highest user fee labor cost.

- **HSSP2 Labor Cost:** SDG grants contributed substantially to staff compensation, covering close to 30% of all labor cost for the CPA 1 hospitals and around 20% for the CPA 2 and CPA 3 hospitals (with the exception of Samroang PH where SDG incentives comprised 41% of all labor cost). Quarterly disbursements of an 80% base payment were provided for staff incentives, with an additional 20% intended for running cost (i.e., staff bonus payments and quality improvement initiatives). Of note, only three of the eight SOA hospitals used funds on items other than staff incentives and bonuses. The share of their SDG grants spent on different cost items is highlighted in the table below.

Cost Item	Samroang PH	Siem Reap PH	Takeo PH
Staff Incentives and Bonus	98%	96%	99%
Mission Expense	2%	1%	0.2%
Other Operating Cost[†]	0%	3%	1%

[†] Items bucketed in other operating cost include expenses on meetings and trainings, office supplies and printing, staff food, minor maintenance projects, and telephone and internet.

The other five hospitals either fully used their running cost budget for staff incentives and bonuses, or had no control over their 20% running cost budget due to OD oversight on financial decision making.

The total SDG grant was unrelated to personnel headcount. Most notably, Kirivong RH and Memot RH employed slightly larger staffs, but SDG incentives at Samroang PH were almost double those of the other hospitals. HSSP2 labor cost did not correlate with staff size at the CPA 1 or 3 levels either. The percentage difference between the staff size at Ang Roka RH and Choeung Prey RH was 29%, however, their SDG grant differed by only 5%. Similarly, Takeo PH employed 30 fewer people than Kampong Cham PH, but spent $13,000 more on SDG incentives. This finding is not unexpected as the SDG allocation formula was designed to determine grants based on population with a premium designated for remote locations.

- **NGO/Donor Labor Cost:** Contributions to overall labor cost from NGOs/Donors were small but important for the staff and services they supported. These organizations shouldered less than 1% to 9% of labor cost at specific facilities. Only one hospital – Kampong Cham PH – received direct support from a team of expatriate and local staff employed by an NGO. Médecins Sans Frontières (MSF) operated the Tuberculosis inpatient ward and outpatient clinic at the hospital and significantly supported the Laboratory.

Although undoubtedly not comprehensive, the list of NGO/Donor supporters and the services they supported are noted in the table below. NGOs/Donors often provided direct support to departments or individuals rather than coordinating donations through hospital administration. NGO/Donor payments to staff are likely underrepresented as their contributions were not always documented.

Hospital	NGO/Donor Supporters	Services
Ang Roka RH	Marie Stopes, MoPoTsyo	Tubal ligation, Diabetes
Bakan RH	TB Cup, CENAT	Tuberculosis, Lab (POC)
Choeung Prey RH	FHI 360, Marie Stopes	HIV/AIDS, Tubal ligation
Kirivong RH	Caritas Takeo Eye Hospital	Ophthalmology
Memot RH	FHI 360	HIV/AIDS
Samroang RH	Fred Hallows Foundation	Ophthalmology
Battambang PH	FHI 360, IRIS, NCHADS, SEVA	HIV/AIDS, Lab (POC), Ophthalmology
Kampong Cham PH	FHI 360, MSF	HIV/AIDS, Lab, Tuberculosis
Siem Reap PH	Fred Hallows Foundation	Ophthalmology
Takeo PH	Institut Pasteur du Cambodge, NCHADS, Ospedale Pediatrico Bambino	Research (e.g., Dengue Fever, Japanese Encephalitis), HIV/AIDS (Lab), Pediatrics, Pregnant Women

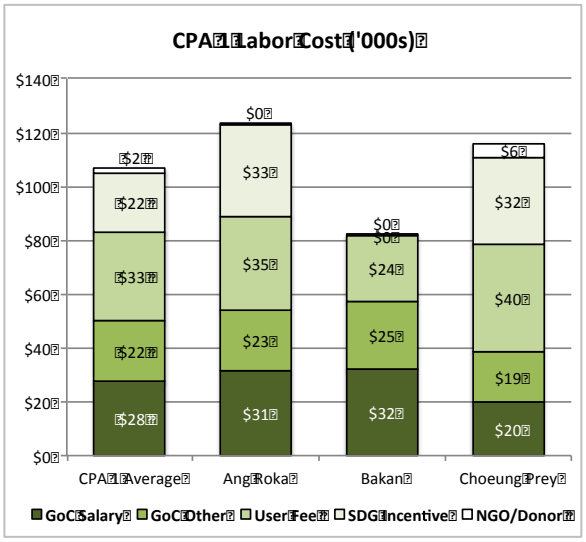
Table 10. Labor Cost

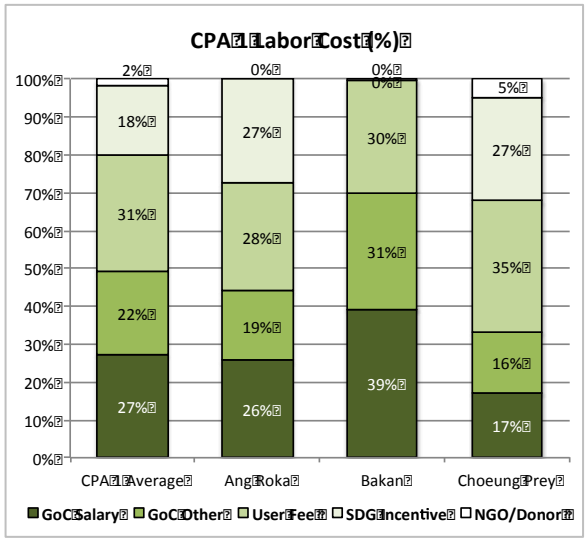
Cost	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
GoC Salary/ Allowance	$31,413	$32,254	$20,040	$38,213	$34,458	$30,397	$286,130	$217,447	$191,097	$182,044
GoC Other	$22,798	$25,042	$18,646	$44,604	$25,592	$36,094	$142,709	$44,770	$116,764	$152,058
User Fee Incentive†	$34,913	$21,736	$40,091	$76,185	$98,873	$39,219	$204,098	$171,478	$310,547	$239,066
User Fee Other†	$0	$2,687	$0	$6,042	$10,934	$2,348	$12,121	$0	$2,187	$6,234
SDG Incentive	$33,498	$0	$31,755	$36,438	$40,509	$76,092	$0	$125,634	$139,918	$138,125
NGO/Donor Allowance	$72	$378	$5,604	$1,200	$5,160	$1,055	$13,705	$53,208	$8,130	$44,330
Preceptors Payments‡	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,358
Total	**$122,695**	**$82,097**	**$116,136**	**$202,681**	**$215,525**	**$185,206**	**$658,764**	**$612,536**	**$768,643**	**$763,215**

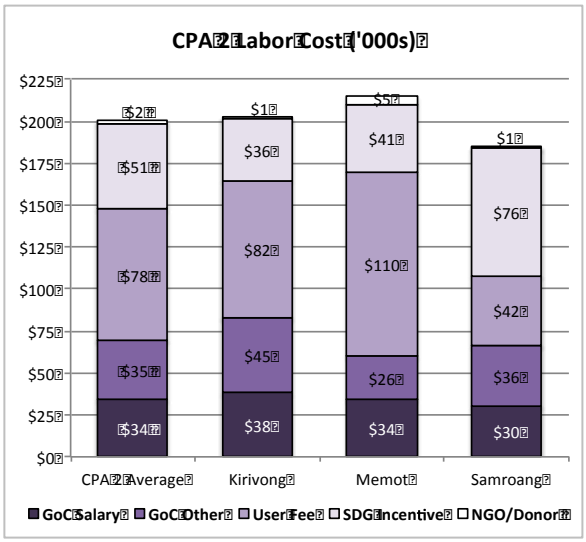
† For presentation purposes, incentives and other staff expense from the user fee budget are combined in the charts below.

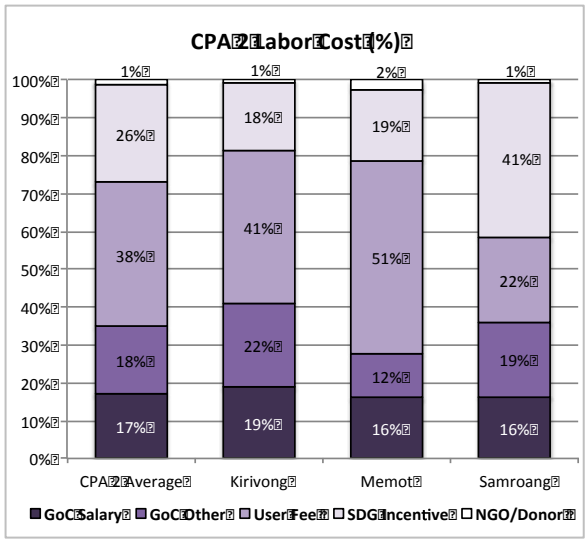
‡ For presentation purposes, this small expense is excluded from the charts below.

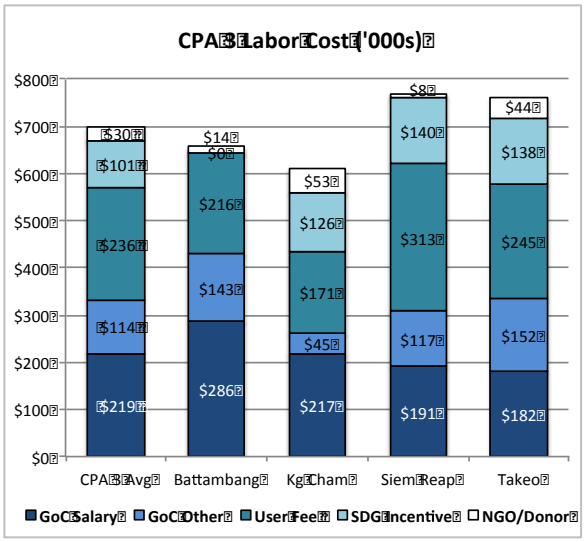
Figure 7. Labor Cost

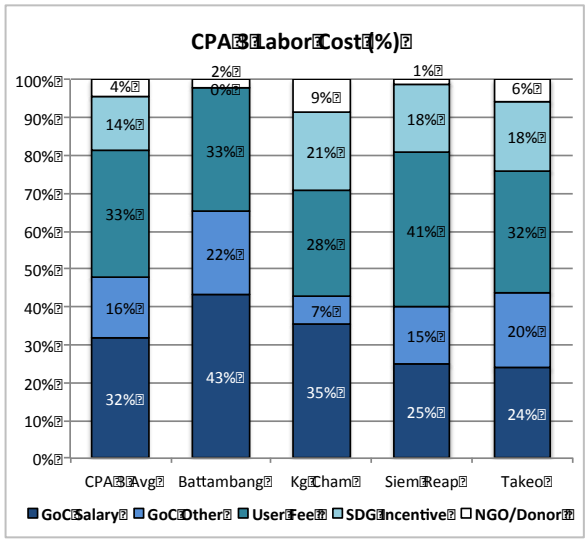












5.3.3. Drug and Medical Supply Cost

Key findings related Government and NGO/Donor provision of in kind drug and medical supply are presented in the "Sources of Funds – In Kind" section above. Additional detail is presented below in relation to total drug and medical supply cost. The following inputs to drug and medical supply cost were documented:

- **Government (CMS):** Drugs and medical supplies provided in kind through CMS, labeled on invoices as "NB." The "Sources of Funds – In Kind" section describes the slight overstatement of this share for CPA 1 and 2 hospitals
- **Government (PBB):** Purchases from PBB budgets, including drugs (Donors and Allowances code 6572), oxygen (Medical Equipment and Supplies code 607), and reagents (Research and Experimentation code 6171)
- **User Fees:** Drugs and medical supplies and oxygen purchased from the 39% OOP and 40% HEF running cost budget
- **NGO/Donor (CMS):** National Program drugs and medical supplies provided in kind by the Global Fund and supplied through CMS. Labeled on invoices as "Other Aid." A very small (<0.1%) of in kind provisions were from the World Bank and Asian Development Bank, labeled on invoices as "WB/ADB"
- **NGO/Donor (Direct):** Drugs and medical supplies provided in kind direct to hospitals from NCHADS, CENAT, and other NGOs/Donors

Centrally procured drugs and medical supplies distributed through CMS assumed the majority of cost, ranging from 63% to 92% of total drug and medical supply cost across the hospitals. In kind materials provided by NGOs/Donors through CMS also comprised a large share of cost. In fact, CMS supplied 90% of the total drug and medical supply cost to the hospitals. This finding corroborates that of the 2009 MOH Annual Health Financing Report, which noted that 95% of provincial level drug spending was supplied by CMS.[16]

This same report found that the remaining drug cost was from local market purchases from the provincial government budget allocation (3.5%) and user fee budget (1.5%). Similarly, the 10 hospitals in the sample also supplemented CMS stock with purchases from their PBB and user fee budgets, but these purchases were small in relation to overall drug and medical supply cost. Government PBB budgets covered 0% to 5% of drug and medical supply cost across the hospitals, while user fee budgets covered 1% to 7%. Although a relatively small proportion of overall spending on drugs and medical supplies, purchases from facility user fee budgets (i.e, 39% OOP and 40% HEF revenue) were significant. The hospitals spent from 6% to 55% of their eligible running cost budget on local retailer drug and medical supply purchases. The provincial hospitals spent a greater share of their budgets to supplement in kind supply, ranging from 38% to 55% of their user fee running cost budget.

As described in the "Sources of Funds – In Kind" section, hospitals with higher drug and medical supply cost were not necessarily those that served a larger population or treated more patients. Refer to this section for more details.

Out of scope for this analysis but worthy of reference is that it is unclear if drug quantities met the needs of patients. Hospitals anecdotally reported stockouts and insufficient in

[16] Johnston T and Özaltin E. *More Health for the Money: Cambodia Health Public Expenditure Review 2010.* The Royal Government of Cambodia and The World Bank. December 2011.

kind supply, requiring that patients buy drugs from local pharmacies. Although a RACHA-developed Logistics Management Information System (LMIS) tracked average monthly consumption to aid MOH in predicting demand, the forecast models did not include facility stockouts as an input. Another study reported stockouts of essential drugs from 2004 to 2009, even though Government spending on drugs and medical supplies more than tripled over this period.[17] This same study reviewed CMS invoices and found that the Government paid six times international reference prices for essential drugs, while items procured using donor-specific procedures tracked closely with reference prices. Another report noted a four-fold increase over this same period in the declared value of Government CMS supply in three provinces included in this study – Kampong Cham, Oddar Meanchey, and Siem Reap.[18]

Table 11. Drug and Medical Supply Cost

Funder	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
GoC (CMS)	$252,415	$135,171	$123,559	$394,381	$253,419	$583,083	$1,090,291	$1,720,152	$2,300,572	$1,241,596
GoC (PBB)	$2,070	$6,172	$1,120	$2,780	$16,042	$1,867	$18,303	$53,528	$0	$0
User Fee	$1,966	$2,064	$13,334	$2,345	$14,695	$6,546	$48,123	$98,721	$93,238	$52,626
NGO/Donor (CMS)†	$54,759	$0	$57,121	$72,809	$26,706	$37,347	$305,341	$285,868	$229,172	$481,281
NGO/Donor (Direct)†	$1,107	$11,418	$0	$5,840	$57	$6,957	$94,487	$356,110	$48,636	$165,223
Total	**$312,317**	**$154,825**	**$195,135**	**$478,154**	**$310,918**	**$635,800**	**$1,556,544**	**$2,514,379**	**$2,671,617**	**$1,940,726**

† For presentation purposes, drugs and medical supplies provided in kind by NGOs/Donors through CMS and direct to hospitals are combined in the charts below.

Table 12. User Fee Drug and Medical Supply Purchases

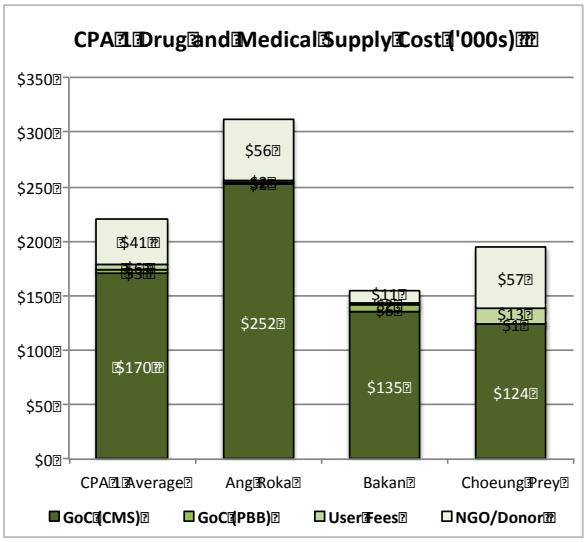
Budget Item	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
OOP and HEF Revenue	$45,015	$37,117	$81,718	$105,617	$173,154	$43,903	$302,400	$454,922	$553,006	$333,134
Running Cost Budget†	$17,705	$14,730	$32,366	$41,464	$68,549	$17,342	$119,142	$179,154	$218,175	$130,384
User Fee Drug Purchase	$1,966	$2,064	$13,334	$2,345	$14,695	$6,546	$48,123	$98,721	$93,238	$52,626
% of Running Cost Budget	11%	14%	41%	6%	21%	38%	40%	55%	43%	40%

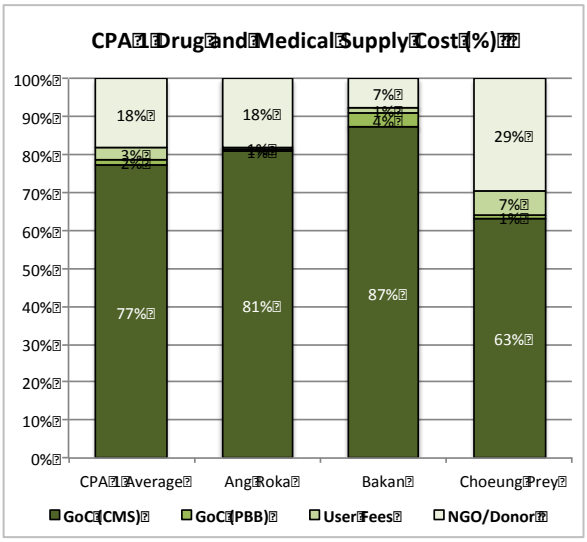
† Represents 39% of OOP and 40% of HEF revenue.

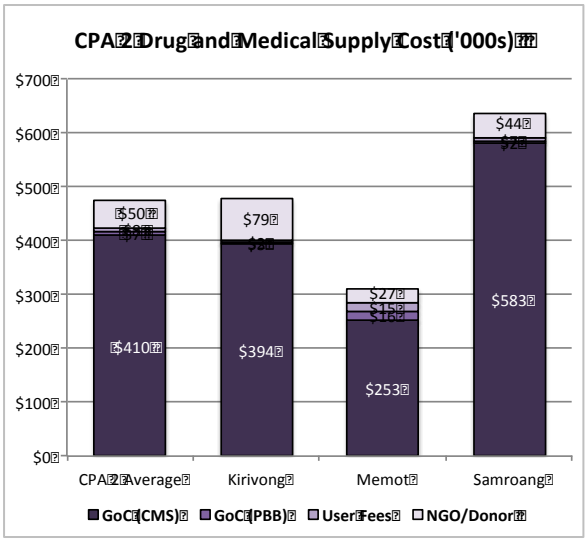
[17] Johnston T and Özaltin E. *More Health for the Money: Cambodia Health Public Expenditure Review 2010.* The Royal Government of Cambodia and The World Bank. December 2011.

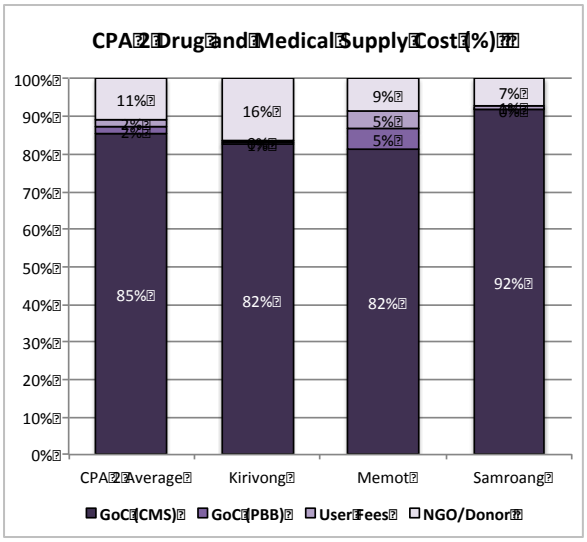
[18] Belgian Technical Corporation. *Provision of Basic Health Services in the Provinces of Siem Reap, Otdar Meanchey and Kampong Cham: 2011 Activity Result, Expenditure and Progress Report & Action and Financial Plan for 2012*. February 2012.

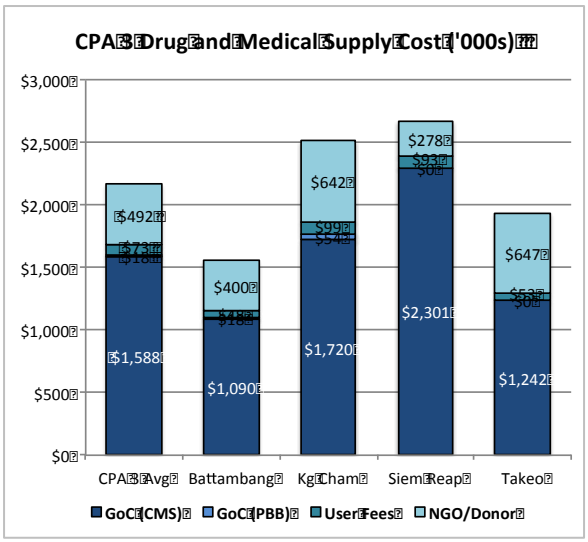
Figure 8. Drug and Medical Supply Cost

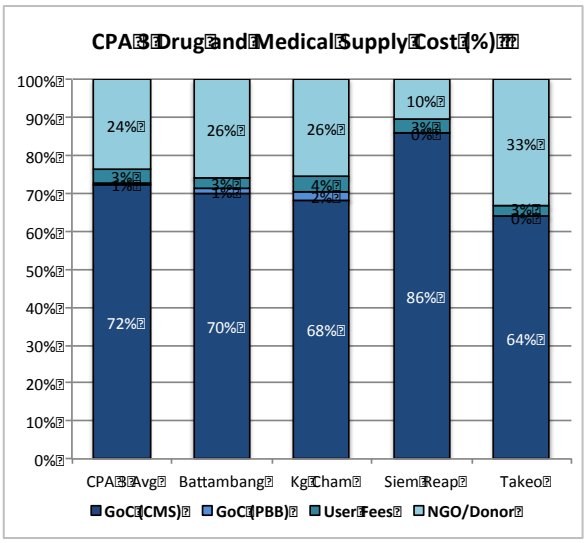












5.3.4. Other Operating Cost

The top other operating cost items for each CPA level included electricity, patient food, motor fuel, office supplies, and building maintenance. A complete view of this cost category was not often possible as hospitals aggregated many expenses into an "other" category, indicating a need for training on improved financial management. This expense was self reported by hospitals as "Other" and could not be analyzed without an audited receipt review, which was out of scope for this study. Other expense ranged from 1% of other operating cost at Bakan RH to 21% at Memot RH.

The tables below show a comparison between other operating cost differences across hospitals within the same CPA level. The costs include those from all funding sources (i.e., Government PBB budget, user fee running cost budget, and NGO/Donor support). The table on the left presents the average cost of each cost item across facilities within a CPA level, in addition to the percentage share the cost comprises of total other operating cost. The right three tables present the item's cost for individual hospitals, in addition to its share of other operating cost for that hospital and its percentage variance from the CPA level average.

For example, the average cost of electricity for CPA 1 hospitals was $10,570, representing 23% of other operating cost. Electricity cost as a share of hospital other operating cost was higher for Bakan RH (33%), marginally higher for Ang Roka RH (24%), and far lower for Choeung Prey RH (10%). Thus, Bakan RH's electricity cost was approximately 10% higher than the CPA 1 average, Ang Roka's was about the same as average, and Choeung Prey's was about 13% below the average.

Table 13. CPA 1 Other Operating Cost Variance Analysis

	CPA 1 Average		Ang Roka RH			Bakan RH			Choeung Prey RH		
Cost Item	**Average Cost**	**% of Cost**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**
Electricity	$10,570	23%	$10,069	24%	0%	$17,594	33%	10%	$4,048	10%	-13%
Patient Food/Materials	$9,789	21%	$7,885	184%	-3%	$9,703	18%	-3%	$11,780	29%	8%
Fuel and Oil	$4,498	10%	$6,972	16%	7%	$6,490	12%	2%	$33	<1%	-10%
Other Expense†	$3,696	8%	$7,235	17%	9%	$375	1%	-7%	$3,479	9%	1%
Office Supplies/Printing	$3,467	8%	$2,829	7%	-1%	$2,203	4%	-4%	$5,369	13%	6%
Building/General Maintenance	$2,559	6%	$1,538	4%	-2%	$5,750	11%	5%	$389	1%	-5%
NGO/Donor Logistic Support	$2,109	5%	$331	1%	-4%	$0	0%	-5%	$5,996	15%	10%
OD Support	$2,022	4%	$2,761	7%	2%	$1,059	2%	-3%	$2,244	6%	1%
Staff Food	$1,637	4%	$0	0%	-4%	$419	1%	-3%	$4,493	11%	8%
Vehicle Maintenance	$1,427	3%	$1,013	2%	-1%	$3,269	6%	3%	$0	0%	-3%
Cleaning Supplies	$864	2%	$516	1%	-1%	$1,667	3%	1%	$409	1%	-1%
Meeting/Visitor Reception	$819	2%	$156	<1%	-1%	$2,065	4%	2%	$237	1%	-1%
Water	$669	2%	$735	2%	<1%	$1,001	2%	<1%	$271	1%	-1%
Uniforms	$638	1%	$0	0%	-1%	$1,020	2%	1%	$893	2%	1%
Treasury Tax	$547	1%	$494	1%	0%	$371	1%	-1%	$776	2%	1%
Festival/Ceremony Expense	$354	1%	$211	1%	0%	$850	2%	1%	$0	0%	-1%
Total	**$45,667**	**100%‡**	**$42,745**	**100%‡**	**N/A**	**$53,837**	**100%‡**	**N/A**	**$40,418**	**100%‡**	**N/A**

† Other Expense was either self reported by hospitals and could not be analyzed without an audited receipt review, or was a very small expense.

‡ Share totals may not sum to 100% due to rounding.

Table 14. CPA 2 Other Operating Cost Variance Analysis

	CPA 2 Average		Kirivong RH			Memot RH			Samroang RH		
Cost Item	**Average Cost**	**% of Cost**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**
Patient Food/Materials	$17,218	22%	$19,144	29%	7%	$20,050	18%	-3%	$12,459	19%	-2%
Electricity	$14,836	19%	$8,261	13%	-6%	$18,227	17%	-2%	$18,020	28%	9%
Other Expense[†]	$9,804	12%	$1,561	2%	-10%	$23,176	21%	9%	$4,674	7%	-5%
Fuel and Oil	$8,892	11%	$4,773	7%	-4%	$13,092	12%	1%	$8,812	14%	2%
Office Supplies/Printing	$7,559	9%	$6,607	10%	1%	$11,697	11%	1%	$4,371	7%	-3%
Building/General Maintenance	$5,278	7%	$8,816	13%	7%	$601	1%	-6%	$6,416	10%	3%
Cleaning Supplies	$3,811	5%	$2,145	3%	-2%	$6,048	6%	1%	$3,239	5%	<1%
NGO/Donor Logistic Support	$3,312	4%	$4,638	7%	3%	$5,299	5%	1%	$0	0%	-4%
Treasury Tax	$2,740	3%	$5,693	9%	5%	$1,732	2%	-2%	$796	1%	-2%
Uniforms	$2,113	3%	$1,339	2%	-1%	$3,232	3%	<1%	$1,767	3%	<1%
Vehicle Maintenance	$2,024	3%	$2,359	4%	1%	$617	1%	-2%	$3,095	5%	2%
OD Support	$1,679	2%	$0	0%	-2%	$5,038	5%	3%	$0	0%	-2%
Ambulance/Transport	$874	1%	$849	1%	<1%	$0	0%	-1%	$1,772	3%	2%
Total	**$80,138**	**100%**[‡]	**$66,186**	**100%**[‡]	**N/A**	**$108,809**	**100%**[‡]	**N/A**	**$65,421**	**100%**[‡]	**N/A**

[†] Other Expense was either self reported by hospitals and could not be analyzed without an audited receipt review, or was a very small expense.

[‡] Share totals may not sum to 100% due to rounding.

Table 15. CPA 3 Other Operating Cost Variance Analysis

	CPA 3 Average		Battambang PH			Kampong Cham PH		
Cost Item	**Average Cost**	**% of Cost**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**
Electricity	$87,056	27%	$69,654	25%	-1%	$129,733	31%	5%
Patient Food/Materials	$61,892	189 %	$49,093	18%	-1%	$79,317	19%	<1%
Fuel and Oil	$21,020	6%	$10,551	4%	-3%	$28,048	7%	<1%
Other Expense[†]	$15,967	5%	$18,746	7%	2%	$28,568	7%	2%
Office Supplies/Printing	$20,825	6%	$25,522	9%	3%	$16,603	4%	-2%
Building/General Maintenance	$28,277	9%	$34,865	13%	4%	$1,283	<1%	-8%
NGO/Donor Logistic Support	$27,649	8%	$21,258	8%	-1%	$56,061	14%	5%
Water	$16,989	5 %	$26,447	10%	4%	$28,611	7%	2%
Cleaning Supplies	$15,987	5%	$8,029	3%	-2%	$13,976	3%	-2%
Uniforms	$8,213	3%	$3,790	1%	-1%	$14,178	3%	1%
Treasury Tax	$6,293	2%	$1,922	1%	-1%	$5,273	1%	-1%
PHD Support	$6,084	2%	$0	0%	-2%	$6,738	2%	0%
Other Maintenance	$5,804	2%	$2,078	1%	-1%	$801	<1%	-2%
Vehicle Maintenance	$3,863	1%	$3,450	1%	<1%	$2,660	1%	-1%
Meeting/Visitor Reception	$2,595	1%	$960	<1%	0%	$912	<1%	-1%
Total	**$328,515**	**100%[‡]**	**$276,366**	**100%[‡]**	**N/A**	**$412,762**	**100%[‡]**	**N/A**

	CPA 3 Average		Siem Reap PH			Takeo PH		
Cost Item	**Average Cost**	**% of Cost**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**	**Hospital Cost**	**% of Cost**	**Variance from Avg %**
Electricity	$87,056	27%	$83,659	24%	-3%	$65,177	24%	25%
Patient Food/Materials	$61,892	189 %	$65,344	18%	0%	$53,815	20%	21%
Fuel and Oil	$21,020	6%	$9,957	3%	-4%	$35,524	13%	16%
Other Expense†	$15,967	5%	$6,954	2%	-3%	$9,600	4%	2%
Office Supplies/Printing	$20,825	6%	$26,268	7%	1%	$14,905	6%	3%
Building/General Maintenance	$28,277	9%	$55,476	16%	7%	$21,484	8%	4%
NGO/Donor Logistic Support	$27,649	8%	$11,010	3%	-5%	$22,265	8%	9%
Water	$16,989	5 %	$5,467	2%	-4%	$7,431	3%	-2%
Cleaning Supplies	$15,987	5%	$31,175	9%	4%	$10,769	4%	6%
Uniforms	$8,213	3%	$9,328	3%	<1%	$5,556	2%	3%
Treasury Tax	$6,293	2%	$5,816	2%	<1%	$12,160	5%	6%
PHD Support	$6,084	2%	$15,404	4%	3%	$2,196	1%	3%
Other Maintenance	$5,804	2%	$16,752	5%	3%	$3,584	1%	2%
Vehicle Maintenance	$3,863	1%	$5,920	2%	1%	$3,424	1%	1%
Meeting/Visitor Reception	$2,595	1%	$5,861	2%	1%	$2,649	1%	1%
Total	**$328,515**	**100%‡**	**$354,392**	**100%‡**	**N/A**	**$270,538**	**100%‡**	**N/A**

† Other Expense was either self reported by hospitals and could not be analyzed without an audited receipt review, or was a very small expense.

‡ Share totals may not sum to 100% due to rounding.

5.3.5. Hospital Cost Recovery

Excluding costs related to supply in kind, hospitals on average covered one-third of their costs (paid by all sources) with their user fee (i.e., OOP, HEF, CBHI) revenue. Cost coverage ranged from 25% to 51% across the hospitals.

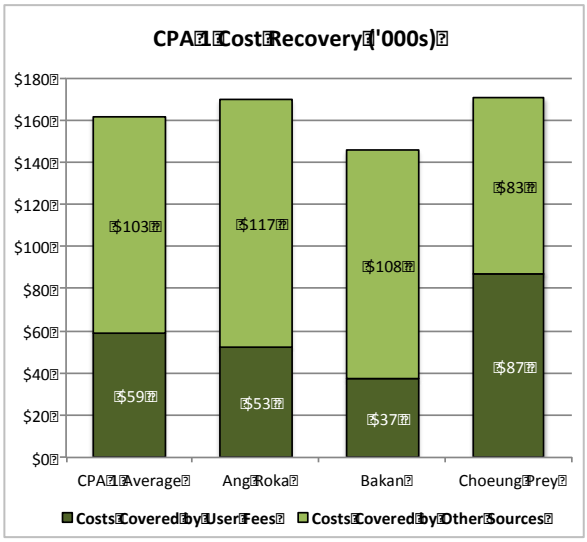
Table 16. Hospital Cost Recovery

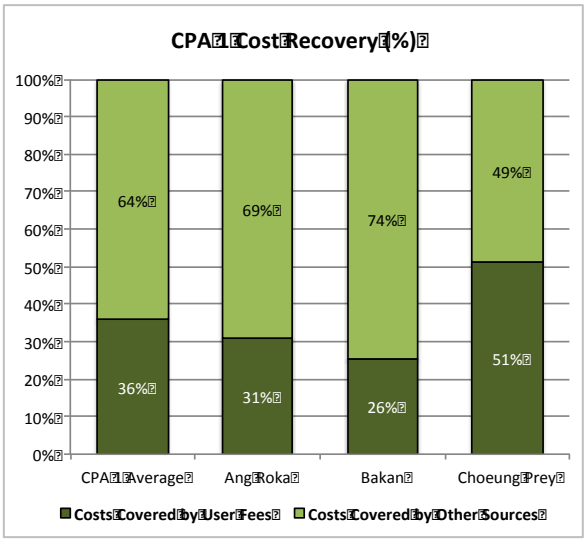
Coverage	AR	BK	CP	KV	MM	SG	BB	KC	SR	TK
User Fee Revenue	$52,546	$37,116	$86,851	$116,698	$177,648	$63,988	$324,051	$479,630	$581,629	$381,984
Non In Kind Costs	$169,383	$145,371	$170,145	$273,992	$354,266	$259,040	$1,020,680	$1,146,195	$1,216,273	$1,086,379
Cost Coverage[†]	31%	26%	51%	43%	50%	25%	32%	42%	48%	35%
Gap in Coverage[‡]	69%	74%	49%	57%	50%	75%	68%	58%	52%	65%

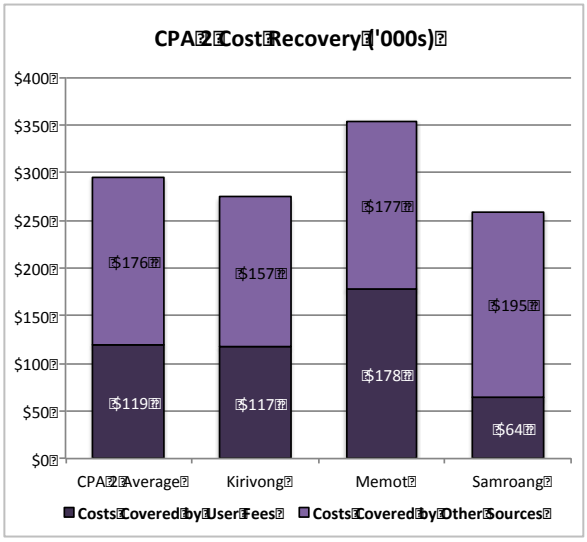
[†] The percentage of non in kind costs that were covered by user fees.

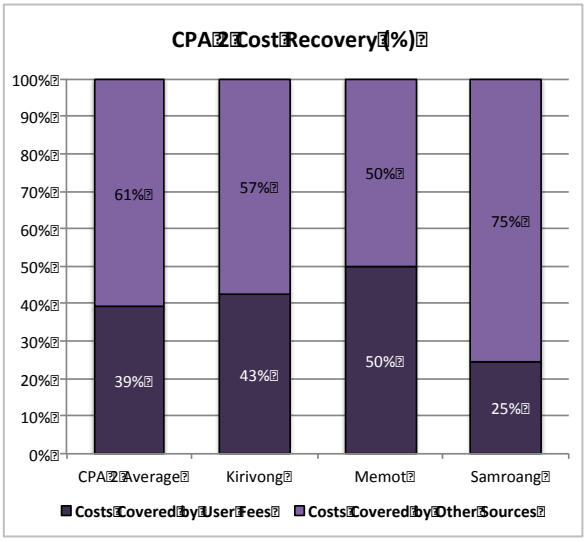
[‡] The percentage of non in kind costs that were covered by sources other than user fees.

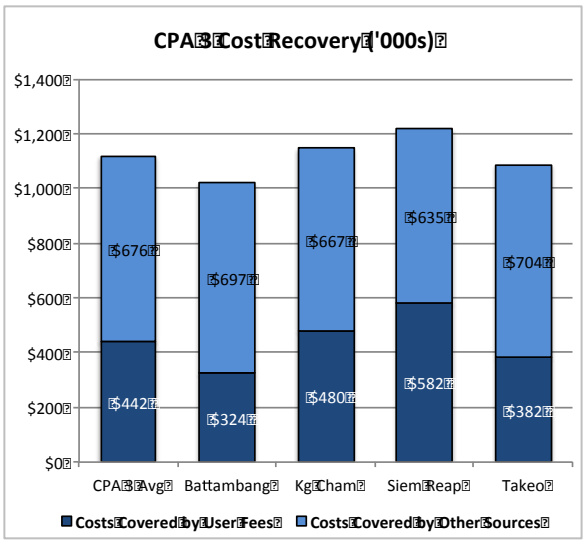
Figure 9. Hospital Cost Recovery

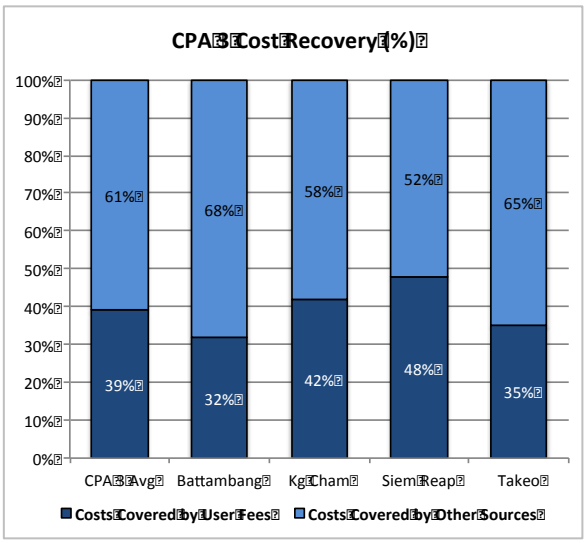












5.4. Hospital Unit Cost Results

5.4.1. Introduction

It bears repeating that cost is a function, reflecting decisions – both rational and irrational – made by financiers and providers. Additionally, estimates capture historical utilization and cost for a particular period studied and reflect the quality and transparency of the data available. Thus "real cost" or "actual cost" are misleading concepts. As such, these point estimates should be interpreted with caution, particularly for provider payment system design. For the purposes of setting payment rates and informing policy, these costs should serve as a guide, rather than an absolute blueprint. The relativity of the department unit costs – within and across hospitals – may be more meaningful than the calculated absolute costs. Relative cost weights are presented in Appendix D.

Due to the observed variability in unit cost estimates, the results are presented in two ways: 1) Including all cost items; and 2) Including all cost items but in kind drugs and medical supplies. This cost item accounted for 60-70% of total hospital cost potentially due to inefficiencies in procurement, significantly impacted unit cost results. Removing this cost item informed the analysis by smoothing some of the variation that was uncontrollable at the hospital level.

Other than volatility caused by in kind drug and medical supply cost, unit cost variation could be explained by many factors. Unit cost differences are largely attributable to differences in price, case mix, services, productivity (efficiency), and utilization (volume). Cost differences may exist due to staffing (both quantity and skill level), supply of drugs, and availability of more advanced medical equipment. Additionally, inherent differences between facilities – such as the clinical characteristics of their departments, geographic location, historical NGO/Donor involvement, and others – can also contribute to cost variation.

Further, variability in costs can reflect differences in the clinical characteristics of the departments being compared. The same department across hospitals can have a different profile based on patient mix and treatment protocols. For example, one hospital may care for HIV/AIDS inpatients in the General Medicine department while another hospital may have a defined Infectious Disease ward for these patients. Alternatively, the General Medicine department at a CPA 1 hospital may care for less severe patients than this department at a CPA 2 or 3 hospital. Thus, the clinical characteristics of the General Medicine departments at these hospitals may be different.

The below charts first present unit cost results for all inpatient and outpatient services, and then for the inpatient departments tracked by the HIS. Unit cost results were computed for all hospital departments, however, with the remaining results presented for nonstandard departments in Appendix E.

The red charts on the left present the unit cost results with all cost items included, and the blue charts on the right with the in kind drug and medical supply cost excluded. The darker three bars on the left present unit costs for the CPA 1 hospitals, the lighter three bars in the middle for the CPA 2 hospitals, and the lighter four bars on the right for the CPA 3 hospitals. To demonstrate the effect of removing in kind drugs, the same scale is used to present the charts that include and exclude in kind drugs. However, the scales differ in the charts for

cost per discharge, inpatient day, and outpatient visit so as to best graphically display the variation in unit cost results.

The horizontal line displays the weighted average cost per case across all hospitals in the sample. In contrast to a straight average, a weighted average provides a more accurate representation of the unit cost across the total sample. Rather than the cost per case of each hospital contributing equally to the final average, weights are given to hospitals based on their utilization, determining the degree of their contribution to the final average.

In the first example of average cost per discharge, each hospital's utilization (i.e., number of discharges) was used to calculate its weight to determine the relative importance of its unit cost on the average. For example, of the 82,403 total discharges across all 10 hospitals, Ang Roka RH discharged 4,124 patients (5%) and Takeo PH discharged 12,215 (15%). The weights of 5% and 15% demonstrate the relative importance of each hospital's cost per discharge contribution to the sample average. To compute the weighted average, the $60 cost per discharge at Ang Roka RH was multiplied by its 5% weight and the $172 cost per discharge at Takeo PH was multiplied by its 15% weight. The same steps were performed for the other hospitals, and then the products summed to return the sample weighted average cost of $146. Thus, it is evident that the hospitals with higher utilization (and heavier weights) had a greater impact on the weighted average.

5.4.2. Cost per Hospital Discharge, Inpatient Day, and Outpatient Visit

There is significant variation in the cost per discharge across hospitals. The average cost per discharge ranged from a low of $56 to a high of $230, with a weighted average of $146. In kind drug and medical supply cost was removed to smooth some of the volatility in the unit cost estimates. After removing this cost, the variance narrowed from $32 to $75, with a weighted average of $58. Both sets of estimates demonstrate a trend towards higher unit costs at higher level facilities. The CPA 1 weighted average unit cost including in kind drugs and medical supplies was $66, compared with $103 for CPA 2 hospitals, and $179 for CPA 3 hospitals. Excluding the in kind items, the weighted average was $34, $43, and $68 respectively.

Regarding inpatient days, variability in unit cost estimates was also evident; however, the range narrowed from $12 to $29, with a weighted average of $25. Increasing unit cost with each successive CPA level was also a trend noted for inpatient days. This trend, however, disappeared after removing in kind materials. In this analysis, the cost per inpatient day varied from $7 to $13, with a weighted average of $10.

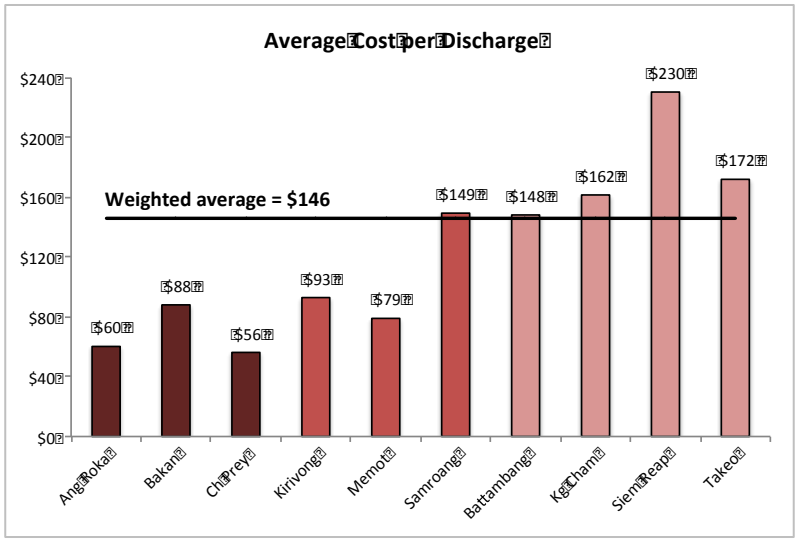
The cost per outpatient visit is inclusive of general and specialty visits. Unit costs varied from a low of $5 to a high of $28 with in kind items included; excluding in kind cost, the range narrowed from $2 to $7. Weighted average costs were $14 and $4 respectively. Higher unit cost at successive CPA levels was not a trend for outpatient visits, potentially suggesting that increased volume created economies of scale.

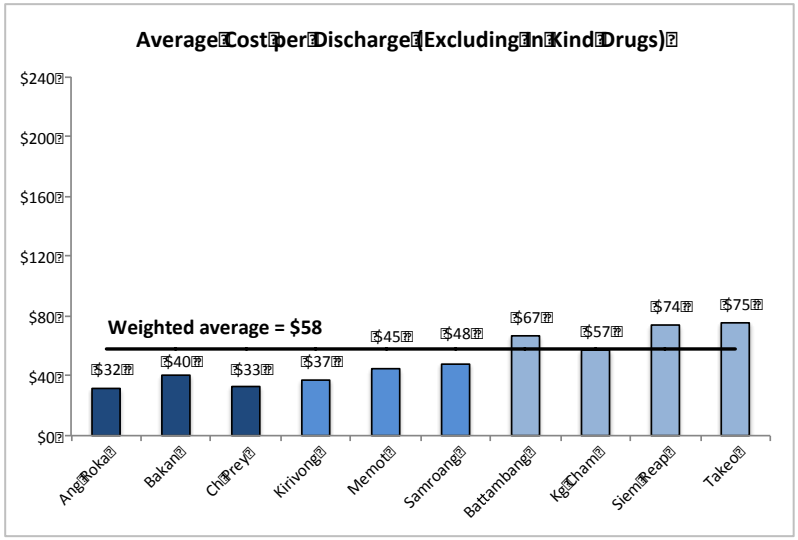
In comparing unit costs across the sample, the following key hospital operating statistics can provide some insight into unit cost differences. However, other factors may explain differences in unit costs as well and are intended for further exploration during provider payment system reform, described further in the Discussion section.

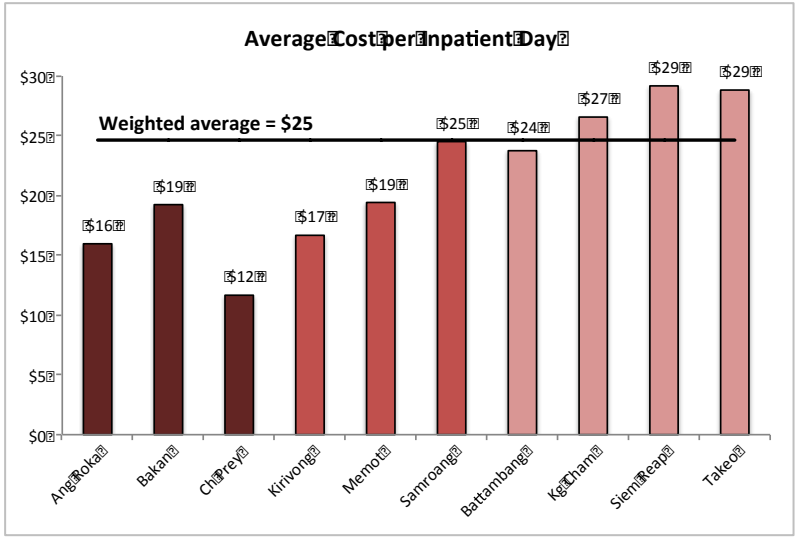
Table 17. Hospital Key Operating Statistics

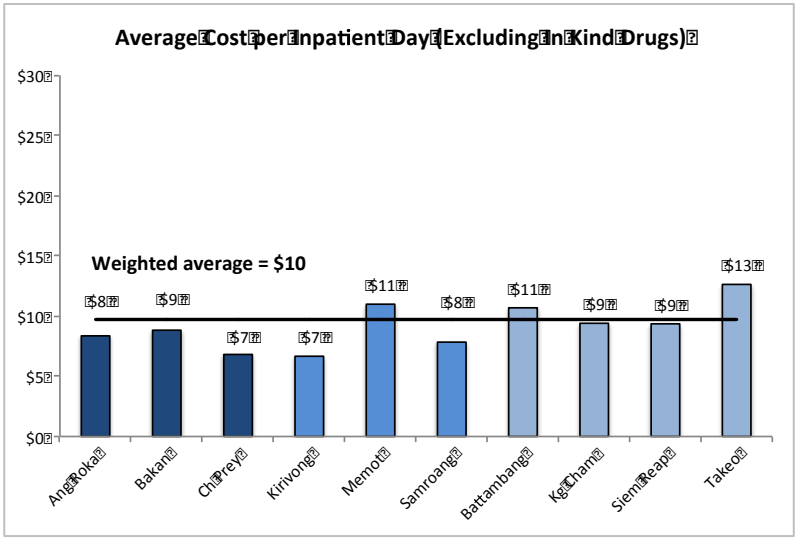
Hospital	Staff	Beds	Dis-charges	Inpatient Days	ALOS	BOR	Surgical Activity	OPD Visits
CPA 1								
Ang Roka	33	60	4,124	15,573	3.78	71%	0	16,556
Bakan	41	64	2,856	13,072	4.58	56%	0	1,527
Choeung Prey	44	70	4,148	19,998	4.82	78%	0	7,731
CPA 2								
Kirivong	54	84	6,378	35,541	5.57	116%	602	19,286
Memot	57	95	6,484	26,401	4.07	76%	377	22,472
Samroang	52	84	4,708	28,714	6.10	94%	197	13,319
CPA 3								
Battambang	325	270	11,813	75,923	6.43	77%	2,489	57,123
Kampong Cham	259	260	17,000	103,422	6.08	109%	2,709	51,465
Siem Reap	261	230	12,677	100,167	7.90	119%	3,171	54,564
Takeo	229	250	12,215	72,916	5.97	80%	3,410	31,419

Figure 10. Cost per Hospital Discharge and Inpatient Day









Due to the great variability in inpatient unit cost estimates across hospitals, the weighted average for each CPA level, in addition to the weighted average across all hospitals is presented first. The first table displays the weighted average cost per discharge, and the second table displays the weighted average cost per inpatient day. The results for individual hospitals are then presented in the inpatient charts that follow.

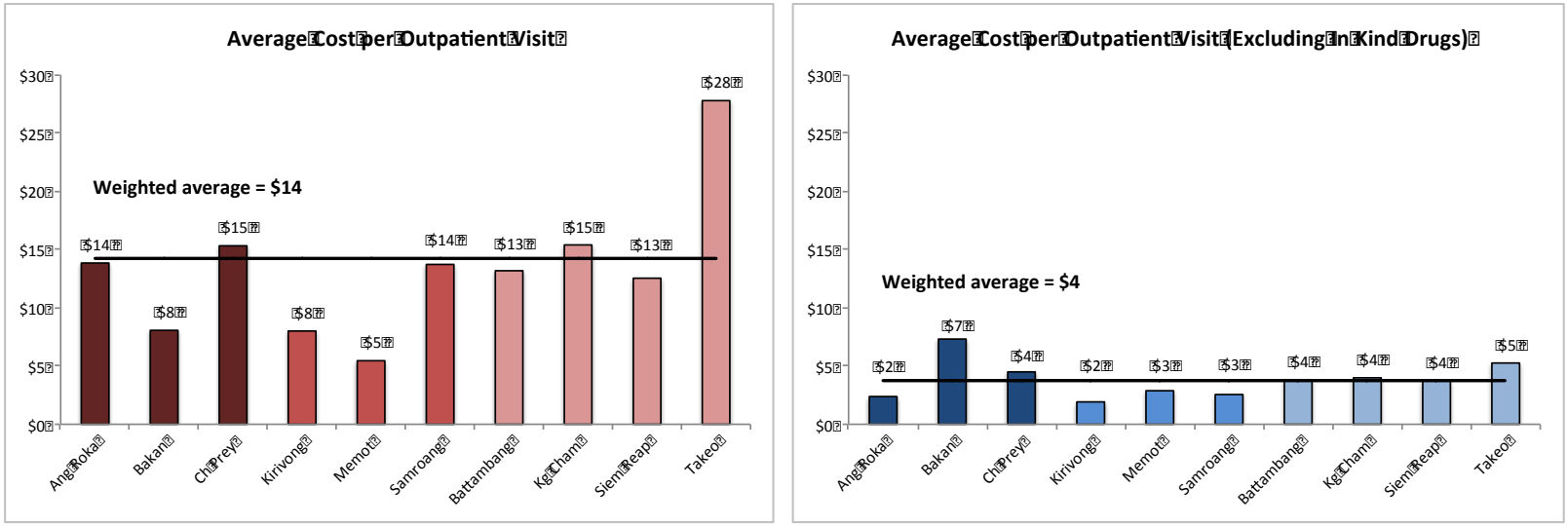
Table 18. Weighted Average Cost per Discharge

Hospital Department	Cost Including In Kind Drugs				Cost Excluding In Kind Drugs			
	CPA 1	CPA 2	CPA 3	Overall	CPA 1	CPA 2	CPA 3	Overall
Overall IPD	$66	$103	$177	$146	$34	$43	$67	$58
General Medicine	$67	$74	$113	$92	$33	$29	$46	$38
Surgery	$0	$142	$213	$197	$0	$56	$78	$73
Maternity/Gynecology	$83	$87	$174	$145	$52	$55	$66	$62
Pediatrics	$53	$85	$101	$86	$28	$27	$51	$39
Tuberculosis	$282	$402	$152	$173	$187	$237	$94	$106

Table 19. Weighted Average Cost per Inpatient Day

Hospital Department	Cost Including In Kind Drugs				Cost Excluding In Kind Drugs			
	CPA 1	CPA 2	CPA 3	Overall	CPA 1	CPA 2	CPA 3	Overall
Overall IPD	$15	$20	$27	$25	$8	$8	$10	$10
General Medicine	$14	$15	$21	$18	$7	$6	$9	$7
Surgery	$0	$33	$25	$26	$0	$13	$9	$10
Maternity/Gynecology	$22	$23	$39	$34	$14	$15	$15	$15
Pediatrics	$14	$19	$25	$21	$7	$6	$12	$9
Tuberculosis	$13	$8	$9	$9	$9	$4	$5	$5

Figure 11. Cost per Hospital Outpatient Visit



Other than the Consultation Externe department that typically offered services for medicine, gynecology, surgery, and pediatrics, the hospitals operated specialty outpatient departments, listed below. The unit cost estimates includes both general and specialty outpatient visits.

- Ang Roka RH: HIV/AIDS
- Bakan RH: N/A
- Choeung Prey RH: HIV/AIDS
- Kirivong RH: Dental, HIV/AIDS, Vision
- Memot RH: HIV/AIDS, Dental
- Samroang PH: Dental, HIV/AIDS, Vision
- Battambang PH: Dental, Diabetes, ENT, HIV/AIDS, Mental Health, Physiotherapy, Tuberculosis, Vision
- Kampong Cham PH: Dental, Diabetes/Hypertension, ENT, HIV/AIDS, Mental Health, Tuberculosis, Vision
- Siem Reap PH: Dental, Diabetes/Hypertension, ENT, HIV/AIDS, Mental Health, Physiotherapy, Vision
- Takeo PH: Dental, Diabetes/Hypertension, ENT, HIV/AIDS, Physiotherapy

5.4.3. Cost per General Medicine Discharge and Inpatient Day

The cost per discharge in the General Medicine departments ranged from $47 to $134 with a weighted average of $92 for all hospitals. After removing in kind drugs, the unit cost ranged from $21 to $53 with a weighted average of $38. The cost per inpatient day ranged from $9 to $32 including in kind drugs, with a weighted average of $18. Excluding in kind drugs, the range was $4 to $13, with a weighted average of $7 per day. Generally, the unit costs were higher for the provincial hospitals (including Samroang PH, a CPA 2).

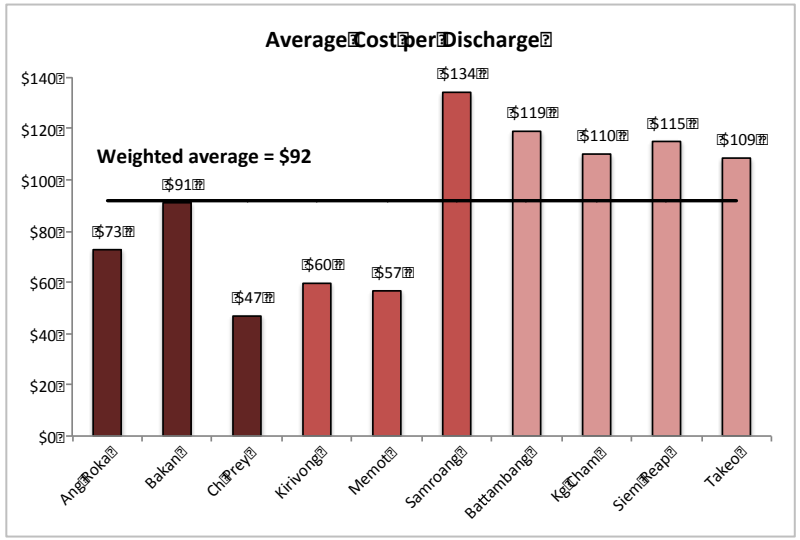
The General Medicine departments differed somewhat across the hospitals. All the CPA 1 and 2 hospitals housed Opportunistic Infection (OI) patients in this ward. In contrast, Kampong Cham PH and Siem Reap PH had distinct HIV/AIDS inpatient departments and Battambang PH and Takeo PH cared for HIV/AIDS patients in their Severe Medicine departments. Further, Ang Roka RH and Choeung Prey RH hospitalized Suspect Tuberculosis patients in their General Medicine departments, before referring them after confirmation of Tuberculosis to the nearby provincial hospitals. The other hospitals operated distinct Tuberculosis departments. Below are the key operating statistics for the General Medicine departments across the hospitals.

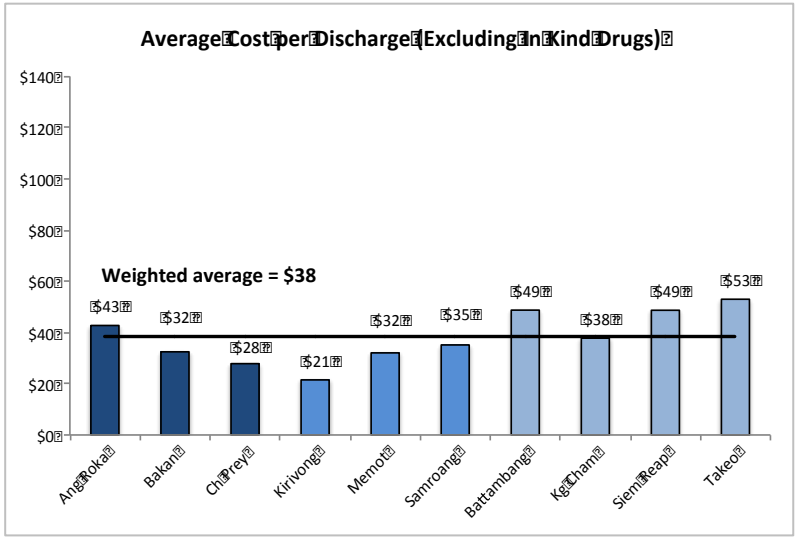
Table 20. General Medicine Department Key Operating Statistics

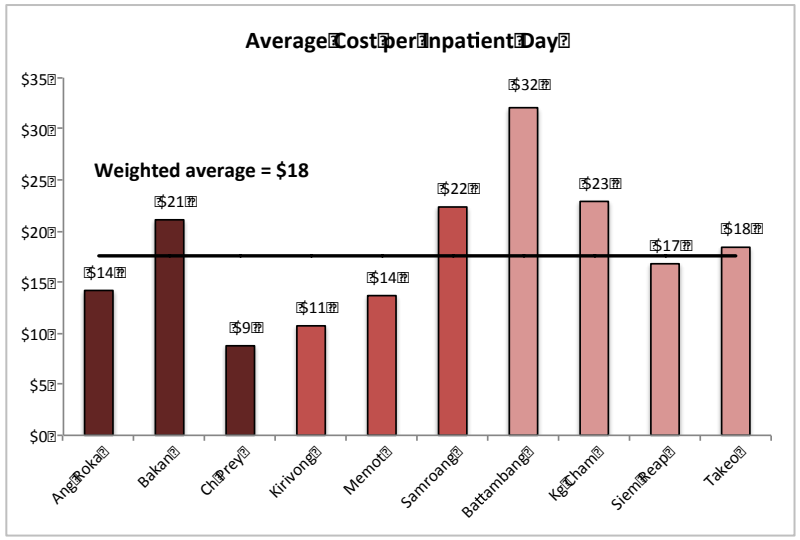
Hospital	Staff	Beds	Dis-charges	Inpatient Days	ALOS	BOR	Surgical Activity	Drug Share†
CPA 1								
Ang Roka	6	10	1,024	5,257	5.13	144%	0	10%
Bakan	3	16	1,210	5,226	4.32	89%	0	47%
Choeung Prey	7	30	1,685	9,011	5.35	82%	0	17%
CPA 2								
Kirivong	5	28	2,399	13,347	5.56	131%	0	19%
Memot	5	30	2,467	10,225	4.14	93%	0	15%
Samroang	6	24	1,303	7,822	6.00	89%	0	10%
CPA 3								
Battambang	18	38	1,826	6,776	3.71	49%	0	7%
Kampong Cham	12	34	2,987	14,367	4.81	116%	0	6%
Siem Reap	13	30	2,444	16,744	6.85	153%	0	4%
Takeo	15	45	2,327	13,728	5.90	84%	0	5%

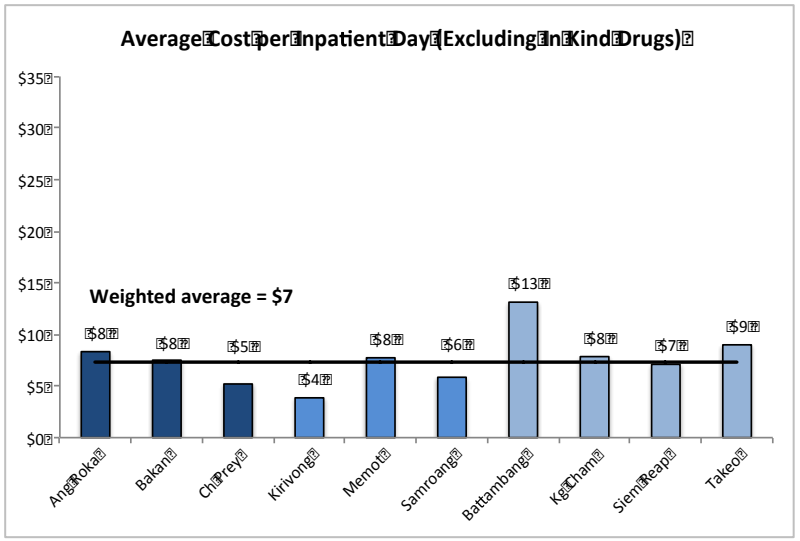
† Drug Share represents the department's percentage share of total hospital drug and medical supply cost.

Figure 12. Cost per General Medicine Discharge and Inpatient Day









5.4.4. Cost per Surgery Discharge and Inpatient Day

The cost per discharge in the Surgery departments ranged from $129 to $243 with a weighted average of $197 for all hospitals. After removing in kind drugs, the unit cost ranged from $46 to $91 with a weighted average of $73. The cost per inpatient day ranged from $20 to $40 including in kind drugs, with a weighted average of $26. Excluding in kind drugs, the range was $7 to $21, with a weighted average of $10 per day.

Interestingly, the unit costs for the CPA 2 hospitals were generally lower for discharges but higher for inpatient days, indicating that their patient stays were shorter, confirmed by the average length of stay (ALOS) statistics below. Less complex surgeries are likely the explanation for this difference in stay.

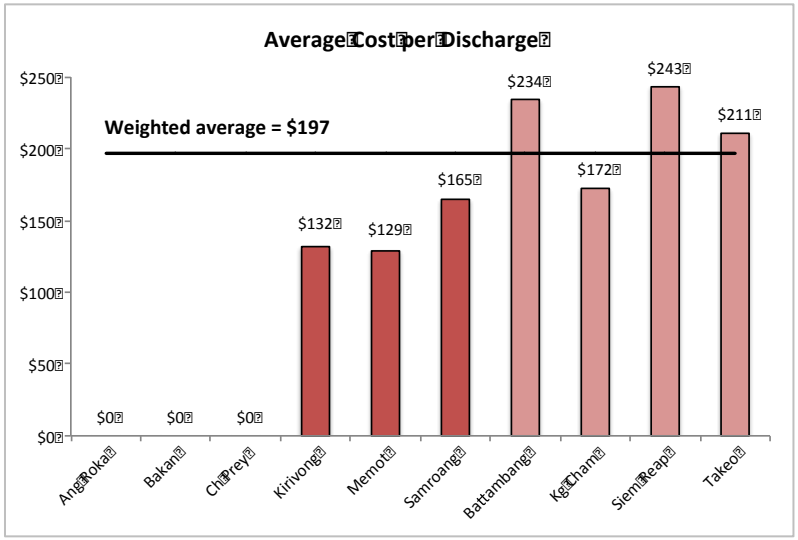
These Surgery departments do not include Dental, ENT, Ophthalmology, or Maternity/Gynecology surgical patients. The departments differed across the hospitals. While the CPA 2 hospitals, Battambang PH, and Takeo PH had one Surgery department alone, Kampong Cham PH and Siem Reap PH operated several Surgery departments, consolidated for the purpose of the costing analysis. The former operated Abdominal and Orthopedic Surgery departments, and the latter operated Abdominal, Orthopedic, and Urology Surgery departments. Below are the key operating statistics for the Surgery departments across the hospitals.

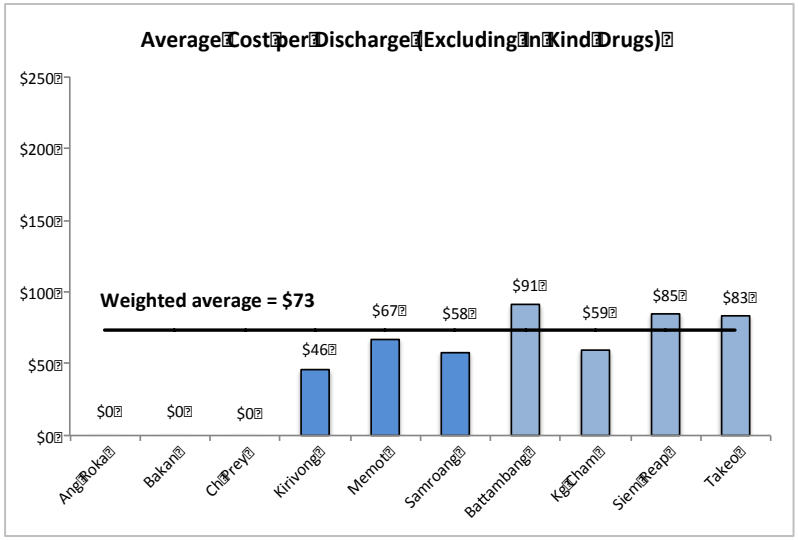
Table 21. Surgery Department Key Operating Statistics

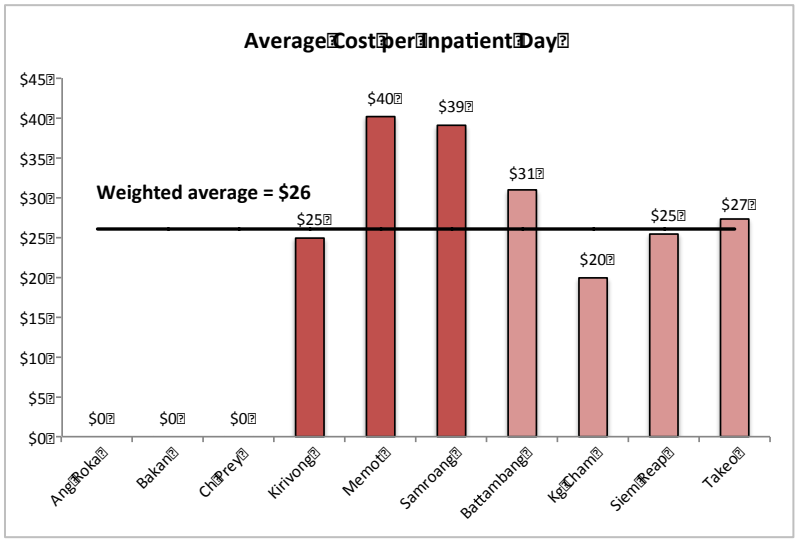
Hospital	Staff	Beds	Dis-charges	Inpatient Days	ALOS	BOR	Surgical Activity	Drug Share†
CPA 2								
Kirivong	4	16	1,183	6,261	5.29	107%	365	21%
Memot	3	12	940	3,018	3.21	69%	254	19%
Samroang	8	14	1,036	4,373	4.22	86%	82	15%
CPA 3								
Battambang	17	40	1,815	13,745	7.57	94%	767	8%
Kampong Cham	20	70	3,328	28,812	8.66	113%	1,074	11%
Siem Reap	27	60	3,205	30,680	9.57	N/A	1,501	15%
Takeo	14	60	2,759	21,301	7.72	97%	1,018	8%

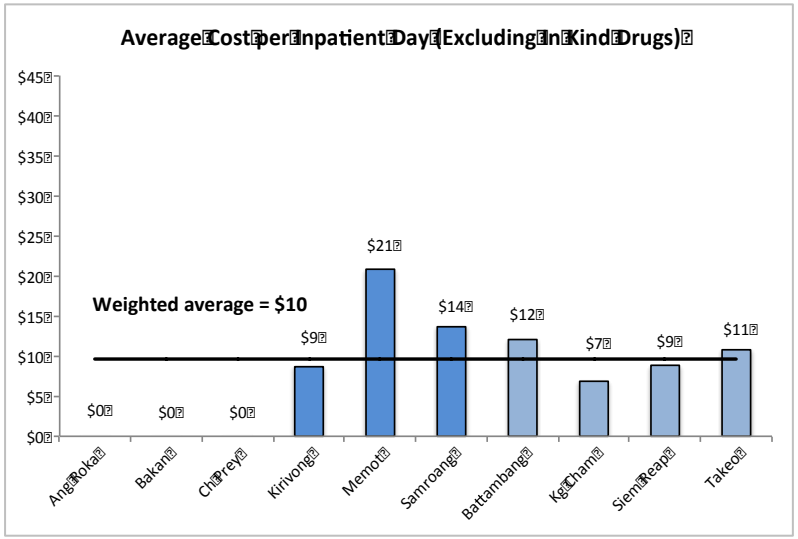
† Drug Share represents the department's percentage share of total hospital drug and medical supply cost.

Figure 13. Cost per Surgery Discharge and Inpatient Day









5.4.5. Cost per Maternity/Gynecology Discharge and Inpatient Day

The cost per discharge in the Maternity/Gynecology departments ranged from $65 to $329 with a weighted average of $145 for all hospitals. After removing in kind drugs, the unit cost ranged from $42 to $79 with a weighted average of $62. The cost per inpatient day ranged from $14 to $84 including in kind drugs, with a weighted average of $34. Excluding in kind drugs, the range was $9 to $28, with a weighted average of $15 per day. As seen with General Medicine, the unit costs were higher for the provincial hospitals (including Samroang PH, a CPA 2).

The unit cost at Siem Reap PH was an extreme outlier explained by the high drug cost for this department. Interestingly, the department was staffed far lower than the other CPA 3 hospitals, and lower than its own key inpatient departments, including Surgery (27), Medicine (13), ICU (12), Emergency (10), and Tuberculosis (6). However, the department's utilization was also lowest among its CPA 3 peers. Further, its percentage share of hospital drug cost was high and Siem Reap PH spent the most on this cost item of any hospital in the sample. One possible explanation for the high drug cost is the tendency of nearby Kantha Bopha Hospital to refer more severe Maternity/Gynecology patients to Siem Reap PH. Once removing in kind drugs, the unit cost variation decreased dramatically.

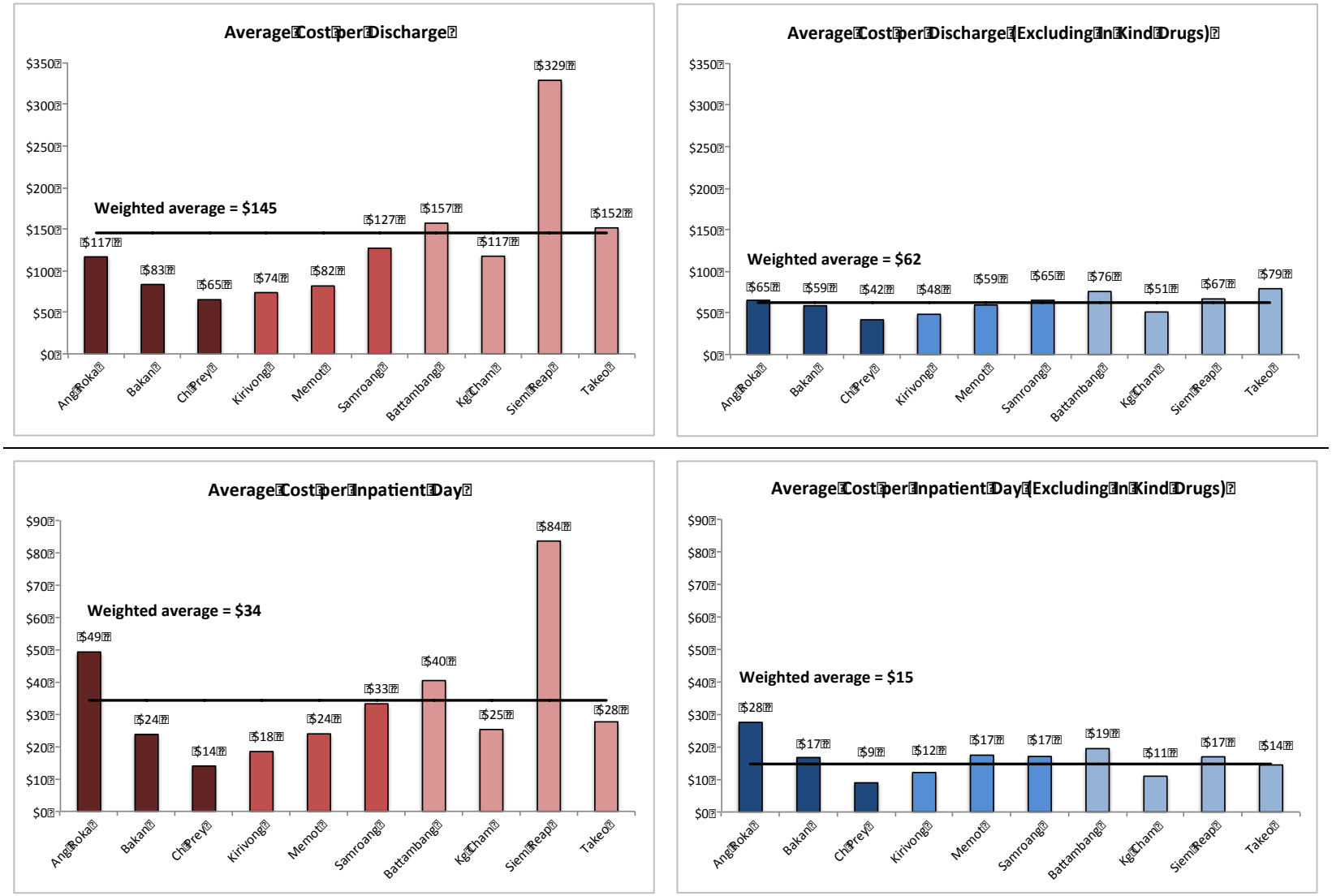
Another possible explanation for the higher cost at both Battambang PH and Siem Reap PH is that these hospitals lacked health centers on their campus. In contrast, the eight other hospitals had functioning health centers onsite that likely absorbed some Maternity/ Gynecology patients. Thus, the patient characteristics within the departments at Battambang PH and Siem Reap PH may have differed somewhat from the other hospitals. Below are the key operating statistics for the Maternity/Gynecology departments across the hospitals.

Table 22. Maternity/Gynecology Department Key Operating Statistics

Hospital	Staff	Beds	Dis-charges	Inpatient Days	ALOS	BOR	Surgical Activity	Drug Share†
CPA 1								
Ang Roka	5	4	450	1,065	2.37	73%	0	7%
Bakan	6	9	505	1,770	3.50	54%	0	9%
Choeung Prey	5	10	897	4,171	4.65	114%	0	12%
CPA 2								
Kirivong	7	8	1,554	6,192	3.98	212%	237	8%
Memot	7	16	1,175	4,000	3.40	68%	66	7%
Samroang	7	10	661	2,526	3.82	69%	91	5%
CPA 3								
Battambang	41	42	3,112	12,087	3.88	79%	522	10%
Kampong Cham	24	30	3,755	17,423	4.64	159%	1,245	6%
Siem Reap	9	25	2,019	7,947	3.94	87%	424	18%
Takeo	20	40	2,130	11,665	5.48	80%	594	5%

† Drug Share represents the department's percentage share of total hospital drug and medical supply cost.

Figure 14. Average Cost per Maternity/Gynecology Discharge and Inpatient Day



5.4.6. Cost per Pediatrics Discharge and Inpatient Day

The cost per discharge in the Pediatrics departments ranged from $36 to $117 with a weighted average of $86 for all hospitals. After removing in kind drugs, the unit cost ranged from $20 to $69 with a weighted average of $39. The cost per inpatient day ranged from $9 to $36 including in kind drugs, with a weighted average of $21. Excluding in kind drugs, the range was $4 to $21, with a weighted average of $9 per day.

The high unit cost of this department at Takeo PH is due to heavy support from Ospedale Pediatrico Bambino. The NGO contributed over $13,000 for staff incentives and paid almost $22,000 to cover patient user fees. Takeo PH also had a small Pediatric Operating Theater. The expenditures for the Operating Theater are absorbed in the general Pediatrics department presented here, as it was impossible to separate these expenditures using hospital data.

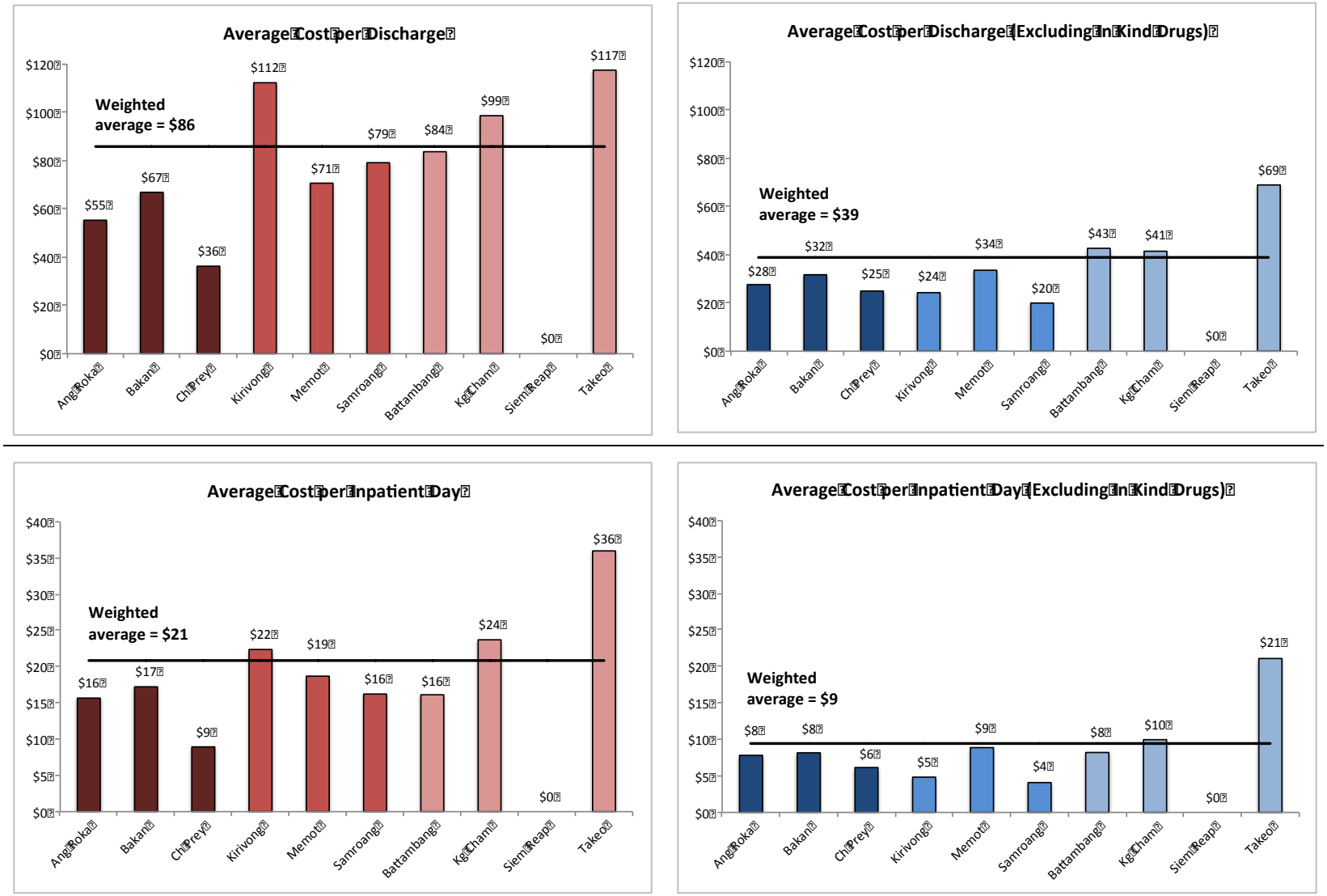
Below are the key operating statistics for the Pediatrics departments across the hospitals. Siem Reap PH did not operate a Pediatrics department as two hospitals also located in the provincial town – Angkor Hospital for Children and Kantha Bopha Hospital – provided free care for pediatric patients. No data was available on Pediatric surgeries at any of the hospitals, hence the quantity is recorded in the table below as not available.

Table 23. Pediatrics Department Key Operating Statistics

Hospital	Staff	Beds	Dis-charges	Inpatient Days	ALOS	BOR	Surgical Activity	Drug Share†
CPA 1								
Ang Roka	5	8	1,485	5,249	3.53	180%	0	13%
Bakan	3	9	845	3,281	3.88	100%	0	20%
Choeung Prey	3	8	837	3,397	4.06	116%	0	5%
CPA 2								
Kirivong	3	16	1,186	5,955	5.02	102%	N/A	22%
Memot	3	17	1,848	6,988	3.78	113%	N/A	17%
Samroang	3	10	1,181	5,763	4.88	158%	N/A	11%
CPA 3								
Battambang	14	30	1,667	8,659	5.19	79%	N/A	3%
Kampong Cham	23	25	2,862	11,915	4.16	131%	N/A	5%
Siem Reap	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Takeo	18	32	2,340	7,647	3.27	65%	N/A	5%

† Drug Share represents the department's percentage share of total hospital drug and medical supply cost.

Figure 15. Average Cost per Pediatrics Discharge and Inpatient Day



5.4.7. Cost per Tuberculosis Discharge and Inpatient Day

The cost per discharge in the Tuberculosis departments ranged from $120 to $826 with a weighted average of $173 for all hospitals. After removing in kind drugs, the unit cost ranged from $75 to $486 with a weighted average of $106. The cost per inpatient day ranged from $4 to $18 including in kind drugs, with a weighted average of $10. Excluding in kind drugs, the range was $2 to $11, with a weighted average of $5 per day.

Of significance, the Tuberculosis department at Kampong Cham PH was heavily supported by Médecins Sans Frontières (MSF). The NGO contributed almost $10,000 for staff wages and incentives in addition to supporting the salaries of expatriate staff working in the hospital (the local rates of comparably qualified nationals were substituted for this expense, amounting to $5,000). Further, MSF spent over $23,000 on drugs and medical supplies and almost $22,000 additional on other operating expense items. Although MSF also supported the outpatient department, these figures represent the NGO's expenditures on the inpatient department alone.

In contrast to the higher utilized provincial hospitals, the high cost per discharge at Bakan RH, Kirivong RH, and Memot RH seems to be related to very low utilization of these departments. Interestingly, the removal of in kind drug cost did little to reduce variability in the unit cost estimates.

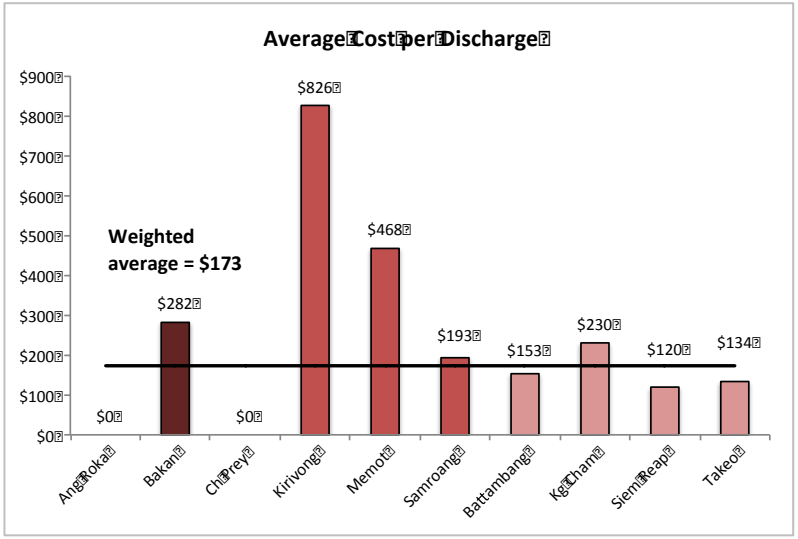
Below are the key operating statistics for the Tuberculosis departments across the hospitals. Both Ang Roka RH and Choeung Prey RH did not operate these departments as they temporarily cared for Suspect Tuberculosis patients in their General Medicine departments, sending them to the nearby provincial hospital once Tuberculosis was confirmed.

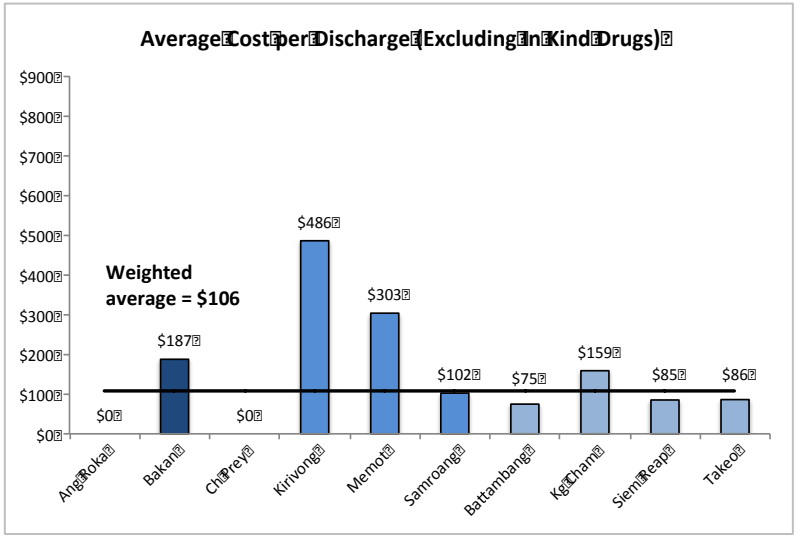
Table 24. Tuberculosis Department Key Operating Statistics

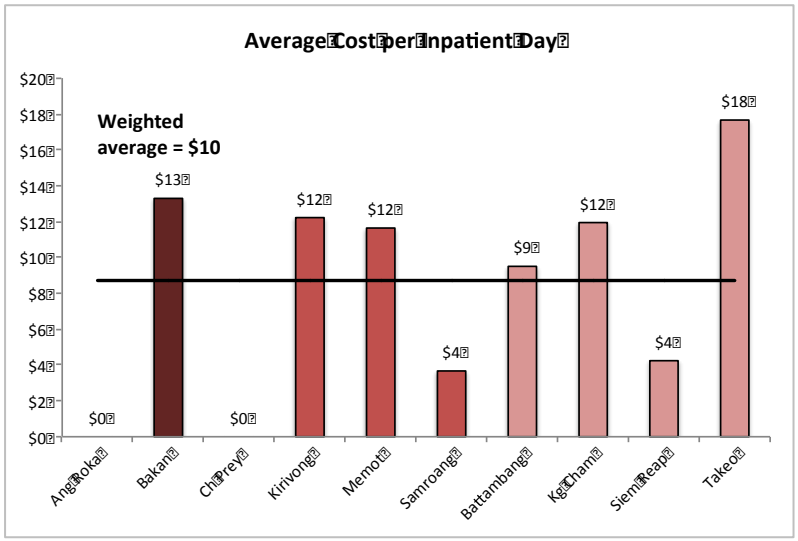
Hospital	Staff	Beds	Dis-charges	Inpatient Days	ALOS	BOR	Surgical Activity	Drug Share†
CPA 1								
Ang Roka	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bakan	3	26	100	2,122	21.22	22%	0	7%
Choeung Prey	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CPA 2								
Kirivong	5	16	56	3,786	67.61	65%	N/A	4%
Memot	2	20	54	2,170	40.19	30%	N/A	3%
Samroang	2	20	131	6,901	52.68	95%	N/A	2%
CPA 3								
Battambang	11	70	975	15,714	16.12	62%	N/A	4%
Kampong Cham	7	30	490	9,457	19.30	86%	N/A	1%
Siem Reap	6	50	766	21,628	28.23	119%	N/A	1%
Takeo	12	31	878	6,643	7.57	59%	N/A	2%

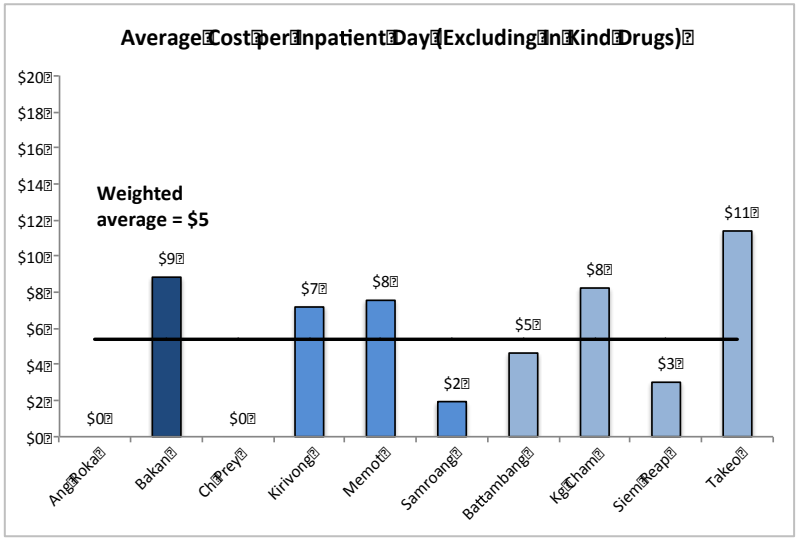
† Drug Share represents the department's percentage share of total hospital drug and medical supply cost.

Figure 16. Cost per Tuberculosis Discharge and Inpatient Day









6. Discussion

6.1. Hospital Financing and Financial Management

This multi-stakeholder perspective costing study revealed that hospital financing silos and fragmented financial management burden Cambodia hospitals today. Cambodia has a complex financing system driven by funds management by different government ministries, multiple donors with different funding instruments, high out-of-pocket spending, and numerous social health insurance schemes. Within this context, there lacked documentation and understanding of how hospitals used various funding sources to support service delivery and operations management.

This study aimed to document all sources of funds for public hospitals and their associated uses. The analysis uncovered a fragmented and redundant system with uncoordinated financing, arbitrary allocation formulas, heavy administrative burden, and reporting inaccuracies.

Share of Government funding by source varied widely across hospitals and was unrelated to factors such as utilization, bed size, population served, or personnel size. Further, income from user fees varied dramatically between hospitals with similar utilization, and in kind pharmaceutical supply was unrelated to hospital utilization. Additionally, funding to support personnel salaries was unrelated to hospital staff size.

In addition to identifying subjective and uncoordinated financial allocation practices, this study also found that hospitals followed distinct accounting practices for the management and use of funds. Hospitals kept separate books for each funding source, sometimes with conflicting information, limiting their ability to interpret overall financial performance and guide management decision making. This study highlighted the need to address the inequity and lack of transparency associated with uncoordinated hospital financing and financial management in Cambodia. This study raised awareness of needed process improvements and will hopefully spur action towards improved aid effectiveness and coordination.

Using these findings, it is recommended that the Government and partner organizations harmonize financial management systems across ministries and donors to eliminate silos and improve accountability. Several tactics could support this effort, including:

- Standardizing accounting and financial management practices across hospitals with corresponding tools and templates;
- Issuing guidelines for consolidated bookkeeping for all sources of funding and rolling out an income statement template; and
- Harmonizing financial reporting processes and templates across ministries and donors.

It is also recommended that measures be undertaken to improve allocative efficiency through establishment of transparent allocation formulas based on clearly defined outputs. The Government and development partners should revisit allocation formulas so that they not only account for facility level and geographic location, but also utilization, catchment population, and other operational statistics.

Lastly, it is recommended that Cambodia move towards use of standardized costing templates – rather than relying solely on one-off costing studies – in order to continually monitor costs, update payment rates, and benchmark facility performance.

6.2. Hospital Cost Structure

This study provided insight on the overall cost structure of hospitals, excluding their fixed costs. The results revealed that drug and medical supply cost comprised the largest share of overall hospital cost, at 60-70% across the facilities. This cost profile is distinct from most other countries, where labor cost comprises the largest share of hospital cost. To improve the motivation and productivity of the workforce, one promising lever for change may be to shift the cost structure so that labor cost comprises a greater share and drug and medical supply cost a reduced share of total cost. Competitive procurement and international price benchmarking offer potential opportunities for efficiency gains.

The costing results also reveal the need to build capacity for stronger expenditure tracking, particularly for spending from user fee budgets. Many hospitals classified expense in an "other" category, suggesting a need for strengthened documentation and revised tools and templates. Further, better coordination in reporting between PHDs, OD offices, and hospitals is needed.

6.3. Hospital Unit Costs

Significant variation exits in the unit costs across hospitals, departments, and CPA levels. On average, unit costs per discharge were estimated to be $66 for CPA 1 hospitals, $103 for CPA 2 hospitals, and $177 for CPA 3 hospitals. Inclusive of all CPA levels, unit costs per discharge were $146 on average. Unit costs per outpatient visit were estimated to be $14 for CPA 1 hospitals, $8 for CPA 2 hospitals, and $16 for CPA 3 hospitals on average. Inclusive of all CPA levels, unit costs per outpatient visit were $14 on average.

Much of the volatility in unit cost estimates of hospital departments can be explained by the high cost of drugs and medical supplies provided in kind to the hospital. However, funding differences, utilization, and differences in department clinical characteristics can also explain some of the variation. Better understanding this variation in unit costs will be important in shaping hospital financing policies and developing a new provider payment system. Additional activities to understand this variation could include:

- Medical record reviews to determine the proportion of medical and surgical patients within each department;
- Medical record reviews to document the types of discharges within departments and their typical use of drugs, medical supplies, and ancillary services;
- Household surveys to assess out-of-pocket spending on items such as drugs and medical supplies not available at the hospital; and
- Hospital staff interviews to obtain qualitative information on hospital department costs.

In using the results to inform policy, it is important to consider the makeup of the unit costs. For example, the results reflect the utilization and cost structure of facilities in 2010-2011. They are based on both rational and irrational provider decisions related to spending. Further, the results include the costs of drugs procured above international reference prices. Additionally, the unit costs do not distinguish between differences in quality (e.g., higher staff attendance, higher maintenance investments, clinical practice guideline care delivery).

6.4. Provider Payment Mechanism Design

Towards achieving universal coverage, many countries are prioritizing the design of new provider payment methods. Establishing a cost basis for health services is a ubiquitous challenge in the design of a new payment mechanism. This study provides unit cost estimates and relative cost weights that could inform payment rates for department-based discharges or outpatient visits. The results – both absolute and relative – can serve as a basis for the establishment of payment rates.

Cambodia has initiated a process to create a standard case-based payment mechanism and price structure to be used by all demand-side financing schemes. Effective June 1, 2012, the HEF scheme enacted a case-based payment system for hospital services,[19] revising the variable payment methods and rates in effect prior to 2012, and revising the standard benefit package rates set on January 1, 2012.[20] The established rates include all clinical and ancillary services in a single case payment, regardless of diagnosis, department of discharge, services provided, or length of stay. Below are the rates hospitals will be reimbursed for seeing HEF patients.

Case Group	CPA 1 Rate	CPA 2 Rate	CPA 3 Rate
OPD Visit	$1.50	$2.00	$2.50
IPD Medical *(including minor surgery and delivery)*	$15.00	$25.00	$30.00
IPD Surgery *(excluding minor surgery)*	N/A	$80.00	$100.00

The Ministry of Labor and Vocational Training (MOLVT) has also initiated work towards development of a standard provider payment method for employment injury and insurance under the National Social Security Fund (NSSF). The ministry has a mandate to roll out this new scheme in 2013. Key representatives from the MOH, MOLVT, and development partners have discussed the benefits of harmonizing the purchase of services between the HEF and NSSF schemes and formation of a workgroup to design a new payment model is underway. The ministries and partners have prioritized the following health financing activities that are planned for 2012 and 2013:

- Conducting additional costing analyses to explore variation in unit costs between hospitals and across CPA levels;
- Launching a collaborative process to design a hospital case-based payment system;
- Updating the Health Financing Charter;
- Coordinating hospital financing and harmonizing financial management systems across ministries and donors; and
- Developing a process to enable routine costing updates to inform adjustments to tariffs.

Both the unit costs and cost weight data can be used to establish the cost per case for a reformed payment system. As a first step towards setting payment rates, the workgroup could review different simulations to determine the impacts on the base rate[21] from inclusion

[19] H.E. Prof. Eng Huot, Standard Benefit Package and Provider Payment Mechanism for Heath Equity Funds (Revised June 2012). June 15, 2012.

[20] H.E. Prof. Eng Huot, Standard Benefit Package and Provider Payment Mechanism for Heath Equity Funds. Letter to HEF Operators, January 18, 2012.

[21] The base rate is the global average payment per hospital case which is computed from the total hospital payment pool. The formula is: Base Rate = Hospital Pool / Total # of Hospital Cases/Year.

or exclusion of different funding sources or cost items. As the unit costs presented in this report include all funding sources and all cost items other than capital, inpatient and outpatient cost tables[22] are included in Appendix F to aid in the process of removing items not planned for inclusion in the payment rates (e.g., salaries, in kind drugs, etc.). In addition to this technical exercise, the workgroup should also discuss the policy considerations for the payment system, focusing on the size of the hospital pool, social protection priorities, and hospital quality and performance improvement initiatives.

[22] The cost tables were developed in collaboration with Dr. Cheryl Cashin, World Bank consultant. The tables were used for simulation exercises during a Provider Payment Workshop in Phnom Penh on June 19, 2012. The workshop title was: *Building Blocks, Technical Issues and Policy Decisions for Harmonizing and Refining the Case-Based Hospital Payment System in Cambodia*.

Appendices

Appendix A: Data Collection Instrument

Category	No.	Data Item	Data Description	Time Period
General Information	1	Departments / Wards List	List of all hospital services / wards (clinical, ancillary, administrative)	Current
	2	Organization Chart	Organization structure of hospital	Current
	3	Staff Lists and Positions	Government, contractual, casual, unpaid, expatriate staff	Current
	4	Staff Schedule and Ward Assignments	Staff schedule and percent time allocation across wards	Current
	5	Payment Contracts	User fee schedule, HEF MOU, CBHI scheme details	Current
Utilization	6	Population Characteristics	Catchment population	Current
	7	Bed Count	Number of beds (recognized and unrecognized) by ward	Current
	8	HIS HO2 Report	Discharges, days, visits (official HO2 and hospital management reports)	July 1, 2010 - June 30, 2011
	9	Utilization by Ward	Data on self pay, HEF, exempt, discount patients	July 1, 2010 - June 30, 2011
	10	Outpatient Utilization	Outpatient services (general, special), relationship with nearest HC	July 1, 2010 - June 30, 2011
	11	Lab Register	Number and type of test by ward, cost of tests (if available)	Oct 2010, Feb 2011, May 2011
	12	Blood Bank Register	Blood unit consumption report by ward	Oct 2010, Feb 2011, May 2011
	13	X-Ray Register	Number of x-rays by ward	Oct 2010, Feb 2011, May 2011
	14	Ultrasound (Echo) Register	Number of tests by ward	Oct 2010, Feb 2011, May 2011
	15	Rx Consumption Report (RACHA)	Monthly drug and medical supply consumption by ward	Oct 2010, Feb 2011, May 2011
	16	Operating Theater Register	Number of surgeries by ward, number of surgeries outside Theater	Oct 2010, Feb 2011, May 2011
	17	Other Ancillary Department Forms	Logs from CT scanner, ambulance, pathology, mortuary, endoscopy, etc.	Oct 2010, Feb 2011, May 2011
Labor Cost	18	Staff Salaries and Allowances	Salary and allowance payments by staff member	July 1, 2010 - June 30, 2011
	19	Staff Overtime Payments	Overtime payments by staff member	July 1, 2010 - June 30, 2011
	20	Midwife Incentive Payments	Incentive payments by staff member	July 1, 2010 - June 30, 2011
	21	Mission Expense Payments	Expense payments by staff member	July 1, 2010 - June 30, 2011
	22	User Fee/HEF Incentives	Incentive payments by staff member	July 1, 2010 - June 30, 2011
	23	SDG Incentive Payments	Incentive payments by staff member	July 1, 2010 - June 30, 2011
	24	POC/National Program Payments	Incentive payments by staff member	July 1, 2010 - June 30, 2011
	25	NGO/Donor Direct Payments	Incentive payments by staff member	July 1, 2010 - June 30, 2011
	26	Other Incentive Payments	Incentive payments by staff member	July 1, 2010 - June 30, 2011

Category	No.	Data Item	Data Description	Time Period
Drug and Medical Supply Cost	28	Invoices from CMS	Drug description, strength, form, quantity, unit cost, total cost	January 1, 2010 - June 30, 2011
	29	Invoices from Local Pharmacies	Drug description, strength, form, quantity, unit cost, total cost	January 1, 2010 - June 30, 2011
	30	Donated Drugs and Medical Supplies	Reports from donors on donated drugs and medical supplies	July 1, 2010 - June 30, 2011
Other Financials	31	AOP Budgets	Budgeting and planning data	July 1, 2010 - June 30, 2011
	32	"D3" MOH Health Financing Report	Income and expense for government budget, user fee/HEF, and donor	January 1, 2010 - June 30, 2011
	33	MEF Health Financing Report	Income and expense for government budget	January 1, 2010 - Dec 31, 2011
	34	HSSP2 Financial Reports	Incentive and operating expense budget and expenditures	July 1, 2010 - June 30, 2011
	35	Journals, Cash Books, Ledgers	Daily tracking of income and expense (government and user fee separate)	July 1, 2010 - June 30, 2011
	36	Cashier User Fee/ HEF Payment File	Patient payments for services by patient type	July 1, 2010 - June 30, 2011
	37	HEF Operator Financial Reports	Hospital reimbursements for HEF patients	July 1, 2010 - June 30, 2011
	38	CBHI Scheme Financial Reports	Hospital reimbursements for CBHI patients	July 1, 2010 - June 30, 2011
	39	Disbursement Request	Disbursements requests to PHD/OD with information on expenditures	July 1, 2010 - June 30, 2011
	40	Purchase Request Forms and Invoices	Notation of items purchased from user fee/HEF budget	July 1, 2010 - June 30, 2011
	41	Other Financial Reports	Managerial reports unique to hospitals	July 1, 2010 - June 30, 2011
	42	NGO/Donor Funding	Financial reports for donor activities	July 1, 2010 - June 30, 2011
	43	Other Sources of Income	Student fees, parking, blood donations, research programs, etc.	July 1, 2010 - June 30, 2011
	44	Capital Donations	Major equipment and medical device donations, building projects	July 1, 2010 - June 30, 2011

Appendix B: Hospital Clinical Departments

Department Costed	Nomenclature	Hospital Code	Notes
Ang Roka RH (CPA 1)			
Emergency/Small Surgery	Reanimation/Chirurgie	Rea/Chir	
General Medicine	Médecine (Salle D)	Med	Includes a small number of TB patients.
Maternity/Gynecology	Maternité	GO	
Pediatrics	Pédiatrie (Salle E)	Ped	
HIV/AIDS (OPD)	OI/ART	OI/ART	
General Consult (OPD)	Consultation Externe	Consul Ext	Includes Medicine, Gynecology, and TB Consults.
Bakan RH (CPA 1)			
Emergency/Small Surgery	Injury	ER/CH	
General Medicine	Salle F	1-2-3 Room	
Maternity/Gynecology	Maternité	Mat	
Pediatrics	Pédiatrie	Ped	
Tuberculosis	Pneumo	TB and STB	Includes TB and Suspect TB.
General Consult (OPD)	Consultation Externe	OPD	
Choeung Prey RH (CPA 1)			
Emergency/Small Surgery	Reanimation/Chirurgie	Rea	
General Medicine	Medicine AB	Med AB	Includes HIV/AIDS patients.
Maternity/Gynecology	Maternité	Mat	
Pediatrics	Pédiatrie	Ped	
HIV/AIDS (OPD)	OI/ART	OI/ART	Department is supervised by the adjoining OD.
General Consult (OPD)	Consultation Externe	CE	
Kirivong RH (CPA 2)			
Surgery	Chirurgie	C/R	
General Medicine	Médecine	M/D	Medicine and ICU (Severe Medicine) are combined.
Maternity/Gynecology	Maternité	G/O	
Pediatrics	Pédiatrie	P/D	

Department Costed	Nomenclature	Hospital Code	Notes
Kirivong RH (CPA 2) continued			
Tuberculosis	Pneumo	P/M	
HIV/AIDS (OPD)	HIV/PMTCT	HIV/PMTCT	
Ophthalmology (OPD)	Vision Center	Vision	
Dental (OPD)	Stoma	Stoma	
General Consult (OPD)	Consultation Externe	CS	Includes Gynecology consultations.
Memot RH (CPA 2)			
Surgery	Chirurgie	CHIR	
General Medicine	Médecine	MED	
Maternity/Gynecology	Gyneco-Obstetric	GO	
Pediatrics	Pédiatrie	PED	
Tuberculosis	Pneumologie	TB	
HIV/AIDS (OPD)	OI/ART	OI	
Dental (OPD)	Dentist	DENTIST	
General Consult (OPD)	Consultation Externe	OPD	
Samroang PH (CPA 2)			
Emergency	Reanimation	REA	
Surgery	Chirurgie	CHI	
General Medicine	Médecine	ME	Includes HIV IPD (OI) patients.
Maternity/Gynecology	Gyneco-Obstetric	GO	
Pediatrics	Pédiatrie	PED	
Tuberculosis	Pneumologie	TB	
HIV/AIDS (OPD)	OI/ART	OI	
Ophthalmology (OPD)	Ophtalmologie	OPH	Department supported by Fred Hollows Foundation.
Dental (OPD)	Stoma	STO	
General Consult (OPD)	Consultation Externe	OPD	

Department Costed	Nomenclature	Hospital Code	Notes
Battambang PH (CPA 3)			
Emergency	Reanimation	ER MED	Rea ward is Emergency Medicine. Includes HIV/AIDS patients.
Surgery	Chirurgie	Chgie	
General Medicine	Médecine	Salle 8 and POP	Patients go to Salle 8 if POP is full. Includes HIV/AIDS patients.
Maternity/Gynecology	Maternité	OBST/GYN	
Pediatrics	Pédiatrie	PED	
Tuberculosis	Salle 10 and Salle 11	TBA and TBB	Pulmonary A, B, C. Includes TB and Suspected TB (Medicine ward Salle 11).
Ophthalmology	Ophtalmologie	Ophthal	
ENT	ORL	ORL	
Dermatology	Dermatology	DERM	Superficial Skin department. Sees diabetes patients with sensitive skin, leprosy patients, and patients with other skin disorders.
Diabetes/Skin (OPD)	Diabète	IPD Derm	
Mental Health (OPD)	Psychiatrie	Psy	
HIV/AIDS (OPD)	OI/ART	OI	Includes Pediatric HIV/AIDS visits.
Tuberculosis (OPD)	Tuberculosis Consult	TBC	
Ophthalmology (OPD)	Ophtalmologie	Ophthal	
ENT (OPD)	ORL	ORL	
Dental (OPD)	Stoma	Stoma	
Physiotherapy (OPD)	Kinésthérapie	Kine	
General Consult (OPD)	Consul Gynéco, Pédiatrie, Méd Generale	N/A (combined with IPD Depts)	Includes Medicine, Pediatrics, and Gynecology consultations. While utilization data was available for each consultation type, data on cost was not available at this level.
Kampong Cham PH (CPA 3)			
Emergency	Reanimation	Rea	Includes ECG and Endoscopy service for the entire hospital
Surgery	Chirurgie Abdo, Traumato	CI, CII	Includes combined departments of Surgery 1 (Abdominal) and 2 (Orthopedics/ Trauma)
ICU	Bloc	ICU/Bloc	On the HIS forms, they code this ward as Bloc, however, this department is distinct from the Operating Theater. It is essentially Post Op (co-located with the OT), and discharges patients.
General Medicine	Médecine	Med	
Maternity/Gynecology	Maternité	Mat	Department sees specialty OPD Gyn, but the hospital could provide no cost or utilization detail.

Department Costed	Nomenclature	Hospital Code	Notes
Kampong Cham PH (CPA 3) continued			
Pediatrics	Pédiatrie	Ped	
HIV/AIDS	Maladie Infectieuse	MI	
Tuberculosis	Tuberculosis Ward	TBW	MSF supports this department clinically, operationally, and financially.
Ophthalmology	Ophtalmologie	OPH	Surgeries are performed in this department, not in the Bloc.
ENT	ORL	ORL	Surgeries are performed in this department, not in the Bloc.
Dental	Stoma	Stoma	
Leprosy	Hansen	HS	
Diabetes/Pain (OPD)	Consultation Externe	Consul Ext	Consul DI is for Pain department.
Mental Health (OPD)	Psychiatrie	Psy	
HIV/AIDS (OPD)	OI/ART	OI/ART	FHI supports this department clinically, operationally, and financially.
TB (OPD)	Tuberculosis Consult	TBC	MSF supports this department clinically, operationally, and financially.
Ophthalmology (OPD)	Ophtalmologie	OPH	Surgeries are performed in this department, not in the Bloc.
ENT (OPD)	ORL	ORL	Surgeries are performed in this department, not in the Bloc.
Dental (OPD)	Stomato	Stoma	Surgeries are performed in this department, not in the Bloc.
Siem Reap Provincial Hospital (CPA 3)			
Emergency	Service Porte	SP (Rea)	Department serves as Triage, Emergency, and OPD. Estimate for staff time split between Rea and Consult Externe was obtained from ward Chief.
Surgery	Chirurgie Abdo, Traumato, Uro	A, B, C	Includes combined departments of Surgery A (Abdominal), B (Orthopedics/Trauma), and C (Urology) wards. Surgeries all take place in the Bloc.
ICU	Rea Med	Medicine A	Severe Medicine.
General Medicine	Medicine B	Salle D	
Maternity/Gynecology	Gyneco-Obstetric	MAT	Surgeries all take place in the Bloc.
HIV/AIDS	Infectious Disease Department	IDD	
Tuberculosis	Pneumo	Medicine C	
Ophthalmology	Ophtalmologie	OPH	Surgeries are at ward, not Bloc.
ENT	ORL	ORL	Surgeries all take place in the Bloc.
Diabetes/Hypertension (OPD)	Diabète	Diabète	MSF stopped supporting this ward in 2009. Includes Hypertension patients.

Department Costed	Nomenclature	Hospital Code	Notes
Siem Reap Provincial Hospital (CPA 3) continued			
Mental Health (OPD)	Mental Health	Mental Health	
HIV/AIDS (OPD)	Consultation Externe Maladie Infectieuse	CEMI	CEMI is a new IPD/OPD ward combined in 2011 to co-locate in a new building.
Ophthalmology (OPD)	Ophtalmologie	OPH	Estimate for staff time split between OPD and IPD was obtained from ward Chief. Surgeries are at ward, not OT.
ENT (OPD)	ORL	ORL	Estimate for staff time split between OPD and IPD was obtained from ward Chief. Surgeries all take place in the Bloc.
Dental (OPD)	Stomato	Stoma	
Physiotherapy (OPD)	Kinésthérapie	Kine	
General Consult (OPD)	Service Porte	SP (CE)	Department serves as Triage, Emergency, and OPD. Estimate for staff time split between Rea and Consult Externe was obtained from ward Chief.
Takeo PH (CPA 3)			
ICU Surgery	Soins Intensif Chirurgie	Sic, Chirg	Severe patients (e.g., traffic accident and fighting victims) who will be operated are admitted here.
Surgery	Hospitali Chirurgie (Soin Apres)	Chirurgie	Post Operation
ICU Medicine	Salle Rea Médecine	Réa Méd	Also includes Nb de Suplément confort (VIP) with 1 room and 2 beds.
General Medicine	Hospitali Médecine	Méd	
Maternity/Gynecology	Hospitali Maternité	Mat	Surgeries all take place in the Bloc.
Pediatrics	Hospitali Pédiatrie	Péd	Includes a Pediatrics Operating Theater.
Tuberculosis	Hospitali Pneumologie	TB	Includes True TB and Suspect TB.
Chronic Disease Clinic (OPD)	Consul Chronic Disease Clinic	CDC	Includes Diabetes, Hypertension, and HIV/AIDS.
ENT (OPD)	Consul ORL	ORL	
Dental (OPD)	Consul Dentaire	Dent	
Physiotherapy (OPD)	Kinésitherapeute	Kiné	
General Consult (OPD)	Consul Chirurgie, Gynéco, Pédiatrie, Méd Generale	N/A (combined with IPD Depts)	Includes Surgery, Medicine, Pediatrics, Gynecology, and TB consultations. Also includes Ai Bi (pregnant and vulnerable women) consults supported by Bambino Italy. While utilization data was available for each consultation type, data on cost was not available at this level.

Appendix C: Staff Compensation Analysis

The results that follow present a comparison of monthly staff compensation across facilities and across staff positions and skills. Compensation records for individual employees were consistently available for four payment types: salaries and allowances, overtime, user fee incentives, and SDG incentives. The facilities differed in how the other payment types were reported. For example, some facilities reported midwife incentives provided to individual staff and others reported the lump sum shared with department chiefs. Some hospitals reported mission payments to individual staff, while others reported the expense on missions for the overall facility. As other reporting was not standard, staff compensation is only presented for the four indicated payment types.

The data set includes 1,509 staff that worked at the facilities during the year of the study, including some "disponible" staff on leave from duty and retirees that still drew a salary or received user fee incentives. The analysis also includes non health workers – either skilled staff in Administration or nonskilled staff that provided service functions to the hospital.

Although staff have both position and skill classifications (e.g., "deputy director" and "medical assistant"), these categories were grouped to best differentiate between compensation levels. The categories listed below were selected to present compensation.

Category	Staff Inclusions
Director	Doctors and Medical Assistants
Deputy Director	Doctors, Medical Assistants, Secondary Pharmacists, and Secondary Nurses
Chief/Doctor	Doctors and Medical Assistants that are chiefs or deputy chiefs of services or wards
Chief/Other	Secondary Pharmacists, Secondary Laboratory Technicians, Secondary Midwives, Secondary Nurses, and Primary Nurses that are chiefs or deputy chiefs of services or wards
Doctor	Generalist Doctors, Specialist Doctors, and Dentist Doctors
Medical Assistant	Medical Assistants
Secondary Ancillary	Secondary Pharmacists and Secondary Laboratory Technicians
Secondary Medical	Secondary Midwives, Secondary Nurses, and Physiotherapists
Primary Medical	Primary Midwives, Primary Nurses, and Primary Laboratory Technicians
Skilled Service	Administrative staff, electricians, and utilities workers
Service	Orderlies, cleaners, cooks, drivers, gardeners, and other "workers"

The tables below display the number of monthly staff payments included for each hospital and within each staff category. For example, 1,553 monthly payments were dispersed to the workforce at Ang Roka RH, including 407 salary/allowance, 324 overtime, 416 user fee incentive, and 406 SDG incentive payments. Aggregating these four types, 524 total monthly payments were distributed to Ang Roka RH staff. Any nil payment was excluded so that the analysis presents the range and spread of data only for those staff that received payments. For example, many personnel received user fee and SDG incentives but not government salary or overtime. The monthly payments to these staff were included as an input to the user fee and SDG incentive analyses, but their nil values were excluded from the salary and overtime analyses. For staff that received payments for only a portion of the year, only the months they received compensation were incorporated.

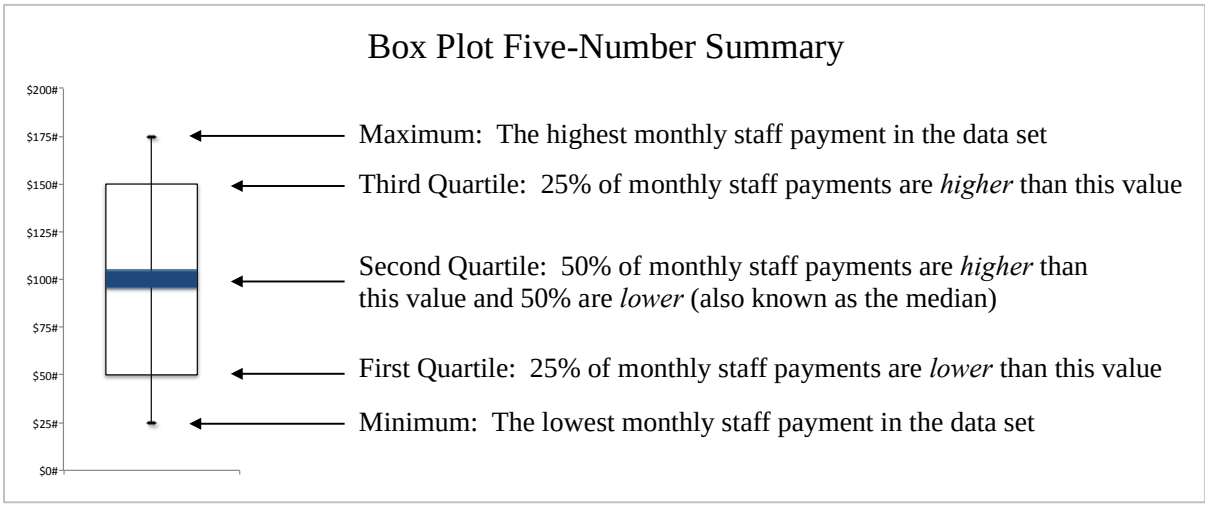
Staff Compensation Data Set – Hospital Comparison

Data Set Summary	Ang Roka	Bakan	Choeung Prey	Kirivong	Memot	Samroang	Battambang	Kampong Cham	Siem Reap	Takeo	Total
Total Number of Payments	1,553	1,232	1,098	2,209	2,208	1,540	9,170	8,539	9,106	9,077	45,732
Salary/Allowance Payments	407	432	254	499	462	390	3,190	2,605	2,178	2,193	12,610
Overtime Payments	324	356	88	489	428	386	2,255	0	2,017	2,082	8,425
User Fee Incentive Payments	416	444	406	635	686	390	3,725	3,052	2,904	2,202	14,860
SDG Incentive Payments	406	0	350	586	632	374	0	2,882	2,007	2,600	9,837
Total Compensation Payments	524	544	441	673	722	396	3,829	3,186	3,134	2,635	16,084

Staff Compensation Data Set – Staff Category Comparison

Data Set Summary	Director	Deputy Director	Chief Advanced	Advanced Medical	Medical Assistant	Secondary Ancillary	Chief Other	Skilled Service	Secondary Medical	Primary Medical	Service	Total
Total Number of Payments	357	1,165	2,336	4,117	688	1,415	8,422	1,256	17,111	5,646	3,219	45,732
Salary/Allowance Payments	120	336	747	1,245	212	402	2,433	292	5,182	1,421	220	12,610
Overtime Payments	63	228	405	798	144	322	1,824	201	3,280	1,047	113	8,425
User Fee Incentive Payments	99	325	718	1,200	220	381	2,447	412	5,189	2,053	1,816	14,860
SDG Incentive Payments	75	276	466	874	112	310	1,718	351	3,460	1,125	1,070	9,837
Total Compensation Payments	120	336	772	1349	240	407	2,488	471	5,617	2,113	2,171	16,084

The tables and box plot charts that follow present the five-number summaries for monthly staff compensation over the entire study period. The below key describes the five-numbers included in the tables and illustrated by the box plots.



The red charts present a comparison of compensation across facilities and the blue charts display a comparison across staff positions and skills. In the hospital comparison charts, the three bars to the left depict staff compensation for CPA 1 hospitals, the three bars in the middle for CPA 2 hospitals, and the four bars to the right for CPA 3 hospitals. The vertical axes of the charts were selected to best present variation within individual charts. Note the differences in scale when comparing charts across payment types.

Monthly Salary and Allowance Compensation

The median staff salary and allowance payment ranged from $65 at Bakan RH to $80 at Battambang PH. The median was notably higher at the CPA 3 hospitals with the range at those hospitals also wider. The maximum salary and allowance at the CPA 3 hospitals was markedly higher as well, with a high of $230 at Takeo PH. By staff category, Directors, Deputy Directors, Chief Doctors, Doctors, and Medical Assistants received the largest salary and allowance payments. The median ranged from $122 to $129 across these staff categories. In contrast, median salary and allowance payments for the less technical staff ranged from $43 to $81 per month.

Monthly Salary and Allowance – Hospital Comparison

5-Number Summary	Ang Roka	Bakan	Choeung Prey	Kirivong	Memot	Samroang	Battambang	Kampong Cham	Siem Reap	Takeo
Maximum	$139	$127	$140	$143	$132	$140	$218	$166	$222	$230
Third Quartile	$106	$80	$80	$81	$78	$83	$102	$100	$114	$87
Median	$70	$65	$74	$71	$70	$71	$80	$76	$79	$75
First Quartile	$57	$47	$63	$65	$57	$64	$74	$57	$67	$65
Minimum	$33	$30	$54	$33	$52	$50	$41	$37	$32	$37

Monthly Salary and Allowance – Staff Category Comparison

5-Number Summary	Director	Deputy Director	Chief/ Doctor	Doctor	Medical Assistant	Secondary Ancillary	Chief/ Other	Skilled Service	Secondary Medical	Primary Medical	Service
Maximum	$167	$166	$213	$230	$141	$153	$162	$146	$199	$134	$72
Third Quartile	$141	$146	$142	$134	$129	$90	$88	$79	$80	$58	$46
Median	$122	$128	$129	$122	$123	$81	$78	$67	$75	$56	$43
First Quartile	$108	$106	$117	$111	$116	$70	$72	$56	$67	$54	$41
Minimum	$75	$65	$57	$67	$71	$47	$42	$33	$37	$33	$30

Monthly Overtime Compensation

The median overtime payment ranged from $29 for staff at Memot RH to $64 for staff at Takeo PH. In contrast to salary and allowance payments, overtime was not exclusively higher at CPA 3 hospitals. Highest payments went to staff at Bakan RH, Samroang PH, Battambang PH, and Takeo PH. Directors and Deputy Directors received the highest median payments ($88 and $72 respectively). The spread of payments for each position was wider than that of salary and allowance payments, presumably due to calculations of hours worked. Each hospital, however, followed different compensation policies. For example, Choeung Prey RH distributed two tiers of overtime – 200,000 vs. 150,000 riel, the higher amount reserved for senior staff. Other hospitals distributed the budget based on staff position and hours worked.

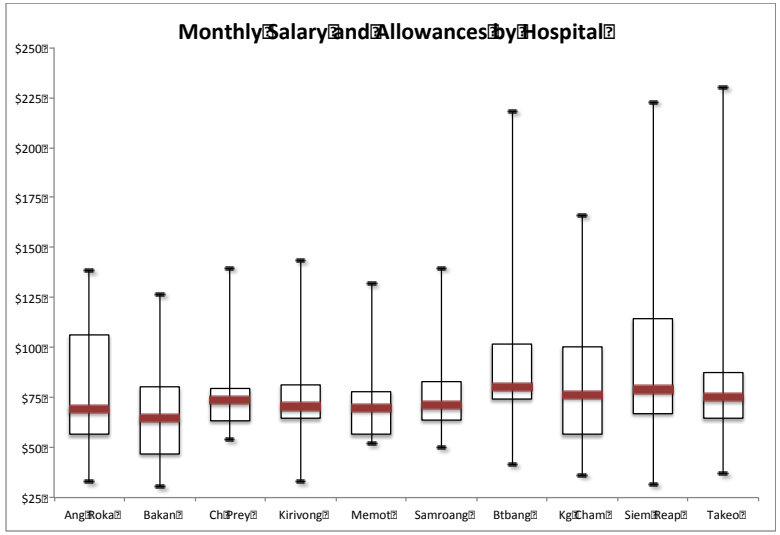
Monthly Overtime – Hospital Comparison

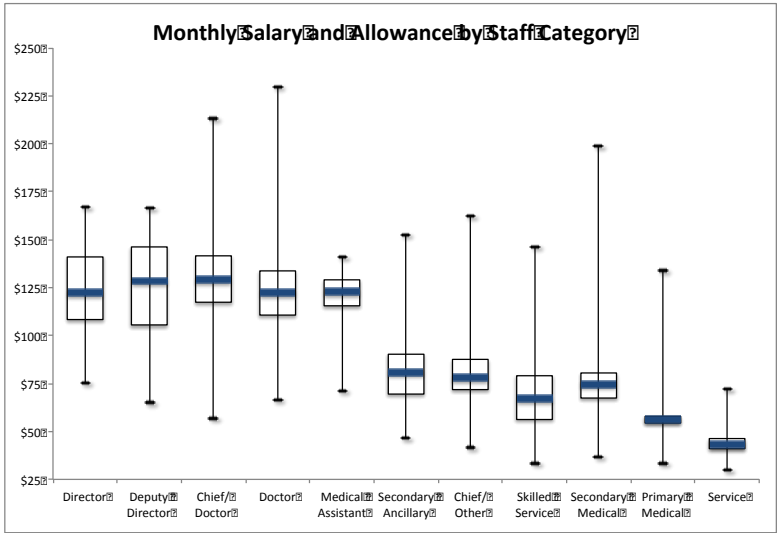
5-Number Summary	Ang Roka	Bakan	Choeung Prey	Kirivong	Memot	Samroang	Battambang	Kampong Cham	Siem Reap	Takeo
Maximum	$113	$170	$49	$116	$39	$132	$126	$0	$80	$147
Third Quartile	$70	$58	$37	$70	$29	$77	$47	$0	$52	$76
Median	$58	$47	$37	$62	$29	$58	$40	$0	$43	$64
First Quartile	$48	$37	$37	$55	$26	$48	$34	$0	$36	$51
Minimum	$27	$6	$37	$27	$26	$10	$5	$0	$18	$7

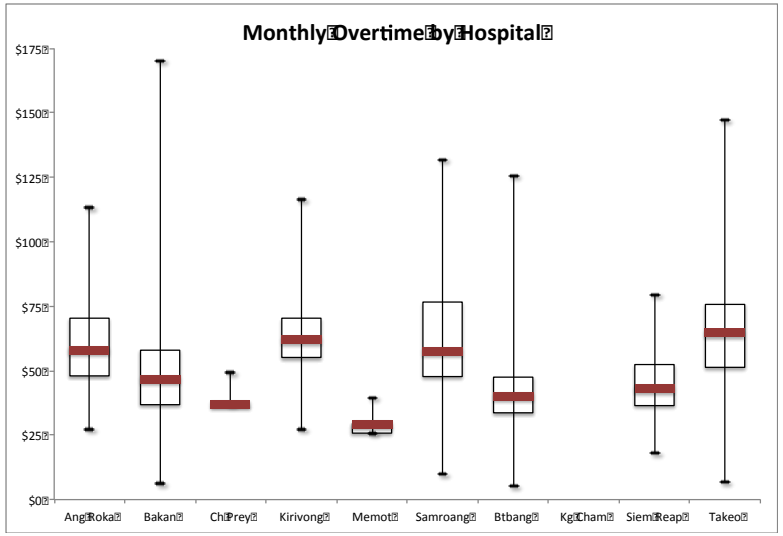
Monthly Overtime – Staff Category Comparison

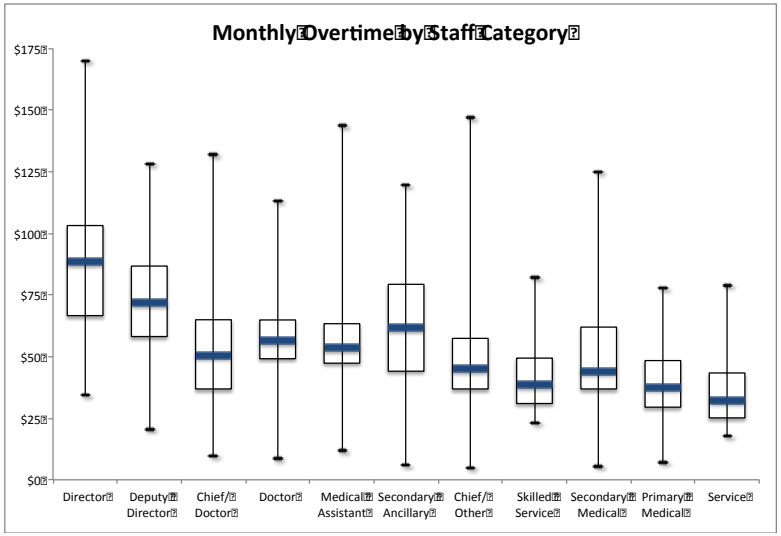
5-Number Summary	Director	Deputy Director	Chief/ Doctor	Doctor	Medical Assistant	Secondary Ancillary	Chief/ Other	Skilled Service	Secondary Medical	Primary Medical	Service
Maximum	$170	$128	$132	$113	$144	$120	$147	$82	$125	$78	$79
Third Quartile	$103	$87	$65	$65	$63	$79	$57	$49	$62	$48	$43
Median	$88	$72	$51	$57	$54	$62	$45	$39	$44	$37	$32
First Quartile	$67	$58	$37	$49	$47	$44	$37	$31	$37	$29	$25
Minimum	$34	$21	$9	$9	$12	$6	$5	$23	$5	$7	$18

Monthly Staff Compensation – Salary and Allowance and Overtime









Monthly User Fee Incentive Compensation

Median staff user fee incentive payments varied across CPA levels, ranging from a low of $43 at Bakan RH to a high of $133 at Memot RH. Most hospitals had a tight spread, indicating half of all payments in the data sets were clustered near each other. Memot RH had a larger spread in addition to an extreme outlier monthly incentive payment of $492. The results for median payments by staff category differed from those of salary and allowance and overtime payments. As expected, median payments were highest for Directors ($123), Deputy Directors ($122), and Doctors ($112). However, the next payment level included highly varied staff, including Chief/Doctors ($88) and Medical Assistants ($77), but Secondary Ancillary ($83), Chief/Other ($81), and Skilled Service ($80) staff as well.

Table 18. Monthly User Fee Incentive – Hospital Comparison

5-Number Summary	Ang Roka	Bakan	Choeung Prey	Kirivong	Memot	Samroang	Battambang	Kampong Cham	Siem Reap	Takeo
Maximum	$196	$159	$190	$264	$492	$163	$236	$184	$250	$263
Third Quartile	$102	$56	$108	$137	$188	$89	$60	$65	$132	$131
Median	$83	$43	$77	$118	$133	$75	$52	$54	$121	$91
First Quartile	$71	$34	$53	$101	$73	$61	$42	$46	$77	$80
Minimum	$9	$14	$5	$42	$4	$27	$3	$2	$23	$10

Table 19. Monthly User Fee Incentive – Staff Category Comparison

5-Number Summary	Director	Deputy Director	Chief/ Doctor	Doctor	Medical Assistant	Secondary Ancillary	Chief/ Other	Skilled Service	Secondary Medical	Primary Medical	Service
Maximum	$264	$464	$492	$219	$194	$208	$371	$179	$297	$306	$232
Third Quartile	$163	$172	$141	$140	$133	$124	$122	$125	$103	$89	$62
Median	$123	$122	$88	$112	$77	$83	$81	$80	$61	$67	$37
First Quartile	$101	$101	$67	$67	$59	$69	$56	$47	$52	$52	$29
Minimum	$7	$16	$34	$14	$38	$28	$5	$8	$4	$2	$3

Monthly SDG Incentive Compensation

The median staff SDG payment ranged from $39 at Kampong Cham PH to $169 at Samroang PH. Excluding Samroang PH, 75% of the monthly SDG payments for all hospitals over the full 12 months were under $100. In contrast, the minimum SDG incentive payment to Samroang PH over this period was $116. Directors had much higher median SDG payments than their peers at the Deputy Director, Chief/Doctor, Doctor, and Medical Assistant levels. Across these staff categories, median monthly payments ranged from $72 to $153. The next staff category grouping included Secondary Ancillary, Chief/Other, and Skilled Service staff with payments ranging from $55 to $65. Secondary Medical, Primary Medical, and Service staff were compensated least, ranging from a $38 to $44 median monthly SDG incentive.

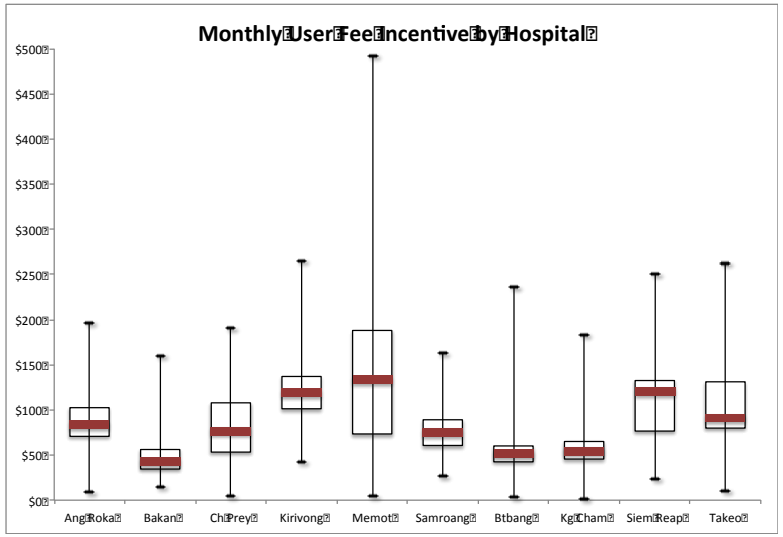
Table 20. Hospital SDG Incentive Comparison

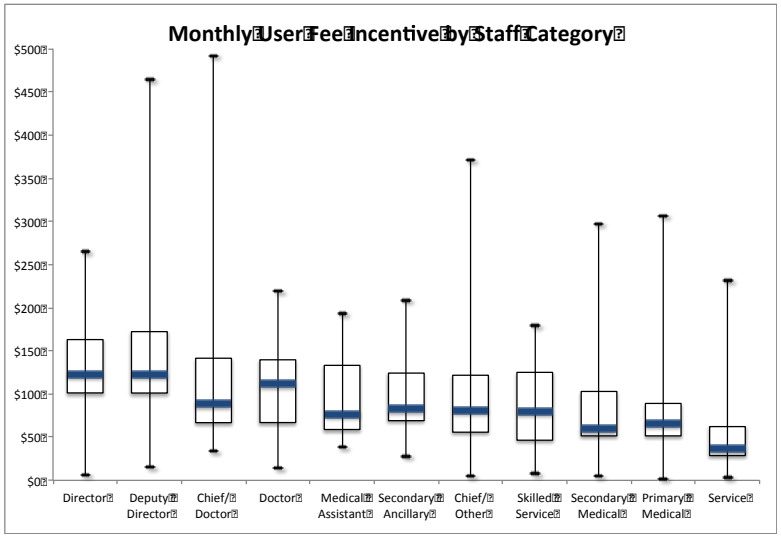
5-Number Summary	Ang Roka	Bakan	Choeung Prey	Kirivong	Memot	Samroang	Battambang	Kampong Cham	Siem Reap	Takeo
Maximum	$173	$0	$196	$138	$190	$535	$0	$187	$146	$180
Third Quartile	$87	$0	$95	$73	$69	$229	$0	$46	$75	$60
Median	$78	$0	$82	$61	$58	$169	$0	$39	$70	$49
First Quartile	$69	$0	$72	$48	$45	$149	$0	$36	$59	$31
Minimum	$8	$0	$51	$24	$30	$116	$0	$9	$14	$7

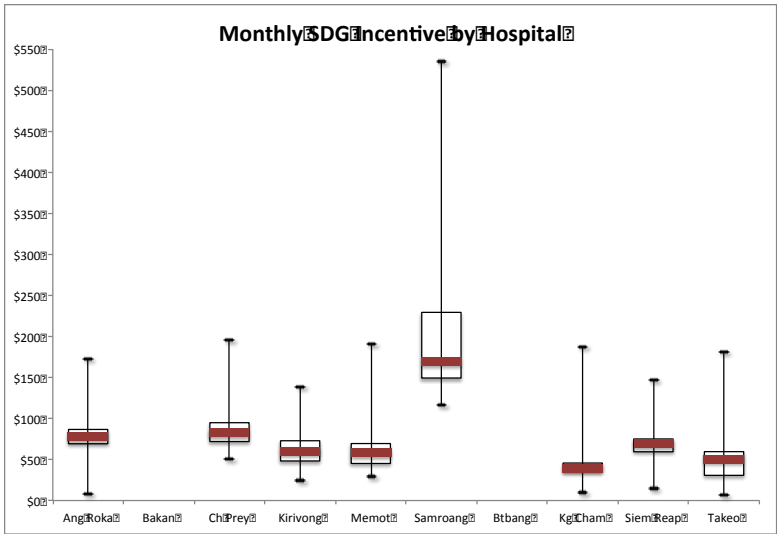
Table 21. Staff Category SDG Incentive Comparison

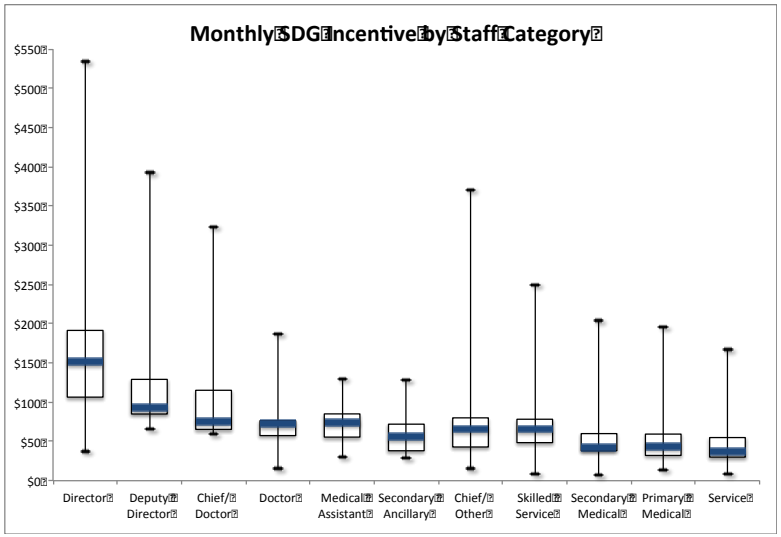
5-Number Summary	Director	Deputy Director	Chief/ Doctor	Doctor	Medical Assistant	Secondary Ancillary	Chief/ Other	Skilled Service	Secondary Medical	Primary Medical	Service
Maximum	$535	$392	$324	$187	$130	$128	$370	$249	$204	$195	$167
Third Quartile	$192	$129	$115	$76	$85	$72	$80	$78	$60	$59	$55
Median	$153	$93	$75	$72	$74	$55	$65	$65	$42	$44	$38
First Quartile	$106	$85	$65	$58	$56	$38	$43	$49	$38	$32	$30
Minimum	$37	$66	$59	$15	$31	$28	$15	$8	$7	$14	$9

Monthly Staff Compensation – User Fee and SDG Incentives









Monthly Total Compensation (Select Types)

The median staff payment including salaries and allowances, overtime, user fee incentives, and SDG incentives ranged from $126 at Bakan RH to $365 at Samroang PH. Median payments varied significantly by hospital and CPA level. Median payments to Directors ($411) and Deputy Directors ($400) were far higher than those for the other technical staff. These payments fell within a close range, from a low of $243 for Medical Assistants to a high of $285 for Chiefs/Doctors. The next skill category included Secondary Service, Secondary Medical, and Primary Medical staff, with median compensation at $180, $177, and $139 respectively. Service staff (i.e., drivers, cleaners, cooks, etc.) were compensated least at a median of $52.

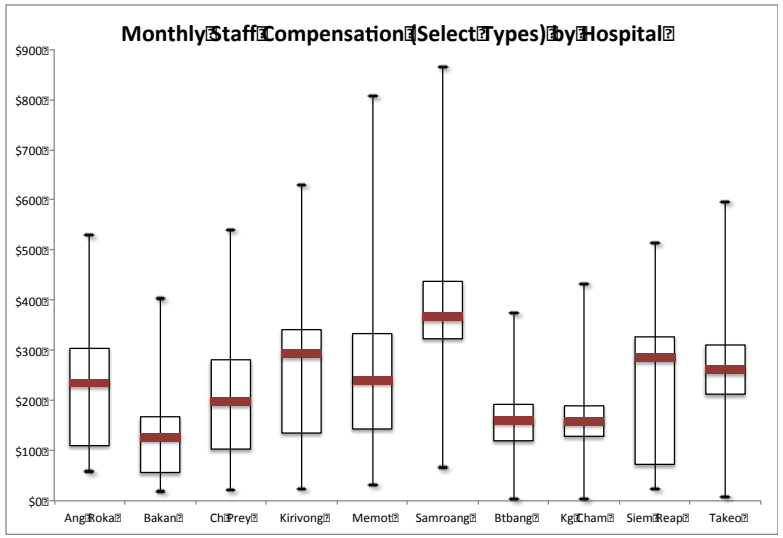
Table 22. Monthly Total Compensation (Select Types) – Hospital Comparison

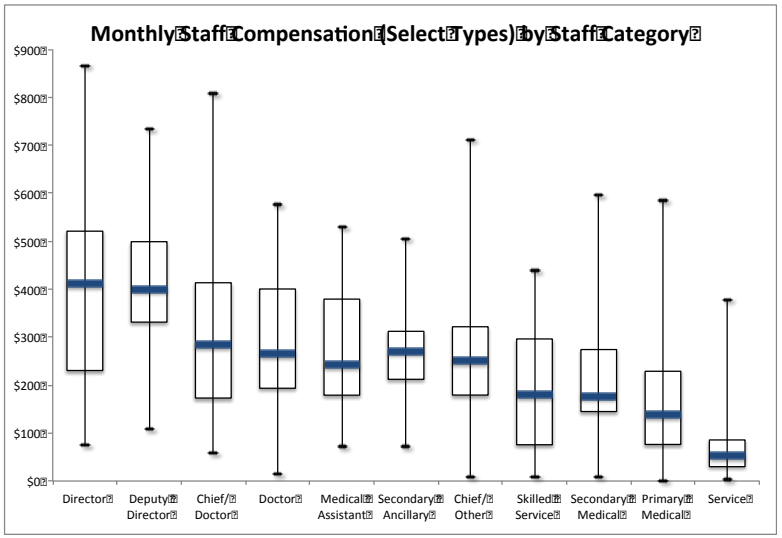
5-Number Summary	Ang Roka	Bakan	Choeung Prey	Kirivong	Memot	Samroang	Battambang	Kampong Cham	Siem Reap	Takeo
Maximum	$530	$403	$540	$629	$807	$865	$374	$433	$513	$595
Third Quartile	$304	$168	$281	$341	$333	$437	$192	$189	$327	$311
Median	$235	$126	$199	$294	$240	$365	$161	$159	$285	$261
First Quartile	$110	$57	$103	$135	$143	$323	$120	$129	$73	$213
Minimum	$57	$18	$21	$24	$31	$67	$3	$2	$23	$8

Table 23. Monthly Total Compensation (Select Types) – Staff Category Comparison

5-Number Summary	Director	Deputy Director	Chief/ Doctor	Doctor	Medical Assistant	Secondary Ancillary	Chief/ Other	Skilled Service	Secondary Medical	Primary Medical	Service
Maximum	$865	$734	$807	$575	$529	$505	$710	$437	$595	$585	$379
Third Quartile	$521	$499	$413	$400	$379	$312	$322	$296	$274	$229	$85
Median	$411	$400	$285	$264	$243	$272	$252	$180	$177	$139	$52
First Quartile	$230	$331	$173	$193	$179	$212	$179	$76	$145	$76	$30
Minimum	$75	$107	$57	$16	$71	$72	$8	$8	$8	$2	$3

Monthly Staff Compensation – Total Compensation (Select Types)





Appendix D: Hospital Department Relative Cost Weights

CPA 1 Hospital Department Cost Weights

Ang Roka RH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Emergency/Small Surgery	0.56	0.62	
General Medicine	1.21	0.89	
Maternity/Gynecology	1.93	3.09	
Pediatrics	0.92	0.98	
HIV/AIDS			2.22
General Consult			0.71
Hospital Average	**1.00**	**1.00**	**1.00**

Bakan RH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Emergency/Small Surgery	2.22	2.96	
General Medicine	0.93	0.99	
Maternity/Gynecology	0.85	1.11	
Pediatrics	0.68	0.80	
Tuberculosis	2.88	0.62	
General Consult			1.00
Hospital Average	**1.00**	**1.00**	**1.00**

Choeung Prey RH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Emergency/Small Surgery	1.60	1.64	
General Medicine	0.83	0.75	
Maternity/Gynecology	1.16	1.20	
Pediatrics	0.64	0.77	
HIV/AIDS			1.31
General Consult			0.76
Hospital Average	**1.00**	**1.00**	**1.00**

CPA 2 Hospital Department Cost Weights

Kirivong RH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Surgery	1.42	1.49	
General Medicine	0.64	0.64	
Maternity/Gynecology	0.79	1.11	
Pediatrics	1.21	1.34	
Tuberculosis	8.89	0.73	
HIV/AIDS			2.54
Ophthalmology			0.76
Dental			1.53
General Consult			0.41
Hospital Average	**1.00**	**1.00**	**1.00**

Memot RH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Surgery	1.63	2.07	
General Medicine	0.72	0.70	
Maternity/Gynecology	1.03	1.23	
Pediatrics	0.89	0.96	
Tuberculosis	5.91	0.60	
HIV/AIDS			0.97
Dental			5.43
General Consult			0.93
Hospital Average	**1.00**	**1.00**	**1.00**

Samroang PH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Emergency	2.62	4.77	
Surgery	1.10	1.59	
General Medicine	0.90	0.91	
Maternity/Gynecology	0.85	1.36	
Pediatrics	0.53	0.66	
Tuberculosis	1.29	0.15	
HIV/AIDS			2.62
Ophthalmology			0.48
Dental			0.31
General Consult			0.90
Hospital Average	**1.00**	**1.00**	**1.00**

CPA 3 Hospital Department Cost Weights

Battambang PH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Emergency	1.44	0.95	
Surgery	1.58	1.30	
General Medicine	0.80	1.35	
Maternity/Gynecology	1.06	1.70	
Pediatrics	0.56	0.68	
Tuberculosis	1.03	0.40	
Ophthalmology	0.34	0.47	
ENT	0.87	0.72	
Dermatology	3.49	3.30	
Diabetes/Skin			0.99
Mental Health			1.31
HIV/AIDS			2.07
Tuberculosis			1.14
Ophthalmology			0.40
ENT			0.53
Dental			1.42
Physiotherapy			0.21
General Consult			2.06
Hospital Average	**1.00**	**1.00**	**1.00**

Kampong Cham PH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Emergency	1.22	2.12	
Surgery	1.07	0.75	
ICU	2.68	2.92	
General Medicine	0.68	0.86	
Maternity/Gynecology	0.73	0.95	
Pediatrics	0.61	0.89	
HIV/AIDS	3.73	1.37	
Tuberculosis	1.43	0.45	
Ophthalmology	0.43	0.85	
ENT	0.54	0.54	
Dental	0.68	0.67	
Leprosy	5.96	0.16	
Diabetes/Pain			0.80
Mental Health			0.38
HIV/AIDS			1.63
Tuberculosis			2.05
Ophthalmology			0.32
ENT			0.43
Dental			0.52
Hospital Average	**1.00**	**1.00**	**1.00**

Siem Reap PH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
Emergency	2.08	4.22	
Surgery	1.06	0.87	
ICU	1.14	1.55	
General Medicine	0.50	0.58	
Maternity/Gynecology	1.43	2.86	
HIV/AIDS	0.24	0.17	
Tuberculosis	0.52	0.15	
Ophthalmology	0.30	0.72	
ENT	0.79	0.76	
Diabetes/Hypertension			0.63
Mental Health			0.67
HIV/AIDS			1.38
Ophthalmology			0.78
ENT			1.87
Dental			13.24
Physiotherapy			0.90
General Consult			2.12
Hospital Average	**1.00**	**1.00**	**1.00**

Takeo PH Departments	Discharge Cost Weight	Inpatient Day Cost Weight	Outpatient Visit Cost Weight
ICU Surgery	2.80	1.55	
Surgery	1.23	0.95	
ICU Medicine	1.24	1.69	
General Medicine	0.63	0.64	
Maternity/Gynecology	0.88	0.96	
Pediatrics	0.68	1.25	
Tuberculosis	0.78	0.61	
Chronic Disease Clinic			2.02
ENT			0.50
Dental			1.59
Physiotherapy			0.09
General Consult			0.77
Hospital Average	**1.00**	**1.00**	**1.00**

Appendix E: Unit Costs of Nonstandard Hospital Departments

Hospital Department	Cost per Discharge Including In Kind Drugs				
	Samroang	Btbang	Kg Cham	Siem Reap	Takeo
Emergency†	$392		$197	$479	
Severe Medicine		$214			$214
ICU			$433	$262	$481
HIV/AIDS			$603	$54	
Dermatology		$517			
Ophthalmology		$51	$69	$69	
ENT		$129	$87	$182	
Dental‡			$109		
Leprosy			$962		

Cost per Discharge Excluding In Kind Drugs				
Samroang	Btbang	Kg Cham	Siem Reap	Takeo
$100		$55	$149	
	$77			$145
		$96	$69	$61
		$165	$40	
	$227			
	$38	$33	$39	
	$98	$67	$67	
		$57		
		$858		

Hospital Department	Cost per Inpatient Day Including In Kind Drugs				
	Samroang	Btbang	Kg Cham	Siem Reap	Takeo
Emergency†	$117		$56	$123	
Severe Medicine		$23			$49
ICU			$78	$45	$45
HIV/AIDS			$36	$5	
Dermatology		$78			
Ophthalmology		$11	$23	$21	
ENT		$17	$14	$22	
Dental‡			$18		
Leprosy			$4		

Cost per Inpatient Day Excluding In Kind Drugs				
Samroang	Btbang	Kg Cham	Siem Reap	Takeo
$30		$16	$38	
	$8			$13
		$17	$12	$14
		$10	$4	
	$34			
		$8	$11	$12
		$13	$11	$8
		$9		
		$4		

† Not shown in the above tables is the unit cost for Emergency/Small Surgery. This ward was found only at CPA 1 hospitals and included treatment for injuries. The cost per discharge was $34 (Ang Roka RH), $218 (Bakan RH), and $90 (Choeung Prey RH). Excluding in kind drugs, the cost was $14, $101, and $43 respectively. The cost per inpatient day was $10 (Ang Roka RH), $63 (Bakan RH), and $19 (Choeung Prey RH). Excluding in kind drugs, the cost was $4, $29, and $9 respectively.

‡ It is unclear why Kampong Cham RH treated some dental patients as IPD.

Cost per Outpatient Visit Including In Kind Drugs

Department	Ang Roka	Bakan	Ch Prey	Kirivong	Memot	Samroang	Btbang	Kg Cham	Siem Reap	Takeo
General Consult	$10	$8	$12	$3	$5	$12	$3		$27	$8
Diabetes/Hypertension							$13	$12	$8	$14
Mental Health							$27	$6	$8	
HIV/AIDS	$31		$20	$20	$5	$36	$15	$25	$17	$42
Tuberculosis							$5	$32		
Ophthalmology				$6		$7	$7	$5	$10	
ENT							$19	$7	$23	$14
Dental				$12	$30	$4	$17	$8	$166	$44
Physiotherapy							$3		$11	$3

Cost per Outpatient Visit Excluding In Kind Drugs

Department	Ang Roka	Bakan	Ch Prey	Kirivong	Memot	Samroang	Btbang	Kg Cham	Siem Reap	Takeo
General Consult	$3	$7	$5	$1	$2	$2	$1		$9	$5
Diabetes/Hypertension							$5	$3	$3	$1
Mental Health							$5	$2	$6	
HIV/AIDS	$1		$3	$2	$3	$5	$7	$4	$3	$4
Tuberculosis							$2	$7		
Ophthalmology				$3		$2	$3	$5	$6	
ENT							$12	$7	$10	$3
Dental				$9	$30	$4	$6	$8	$37	$27
Physiotherapy							$3		$11	$3

Appendix F: Hospital Cost Tables (CPA 1 Discharge Base Rate)

Annual Expenditure By Cost Category				Annual Expenditure By Funding Source						Total Expen-ditures
Level 1 Disaggregation		Level 2 Disaggregation		GOC	OOP	HEF	CBHI	SDG	NGO/ Donor	
LABOR COST	**$260,535**	**Total Labor**	**$260,535**							**$260,535**
		Government salary	$68,043	$68,043	$0	$0	$0	$0	$0	$68,043
		Overtime	$42,023	$42,023	$0	$0	$0	$0	$0	$42,023
		Mission	$4,093	$4,093	$0	$0	$0	$0	$0	$4,093
		Nongovernment salary	$826	$826	$0	$0	$0	$0	$0	$826
		Incentive payments	$145,551	$9,493	$35,669	$43,542	$3,788	$51,532	$1,527	$145,551
DRUG AND MEDICAL SUPPLY COST	**$382,859**	**Total Drugs/Supplies**	**$382,859**	**$358,221**	**$5,165**	**$7,959**	**$100**	**$0**	**$11,414**	**$382,859**
		Purchased drugs/supplies	$22,108	$8,884	$5,165	$7,959	$100	$0	$0	$22,108
		In-kind drugs/supplies	$360,751	$349,337	$0	$0	$0	$0	$11,414	$360,751
OTHER OPERATING COST	**$118,759**	**Total Other Operating**	**$118,759**	**$87,392**	**$12,576**	**$17,975**	**$742**	**$0**	**$75**	**$118,759**
		Utilities	$26,662	$22,703	$1,739	$2,072	$148	$0	$0	$26,662
		Other recurrent	$92,097	$64,689	$10,837	$15,903	$594	$0	$75	$92,097
CAPITAL COST	**N/A**	**Total Capital**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
		Purchased equipment								N/A
		Donated equipment								N/A
		Purchased renovation								N/A
		Donated renovation								N/A
		Other capital investment								N/A
		Depreciation								N/A
Expenditures	**$762,154**		**$762,154**	**$570,089**	**$53,411**	**$69,476**	**$4,629**	**$51,532**	**$13,017**	**$762,154**
Total Cases/Year										11,128
Gross Base Rate										$68
Excluded Cases										N/A
Net Base Rate										**$68**

CPA 2 Discharge Base Rate

Annual Expenditure By Cost Category				Annual Expenditure By Funding Source						Total Expen-ditures
Level 1 Disaggregation		Level 2 Disaggregation		GOC	OOP	HEF	CBHI	SDG	NGO/ Donor	
LABOR COST	**$510,669**	**Total Labor**	**$510,669**	**$179,749**	**$98,882**	**$83,239**	**$18,502**	**$130,131**	**$167**	**$510,669**
		Government salary	$86,769	$86,769	$0	$0	$0	$0	$0	$86,769
		Overtime	$57,041	$57,041	$0	$0	$0	$0	$0	$57,041
		Mission	$644	$644	$0	$0	$0	$0	$0	$644
		Nongovernment salary	$13,444	$13,444	$0	$0	$0	$0	$0	$13,444
		Incentive payments	$352,771	$21,851	$98,882	$83,239	$18,502	$130,131	$167	$352,771
DRUG AND MEDICAL SUPPLY COST	**$1,095,614**	**Total Drugs/Supplies**	**$1,095,614**	**$1,060,656**	**$8,613**	**$9,979**	**$1,932**	**$0**	**$14,434**	**$1,095,614**
		Purchased drugs/supplies	$39,043	$18,519	$8,613	$9,979	$1,932	$0	$0	$39,043
		In-kind drugs/supplies	$1,056,571	$1,042,137	$0	$0	$0	$0	$14,434	$1,056,571
OTHER OPERATING COST	**$201,643**	**Total Other Operating**	**$201,643**	**$131,045**	**$31,926**	**$33,042**	**$5,211**	**$0**	**$418**	**$201,643**
		Utilities	$26,632	$25,892	$305	$435	$0	$0	$0	$26,632
		Other recurrent	$175,011	$105,153	$31,621	$32,607	$5,211	$0	$418	$175,011
CAPITAL COST	**N/A**	**Total Capital**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
		Purchased equipment								N/A
		Donated equipment								N/A
		Purchased renovation								N/A
		Donated renovation								N/A
		Other capital investment								N/A
		Depreciation								N/A
Expenditures	**$1,807,926**		**$1,807,926**	**$1,371,449**	**$139,421**	**$126,260**	**$25,645**	**$130,131**	**$15,019**	**$1,807,926**
Total Cases/Year										17,570
Gross Base Rate										$103
Excluded Cases										N/A
Net Base Rate										**$103**

CPA 3 Discharge Base Rate

Annual Expenditure By Cost Category				Annual Expenditure By Funding Source						Total Expen-ditures
Level 1 Disaggregation		Level 2 Disaggregation		GOC	OOP	HEF	CBHI	SDG	NGO/ Donor	
LABOR COST		**Total Labor**								
		Government salary								
		Overtime								
		Mission								
		Nongovernment salary								
		Incentive payments								
DRUG AND MEDICAL SUPPLY COST		**Total Drugs/Supplies**								
		Purchased drugs/supplies								
		In-kind drugs/supplies								
OTHER OPERATING COST		**Total Other Operating**								
		Utilities								
		Other recurrent								
CAPITAL COST	**N/A**	**Total Capital**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
		Purchased equipment								N/A
		Donated equipment								N/A
		Purchased renovation								N/A
		Donated renovation								N/A
		Other capital investment								N/A
		Depreciation								N/A
Expenditures										
Total Cases/Year										
Gross Base Rate										
Excluded Cases										N/A
Net Base Rate										

CPA 1 Outpatient Visit Base Rate

Annual Expenditure By Cost Category				Annual Expenditure By Funding Source						Total Expen-ditures
Level 1 Disaggregation		Level 2 Disaggregation		GOC	OOP	HEF	CBHI	SDG	NGO/ Donor	
LABOR COST	**$61,592**	**Total Labor**	**$61,592**	**$25,718**	**$7,817**	**$7,394**	**$1,217**	**$13,721**	**$5,726**	**$61,592**
		Government salary	$15,665	$15,665	$0	$0	$0	$0	$0	$15,665
		Overtime	$9,339	$9,339	$0	$0	$0	$0	$0	$9,339
		Mission	$626	$626	$0	$0	$0	$0	$0	$626
		Nongovernment salary	$88	$88	$0	$0	$0	$0	$0	$88
		Incentive payments	$35,875	$0	$7,817	$7,394	$1,217	$13,721	$5,726	$35,875
DRUG AND MEDICAL SUPPLY COST	**$279,417**	**Total Drugs/Supplies**	**$279,417**	**$162,287**	**$1,857**	**$2,102**	**$182**	**$0**	**$112,990**	**$279,417**
		Purchased drugs/supplies	$4,619	$479	$1,857	$2,102	$182	$0	$0	$4,619
		In-kind drugs/supplies	$274,798	$161,808	$0	$0	$0	$0	$112,990	$274,798
OTHER OPERATING COST	**$18,241**	**Total Other Operating**	**$18,241**	**$8,214**	**$1,724**	**$1,834**	**$217**	**$0**	**$6,252**	**$18,241**
		Utilities	$7,057	$5,577	$620	$808	$52	$0	$0	$7,057
		Other recurrent	$11,184	$2,637	$1,104	$1,026	$165	$0	$6,252	$11,184
CAPITAL COST	**N/A**	**Total Capital**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
		Purchased equipment								N/A
		Donated equipment								N/A
		Purchased renovation								N/A
		Donated renovation								N/A
		Other capital investment								N/A
		Depreciation								N/A
Expenditures	**$359,251**		**$359,251**	**$196,218**	**$11,397**	**$11,330**	**$1,616**	**$13,721**	**$124,969**	**$359,251**
Total Cases/Year										25,814
Gross Base Rate										$14
Excluded Cases										N/A
Net Base Rate										**$14**

CPA 2 Outpatient Visit Base Rate

Annual Expenditure By Cost Category				Annual Expenditure By Funding Source						Total Expen-ditures
Level 1 Disaggregation		Level 2 Disaggregation		GOC	OOP	HEF	CBHI	SDG	NGO/ Donor	
LABOR COST	**$92,742**	**Total Labor**	**$92,742**	**$29,608**	**$15,687**	**$14,939**	**$2,353**	**$22,908**	**$7,248**	**$92,742**
		Government salary	$16,298	$16,298	$0	$0	$0	$0	$0	$16,298
		Overtime	$11,049	$11,049	$0	$0	$0	$0	$0	$11,049
		Mission	$562	$562	$0	$0	$0	$0	$0	$562
		Nongovernment salary	$1,565	$1,565	$0	$0	$0	$0	$0	$1,565
		Incentive payments	$63,269	$134	$15,687	$14,939	$2,353	$22,908	$7,248	$63,269
DRUG AND MEDICAL SUPPLY COST	**$329,259**	**Total Drugs/Supplies**	**$329,259**	**$190,917**	**$1,247**	**$1,470**	**$345**	**$0**	**$135,280**	**$329,259**
		Purchased drugs/supplies	$5,233	$2,171	$1,247	$1,470	$345	$0	$0	$5,233
		In-kind drugs/supplies	$324,026	$188,746	$0	$0	$0	$0	$135,280	$324,026
OTHER OPERATING COST	**$38,773**	**Total Other Operating**	**$38,773**	**$21,229**	**$3,648**	**$3,229**	**$674**	**$0**	**$9,993**	**$38,773**
		Utilities	$17,876	$16,945	$383	$548	$0	$0	$0	$17,876
		Other recurrent	$20,897	$4,284	$3,265	$2,681	$674	$0	$9,993	$20,897
CAPITAL COST	**N/A**	**Total Capital**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
		Purchased equipment								N/A
		Donated equipment								N/A
		Purchased renovation								N/A
		Donated renovation								N/A
		Other capital investment								N/A
		Depreciation								N/A
Expenditures	**$460,773**		**$460,773**	**$241,753**	**$20,581**	**$19,637**	**$3,372**	**$22,908**	**$152,522**	**$460,773**
Total Cases/Year										55,077
Gross Base Rate										$8
Excluded Cases										N/A
Net Base Rate										**$8**

CPA 3 Outpatient Visit Base Rate

Annual Expenditure By Cost Category				Annual Expenditure By Funding Source						Total Expen-ditures
Level 1 Disaggregation		Level 2 Disaggregation		GOC	OOP	HEF	CBHI	SDG	NGO/ Donor	
LABOR COST		**Total Labor**								
		Government salary								
		Overtime								
		Mission								
		Nongovernment salary								
		Incentive payments								
DRUG AND MEDICAL SUPPLY COST		**Total Drugs/Supplies**								
		Purchased drugs/supplies								
		In-kind drugs/supplies								
OTHER OPERATING COST		**Total Other Operating**								
		Utilities								
		Other recurrent								
CAPITAL COST		**Total Capital**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
		Purchased equipment								N/A
		Donated equipment								N/A
		Purchased renovation								N/A
		Donated renovation								N/A
		Other capital investment								N/A
		Depreciation								N/A
Expenditures										
Total Cases/Year										
Gross Base Rate										
Excluded Cases										N/A
Net Base Rate										

BASIC. (2003). *MPA costing study*.
MoH. (2008). *CPA Guideline & MPA Guideline.*