

## 5.3 COMPARISON OF COST ESTIMATES

### 5.3.1 FEATURES OF THE THREE HOSPITALS

The results of cost accounting at the three hospitals have to be taken into consideration in the context of their inherent differences with regard to administration, hospital category and service orientation. Given these qualitative differences this is merely an attempt to compare costs in different locations and does not attempt to relate such costs to differences in quality of care. Such differences in quality of care are likely to be inevitable given the differences in hospital category that tend to be closely linked to such factors as staff qualifications and seniority as well as access to higher levels of equipment and facilities.

TABLE 5- 12 : FEATURES OF THE HOSPITALS

Hospital Description	BHK	THK	SJ GH
<b>Administered by</b>	Provincial Council	Line Ministry	Line Ministry
<b>Hospital Category</b>	Base Hospital Secondary care	Teaching Hospital Tertiary care	Teaching Hospital Tertiary care
<b>User charges</b>	Free health care	Free health care	Semi-autonomous Fee levying hospital
<b>Number of Pt. Beds</b>	402 beds	1,276 beds	1,001 beds
<b>Number of Staff</b>	509 staff	1,972 staff	1,411 staff
<b>Average Number of Inpatients per Day</b>	347	1,312	605
<b>Bed Occupancy Rate</b>	86.3 %	102.8 %	60.5 %
<b>Average Length of Stay</b>	3.4 days	3.5 days	4.8 days
<b>Yearly Total Number of Outpatients</b>	204,782	346,845	15,827
<b>Yearly Total Number of Clinics Patients</b>	112,454	423,993	160,725
<b>Specialty of Clinics</b>	Gynaecology, Venereal disease, Paediatric, Baby, Medical, Surgical, Antenatal, Dental, ENT Eye, Alcoholic, Family planning, Psychiatric	Medical, Surgical, Orthopaedic, Neurology, ENT, Skin, Paediatric, Psychiatric, Antenatal, Baby, Gynaecology, Family planning, Eye, Dental, Cancer, S.T.D., Special dental, DRR, Diabetic, S.P.C., Cardiology, Thalassaemia, Orthodontic, Speech therapy,	Medical, Paediatric, Gynaecology, Obstetrics, Surgical, Eye, Psychiatry, Renal, Cardio-thoracic, ENT, Orthopaedic, Asthma, Cancer, Cardiology, Children asthma, Baby, Immunization, R.H.T., Kidney transplant

Urology,  
Respiratory  
diseases, Asthma,  
Rheumatic,  
Neurosurgery

### 5.3.2 FINANCIAL INFORMATION RELATING TO THE HOSPITAL

The annual expenditure at the three hospitals in 2005 is as shown in the table below.

**Table 5- 13 :** FINANCIAL SITUATION OF THE HOSPITALS IN 2005 (thousand LKR)

Hospital Description	BHK		THK		SJ GH	
<b>Total expenditure</b>	<b>189,666</b>	<b>100%</b>	<b>899,889</b>	<b>100%</b>	<b>959,881</b>	<b>100%</b>
<b>Personnel</b>	127,739	67%	429,795	48%	458,189	48%
<b>Drugs, Materials</b>	51,428	27%	402,337	45%	353,608	37%
<b>Running costs</b>	10,498	6%	67,757	7%	148,085	15%
<b>Resource of Expenditure</b>	<b>189,666</b>	<b>100%</b>	<b>899,889</b>	<b>100%</b>	<b>959,881</b>	<b>100%</b>
<b>Government budget</b>	189,666	100%	899,889	100%	530,407	55%
<b>Hospital income</b>	0		0		429,474	45%

Personnel costs are the major component of total costs in all three hospitals, followed by drugs and material costs, and running costs. Differences in the characteristics of the hospital however result in the relative share of the different cost components varying significantly. Depreciation costs were presented in the accounting report of SJGH for the year 2005, but as this cost component was not calculated for the other two hospitals, it has been omitted from the analysis carried out for this report.

When introducing department-based cost accounting to a hospital, it is important to focus on understanding of the cost components which are major contributors to cost, since this improves the accuracy of cost accounting.

### 5.3.3 PERSONNEL COSTS

In respect of personnel costs, which contribute 67% at BHK and 48% at THK and SJGH of total expenditure, department-based personnel cost can be calculated through adding department-based information to the Government Payroll System which is presently being introduced. The ability to computer generate this information, relating to the

major cost component of hospital expenditure on a monthly basis is a valuable contribution.

When calculating a department-based personnel cost, since doctors may move around several departments such as wards, the outpatient department and operating rooms, it is necessary to set time study-based apportionment criteria in order to further improve the accuracy of cost accounting. Once this issue of multiple-tasking is understood by the manager, and steps are taken to primarily affiliate each staff member to a single department (while allowing the person to work on other wards/units), there will be no problem.

TABLE 5- 14: NUMBER OF HOSPITAL STAFF BY DESIGNATION (THOUSAND LKR)

Hospital Designation	BHK		THK		SJ GH	
	Count	%	Count	%	Count	%
Doctor ( Dentist )	104	20%	242	12%	217	15%
Nurse ( Midwife )	200	39%	785	40%	421	30%
Paramedical	32	6%	87	4%	94	7%
Clerk	19	4%	75	4%	138	10%
Other staffs	154	30%	783	40%	541	38%
<b>Total</b>	<b>509</b>	<b>100%</b>	<b>1,972</b>	<b>100%</b>	<b>1,411</b>	<b>100%</b>

In order to facilitate a comparison between the hospitals based on numbers of hospital staff incorporating a different scale, the number per 100 beds was calculated and is indicated in the graph shown below. Similarly staff numbers could be scaled by average number of inpatients per day taking the occupancy rate into consideration.

Based on the number of beds, the number of hospital staff at BHK was the highest. However, the number of hospital staff per average of 100 inpatients per day was highest at SJGH.

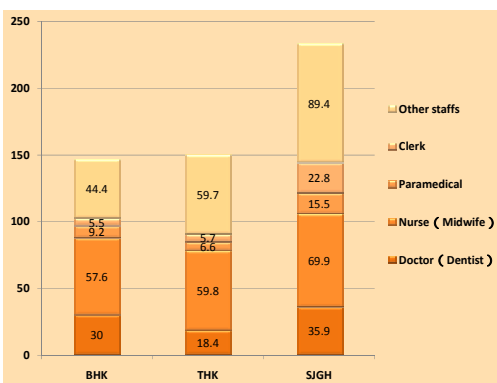


FIGURE 5- 11: NUMBER OF HOSPITAL STAFF PER AVERAGE NUMBER OF IN-PATIENTS

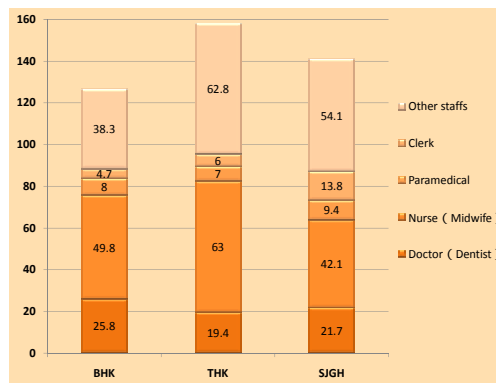


FIGURE 5- 12: NUMBER OF HOSPITAL STAFF PER 100 BEDS

### 5.3.4 DRUGS, SURGICAL CONSUMABLES, DRESSINGS, OTHER MATERIALS

Drugs, surgical consumables, dressings and other materials is the second largest component of total costs contributing 27%, 45% and 37% at BHK, THK and SJGH respectively. These items are consumed by patients directly and can therefore be directly attributed to the final cost centre, an important aspect of department based cost accounting. The establishment of a system where the quantity and value of consumed materials is reported on a regular basis is essential in ensuring efficient hospital administration and management.

In respect of the cost of drugs and medical materials the quantities disbursed by the Medical Supply Division and the Regional Medical Supply Division are identified by public hospital but the actual quantities consumed by the hospital or by the different hospitals departments cannot be quantified except in the case of SJGH. This results from the fact that drug use on wards is manually recorded, so that while tabulation by type of drug regarding consumption by each department is possible this is a time consuming process. Alternatively, particularly in large hospitals like THK, the quantity and value of the disbursed drugs could be assumed to be similar to that consumed, allowing for the use of In-house Dispensary disbursement statistics for this purpose.

TABLE 5- 15: DRUGS, SURGICAL CONSUMABLES, DRESSINGS, OTHER MATERIALS (THOUSAND LKR)

Hospital Account	BHK		THK		SJ GH	
Drugs	30,298	16.0%	184,061	20.5%	93,235	9.7%
Surgical Consumable	9,017	4.8%	31,132	3.5%	120,974	12.6%
Dressing	3,608	1.9%	17,138	1.9%	19,637	2.0%
Medical Oxygen	1,285	0.7%	8,626	1.0%	7,780	0.8%
Lab. Chemicals	97	0.1%	6,784	0.8%	25,979	2.7%
X-Ray Films	778	0.4%	4,842	0.5%	8,959	0.9%
Food provision	3,685	1.9%	14,563	1.6%	48,789	5.1%
Other	2,659	1.4%	135,192	15.0%	28,254	2.9%
Sub Total	51,428	27.1%	402,337	44.7%	353,608	36.8%
Total Expenditure	189,666	100%	899,889	100%	959,881	100%

The category "Other" is high at THK, due to a large purchase of consumables such as emergency trolleys, in this year.

### 5.3.5 RUNNING COSTS

Running costs include indirect costs necessary for hospital administration, such as electricity, water, telephone, stationary, laundry, repairs, and maintenance costs. Such costs contribute 5.5%,

7.5% and 15.4% at BHK, THK and SJGH respectively. Comparing only utility costs gives figures of 3.6% and 3.2% for BHK and THK but a significantly higher figure, 8.3%, for SJGH.

TABLE 5- 16: DETAILS OF RUNNING COSTS (THOUSAND LKR)

Hospital Account	BHK		THK		SJ GH	
Repairs, Maintenance	2,432	1.3%	7,803	0.9%	17,594	1.8%
Utility services	6,889	3.6%	28,874	3.2%	79,896	8.3%
Other services	1,178	0.6%	31,079	3.5%	50,595	5.3%
Sub Total	10,498	5.5%	67,757	7.5%	148,085	15.4%
Total Expenditure	189,666	100%	899,889	100%	959,881	100%

### 5.3.6 CLINICAL INFORMATION

Clinical Information for the three hospitals is given in Table 6 below. Such clinical information is prepared by all hospitals in Sri Lanka on an annual basis. However in implementing cost accounting it is necessary to obtain more regular and detailed information: per month, per disease, per cost centre. Such detailed information can be obtained by slightly improving the present clinical data recording system. The availability of such detailed information would be useful for hospital administration if it is combined with corresponding financial information, since this would allow for the calculation of unit costs.

TABLE 5- 17: CLINICAL INFORMATION (STATISTICS) ON THE HOSPITALS

Hospital Description	BHK	THK	SJ GH
Hospital Deaths	522	2,184	691
Physiotherapy	14,701	54,066	49,585
ECG	12,342	64,535	33,172
Radiology	11,049	67,939	56,428
Ultra sound scan	2,597	7,160	9,532
Operations	9,551	28,756	14,519
Laboratory Exam.	223,484	427,090	619,303
Delivery	5,526	12,158	4,786

TABLE 5- 18: PATIENT'S DISCHARGE ANALYSIS BY WARD (DETAILED CLINICAL INFORMATION)

WARD	SERVICES	BEDS	ADMISSION	LIVE DISCHARGE	DEATHS	A.V.LENGTH OF STAY	A.V.DAILY SICK	%BED OCCUPANCY
1	Paediatric	40	3432	3416	5	3.9	26.2	65.5
NICU	NICU	23	881	843		6.3	13.9	60.6

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2	GYN & OBS	62	4583	4548	36	4.9	51.8	83.5
3	Paying 1	18	1293	1317	7	4.8	13.1	72.7
4	Paying 2	48	1978	1959	9	3.7	16.1	33.6
5	Paying 2	48	2432	2374	1	3.7	19.5	40.6
6	Medical	62	5120	4955	127	4.6	52.7	85.0
7A		26						
7B	Nephrology	30	1469	1431	31	6.1	20.6	68.7
7C		4	78	74	1	4.1	0.7	18.4
8	Surgical	62	1958	1907	14	4.9	23.1	37.2
9	GYN & OBS	62	4270	4246	1	4.3	44.0	70.9
10	Orthopaedic	62	2103	2099	4	6.3	41.7	67.2
11	ENT	62	1743	1739		5.9	23.8	38.4
12	Medical	62	5168	5276	119	4.5	54.0	87.1
14	Surgical	62	2574	2555	8	6.3	42.0	67.8
15	Surgical	62	2427	2420	23	5.2	30.3	48.9
16A	Eye	32	1420	1420		4.7	15.3	48.0
16B		30						
17	Medical	62	5039	4914	91	4.8	55.7	89.9
18	Cardio thora	20	853	819	4	9.5	23.6	117.9
18	ICU	11	610	484	33	1.9	8.7	79.4
19	CIU	32	1111	1138	8	5.2	11.5	35.9
Dys	Dialysis	11	3548	3617	5	1.0	10.9	99.5
ICU/ CCU	Intensive	7	650	435	164	2.4	5.3	75.2
<b>Total</b>		<b>1000</b>	<b>54740</b>	<b>53986</b>	<b>691</b>	<b>4.6</b>	<b>604.6</b>	<b>60.5</b>

## 5.4 RESULTS OF DEPARTMENT-BASED COST ACCOUNTING

In the following section department based cost accounting information is presented in relation to the step down cost accounting procedure: as overhead, intermediate and final cost centre cost estimates.

### 5.4.1 OVERHEADS COST CENTER'S COST

Overheads as a cost centre do not relate to a single department but directly relate to patients through utilization of wards, operation rooms and clinical laboratory. They provide support in achieving the efficient functioning of the hospital. This Centre includes Director's office, Matron's office, A.O's room, Accounts and Maintenance departments, etc. The percentage of Overheads Costs in the total expenditure of each hospital was 10.4 at BHK, 8.2% at THK and 10.6% at SJGH.

TABLE 5- 19: OVERHEADS COST CENTER (THOUSAND LKR)

Hospital Description	BHK		THK		SJ GH	
Overheads Cost	19,765	10.4%	73,800	8.2%	101,943	10.6%
Total Expenditure	189,666	100%	899,889	100%	959,881	100%

### 5.4.2 INTERMEDIARY COST CENTRE'S COST

Intermediary Cost Centre, also known as Para-medical departments, such as clinical laboratory, X-ray examination rooms, operation rooms and the pharmaceutical department. These departments deal with patients and provide examinations and operations at the request of clinical departments. These calculations are of particular importance, since they support the disease based costing as well as hospital department based costing.

**Table 4- 20** presents the annual expenditure per department as well as the unit cost per case. Overhead costs have appropriately been absorbed into the costs of the intermediary cost centres. The unit costs presented here were calculated by simply dividing the relevant cost by the corresponding output as in the case of calculating the unit cost of the Operation Theatre through dividing the expenditure of the Operation Theatre by the total number of major and minor surgeries carried out. The types of surgery can vary widely from Gynaecology, Orthopaedics, Neurosurgery, ENT to Cardiovascular operations. As a result the unit cost of the Operation Theatre is significantly higher in the hospital that carried more advanced operations (SJGH). While more detailed information relating to the duration of operations,

number of staff involved and the sophistication of the procedures undertaken would allow for more disaggregated and specific cost estimates, these average values are still useful in highlighting differences in hospital functions. Similarly with regard to the category X-ray notable differences exist in the cost of x-ray photography and CT scans. This highlights the need for more detailed costing involving records on x-rays and scans by type with corresponding time studies in order to gain a better understanding of the functioning of the different hospitals.

TABLE 5- 20: INTERMEDIARY COST CENTRES (PARA-MEDICAL DEPARTMENTS) (THOUSAND LKR)

Hospital Cost Centre	BHK		THK		SJ GH	
Operations	20,627	2,160Rs	93,567	3,254Rs	152,311	10,490Rs
X-ray	2,129	193Rs	13,310	196Rs	35,427	628Rs
Physiotherapy	824	56Rs	5,280	98Rs	4,807	97Rs
Laboratory	5,151	23Rs	25,324	59Rs	71,316	115Rs
Kitchen	3,706	57Rs	21,688	86Rs	66,918	230Rs

### 5.4.3 FINAL COST CENTRE'S COST

Final Cost Centres are departments which directly provide patients with medical treatment and care, and can be broadly classified as the Outpatient department and the Inpatient department. In respect of the Inpatient department, wards are considered as the Cost Centres and their cost is estimated separately, as cost per ward is useful for hospital administration. The final objective of department-based cost accounting is to calculate the unit cost per patient in each medical department, and the unit cost per patient per day. Calculating the unit cost for each medical department in addition to each ward, would be useful for comparison with other institutions, and for providing information that could contribute to the establishment of national level estimates of hospital cost. The latter would prove to be extremely useful in national planning as well.

An issue that needs focusing on is the fact that patients from different medical departments are hospitalized in the same ward in some cases. For instance, in an ICU and mixed wards, there are patients from several departments such as internal medicine, surgery and orthopaedic. This necessitates two strategies in determining costs by medical department (speciality): in cases where wards involve similar patients (as in the case of a maternity ward), then the cost of the ward can be divided by the number of patients on that ward; where the ward involves a mix of patients (as in the case of the ICU) may involve apportioning the total cost of the ward by resource usage, to the different medical departments and dividing by the number of patients from the different medical departments.



TABLE 5- 21: ICU COST OF EACH HOSPITAL (THOUSAND LKR)

Hospital Description	BHK		THK		SJ GH	
Average Number of Inpatients per Day	3.1		6.2		5.3	
Personnel	5,528	58.9%	10,682	32.4%	15,399	38.5%
Drugs, Materials	1,969	21.0%	9,958	30.2%	12,689	31.7%
Recurrent	864	9.2%	4,102	12.4%	5,359	13.4%
Overheads Costs	735	7.8%	1,599	4.8%	3,114	7.8%
Intermediary Costs	292	3.1%	6,659	20.2%	3,463	8.7%
Total ICU Cost	9,389	100%	33,000	100%	40,024	100%

The latter point regarding differences in patient mix would explain the difference in ICU costs per patient in the different hospitals.

#### 5.4.4 UNIT COST RESULTS

After summarizing the cost accounting results, where the cost is tabulated by each Final cost centre (Ward), based on individual medical departments, a unit cost is obtained by dividing it by the number of patients or the total number of patient days. The unit costs for each medical department (per patient, per patient per day) for the three hospitals are presented below.

As these 3 hospitals chosen have different features, there is a significant difference in the unit costs. In particular, the unit costs in SJGH are two to three times greater than those in the other two hospitals (BHK and THK). Even though the figures relate to similar medical departments, differences in the severity of the condition of the patients treated and differences in resources and facilities would result in such an outcome. This difference may also stem from the fact that SJGH is a fee levying hospital (which covers at least a part of its medical costs from patients) in contrast to the other two hospitals which are free of charge public hospitals. This difference would affect the patient mix, even with regard to severity of condition.

TABLE 5- 22: IN-PATIENT COST PER PATIENT AND COST PER PATIENT PER DAY BY SPECIALTY (LKR)

Specialty	BHK		THK		SJ GH	
	Per Patient	Per Day	Per Patient	Per Day	Per Patient	Per Day
Medical	2,931	808	3,351	1,104	9,943	2,185
Surgical	2,900	934	3,754	1,044	21,022	3,453
Paediatric	4,099	1,814	2,610	933	7,701	1,982
Obstetric/Gynaecology	4,027	1,173	3,540	1,233	14,362	3,131
Eye	3,448	1,378	3,641	1,227	24,185	4,897
Orthopaedic	-	-	4,690	773	29,242	4,702

<b>Neonatal</b>	-	-	9,738	1,850	37,112	5,902
<b>Cardio thoracic</b>	-	-	17,027	5,067	70,828	12,009
<b>Nephrology</b>	-	-	8,548	2,497	15,770	2,966
<b>Dialysis</b>	-	-	-	6,516	-	7,177
<b>ENT</b>	-	-	4,815	2,611	13,457	3,447
<b>Dermatology</b>	-	-	4,993	1,117	-	-
<b>Rheumatology</b>	-	-	12,325	1,222	-	-
<b>Neurology</b>	-	-	20,788	2,117	-	-
<b>Psychiatric</b>	-	-	8,059	803	-	-

When examining the cost per patient per day, it is important to consider costs from the viewpoint of fixed costs and variable costs. Fixed costs are necessary costs regardless of an increase or a decrease in the number of patients. In this report, Personnel cost and Overheads cost are fixed costs. Comparing fixed unit costs across wards or hospitals therefore must explicitly focus on utilization rates to be meaningful. Unless we do so we are unable to conclude whether high unit costs are a reflection of high expenditure or low utilization rates: the source of the high cost being of fundamental importance in determining appropriate policy for the future.

The other type of costs, variable costs increase or decrease in proportion to the number of patients. In this report, the cost of drugs and materials, heat, light and water expenses incorporated in running costs, and the paramedical costs, are termed variable costs. In the case of variable expenses direct comparison of per unit costs is meaningful. In comparing between SJGH and the other two hospitals with regard to drugs and materials however a further complication is imposed by the fact that the latter two hospitals involve patient purchases of drugs in short supply within the hospital whereas SJGH supplies all drug needs (while charging the patient for the medicine).

TABLE 5- 23: UNIT COST OF MEDICAL PATIENT PER DAY ( LKR )

Hospital Description	BHK		THK		SJ GH	
<b>Total cost of Medical department</b>	32,800		105,280		166,392	
	thousand LKR.		thousand LKR.		thousand LKR.	
<b>Total hospital days of Medical dept.</b>	40,589		95,355		76,151	
	hospital-days		hospital-days		Hospital-days	
<b>Personnel</b>	359	44.4%	341	30.9%	477	21.8%
<b>Drugs, Materials</b>	187	23.1%	230	20.8%	498	22.8%
<b>Recurrent cost</b>	8	1.0%	42	3.8%	167	7.6%
<b>Overheads cost</b>	53	6.6%	59	5.3%	171	7.8%
<b>Intermediary cost</b>	200	24.8%	431	39.0%	872	39.9%
<b>Total</b>	808	100%	1,104	100%	2,185	100%

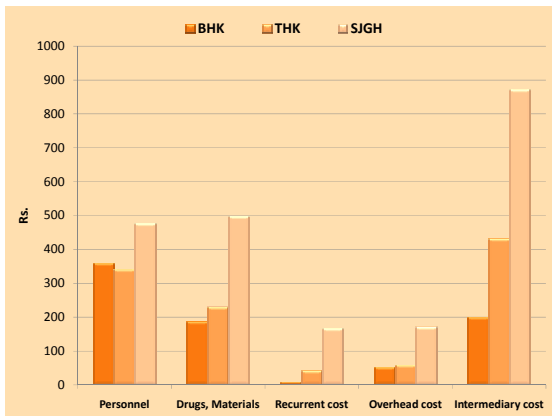


FIGURE 5- 13: MEDICAL PATIENT'S UNIT COSTS BY TYPE OF ACCOUNTS

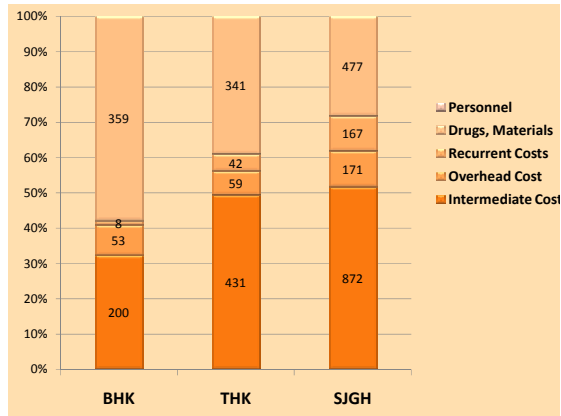


FIGURE 5- 14: PROPORTION OF MEDICAL PATIENT'S UNIT COST

### 5.4.5 CRITIQUING UNIT COST

In addition to the many complexities in the calculation of unit costs noted above it is also important to note that quality of performance is ignored. A unit cost is only a summary of resource use in financial terms: it does not take into account of the clinical outcome, even to the extent of not differentiating between cure and death. Nor does it reflect the degree of patient satisfaction generated by the service since only the differences in quality of physical facilities and quantity of other resources such as human capital is encompassed in the cost calculation. This highlights the need to supplement cost accounting with other forms of evaluation such as clinical audits and patient responsiveness surveys.

## 5.5 APPLICATION OF COST ACCOUNTING

This section focuses on the issue of applying cost accounting by drawing on the Japanese experience through presenting the results of a studies carried out by the Japan Hospital Federation. This is important since it utilized the same cost accounting technique as was adopted in Sri Lanka. This allows for a comparison with the results of Sri Jayawardenapura General Hospital and also highlights how regular data collection in this manner can be utilized in determining future policy.

### 5.5.1 STUDY I: FOCUSING ON COSTING BY SPECIALITIES

This study involved 504 hospitals of which 476 were General Hospitals and 28 Psychiatric hospitals. In this study, cost accounting was carried out according to medical departments. The study was done in the month of June 1999.

Considering scale, using the number of beds as an indicator, of the general hospitals, 106 hospitals had between 20-99 beds, 100 between 100-199 beds, 79 had 200-299 beds, 75 had 300-399 beds and 46 had 400-499 beds, with 70 hospitals having more than 500 beds.

Considering ownership, 419 were government hospitals, 79 were public hospitals and 6 were non-profit organization hospitals.

TABLE 5- 24: NUMBER OF HOSPITALS/ TYPE/ SCALE

Scale Owner	Total	General Hospital	Scale						Mental Hospital
			20 ~ 99	100 ~ 199	200 ~ 299	300 ~ 399	400 ~ 499	500 ~	
<b>Total</b>	504	476	106	100	79	75	46	70	28
<b>Government</b>	419	392	102	85	62	57	31	55	27
<b>Public</b>	79	78	4	13	15	16	15	15	1
<b>Non-profit</b>	6	6	0	2	2	2	0	0	0

The number of medical departments (specialities) is 468 internal medicine hospitals, 456 surgery hospitals, 390 orthopaedics hospitals, 355 paediatrics hospitals, 354 ophthalmology hospitals, 335 otolaryngology hospitals, 301 obstetrics and gynaecology department hospitals. The number of main medical departments (specialities) is as follows.

TABLE 5- 25: MEDICAL DEPARTMENTS (SPECIALTY)

Specialty	Number of Hp.	Specialty	Number of Hp.
<b>Total</b>	504	Neurosurgical	237
<b>Internal Medicine</b>	468	Cardiovascular Surgery	60
<b>Respiratory</b>	73	Obstetrics, Gynaecology	301
<b>Gastroenterology</b>	62	Ophthalmology	354
<b>Cardiovascular</b>	86	Otolaryngology	335
<b>Paediatric</b>	355	Urology	290
<b>Psychiatric</b>	169	Dermatology	266
<b>Surgery</b>	456	Rehabilitation	71
<b>Orthopaedics</b>	390	Dentistry	117

Costs such as personnel costs, material costs, recurrent costs and depreciation were calculated for about ten main medical departments. Running costs contributed around 11%-14% of costs and depreciation 6%-8%. Together these costs contributed around 20% of total costs with the remaining 80% being divided between personnel and material costs.

The highest ratios of personal costs to total costs were observed in the departments of Psychiatry (69%), Obstetrics and Gynaecology (57%), Paediatrics (56%), Orthopaedics (56% and Otolaryngology (55%).

Material costs, the second largest component, was reported to have high ratios in the case of Internal Medicine (34%), Dermatology (33%), Surgery (30%), Neurosurgery (29%), and Ophthalmology (28%).

### 5.5.2 STUDY II: FOCUSING ON COSTING BY SCALE

Japan's Hospital Federation carries out an actual situation analysis investigation on hospital administration every year in June involving the 3426 participating hospitals. This study does not undertake a close investigation like the medical department-based cost accounting study. However it is important in documenting hospital-based medical cost composition ratios which are then available on an annual basis. These component cost ratios are affected by scale of hospital, as reflected by number of beds.

The study shows that as bed numbers become large, the ratios of Personnel costs decrease and ratios of Material costs increase. Hospitals where bed numbers are large generally need to provide more medical care and as a result, it is considered that the ratios of the cost of drugs, medical examinations and treatment materials increase.

### **5.5.3 STUDY III COMPARISON WITH SJGH**

The cost composition of the Sri Jayewardenepura General Hospital (1001 beds) is as follows: Personnel cost 46%, Material costs 33%, Running costs 13%, and Depreciation 8%. In contrast a Japanese hospital with more than 700 beds has a cost composition as follows: Personnel costs 49%, Material costs 31 %, Running costs 14% and Depreciation 6 %. We may conclude that the cost compositions are relatively similar and the SJGH cost composition as expected in terms of its scale.

SJGH which deals with a lot of cardiovascular surgeries, has a high ratio of Material costs in line with the conclusion of the Japanese Hospital Federation study.



## Chapter 6

# WAY FORWARD

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### Key Messages

- Experience gained by piloting the managerial cost accounting system, calculating per patient day costs by speciality, and devising means of disseminating and utilizing such information, have been summarised in a Sinhala manual, to support and encourage the continuous costing work at these two pilot hospitals and to assist in introducing it to others.
- It is important to make use of the existing financial accounting system fully for purposes of managerial cost accounting; in the case of clinical information, as well in order to minimize the data collection workload, wherever possible existing data collection procedures should be adopted with minimal adjustments.
- The purpose of hospital department-based cost accounting is not merely the gaining of final unit cost results but the fact the implementation of a systematic accounting process itself results in improved efficiency.
- Institutionalizing the data collection process; utilizing cost information for budgeting and planning; and encouraging the use of costing information as the basis for evidence based managerial decision making are all crucial for improving the efficiency and financial viability of the health system.





## **6.1 OUTCOMES OF THE PRESENT PROJECT**

### **6.1.1 DEVELOPMENT OF HOSPITAL COST ACCOUNTING SYSTEMS FOR THK AND BHK**

A comprehensive managerial cost accounting information collection system was developed and implemented in these two hospitals. These cost accounting programmes are currently continuing.

A system where information necessary for cost accounting is regularly recorded by the relevant departments (wards, pharmacy, operation theatre, examination room, etc.) and collected by the department in charge of cost accounting was implemented.

By linking financial information and clinical information, the personnel costs, drugs and material costs and other costs are calculated for each of the three types of departments: major departments (specialties such as Outpatients, Surgery, Internal Medicine, etc.), Auxiliary departments (Co-medical: Operation theatre, clinical examination department, image diagnosis department, etc.) and Indirect departments (General Affairs Section, Accounting Section, Material Procurement Section, etc.). Finally, the expenses to indirect and Auxiliary departments are channelled to the Major departments, enabling the calculation of costs at individual specialties. The disaggregation of the entire hospital's expenses based on individual specialties is possible and enables hospital administrators and specialists to gain a sound understanding of the financial impacts of their clinical actions

The JICA-EBM study developed a costing system where the results of hospital cost accounting by ward and unit in per capita form is reported monthly. Up to date monthly reports have been prepared and submitted for the period January to April 2007. At the moment, it takes more than a month to prepare the previous months report. The intention of the study team is to reduce the time taken for this process to less than a month.

The process of introducing the managerial hospital cost accounting system was documented in Sinhala (and this will prove useful in introducing the costing system to other hospitals).

### **6.1.2 SUSTAINABILITY OF THE SYSTEM AT THK AND BHK**

#### **A. ESTABLISHMENT OF A SOUND FINANCIAL INFORMATION SYSTEM**

Improvement of the salary calculation system: The addition of department-based information to personnel cost computation (calculated using GPS), enables the calculation of personnel cost

per cost centre. As a result, the tabulation of department-based personnel cost that is necessary for cost accounting is automatically derived from the system, at the time when monthly salaries are calculated. In the future it is necessary to develop a further linkage system in cases of internal transfer, if not the salaries will be attributed to the previous department they belonged to, which will distort the cost estimates by cost centre.

**B. COSTING SYSTEM BASED ON CURRENT ACCOUNTING SYSTEM**

The existing accounting information system was used, without any major modification. The importance of utilising existing information more fully was stressed. Accounting at government hospitals is carried out on the basis of cash flows. For example, paying the January electricity bill in March is considered an expense in March rather than January. The quality of cost estimates could suffer due to this practice however since expenses are attributed not at the point of incurring the cost but to a later time period. This could also create confusion in analysing the cost information, if the items so paid are unequally distributed among the different months.

**C. IMPROVEMENT ON DRUG/MEDICAL MATERIAL SYSTEM**

The system used previously was to calculate consumption in terms of quantity. However with the introduction of the costing programme the value of drugs and materials was recorded when drugs and materials were disbursed to the wards. It is then possible to figure out the value of disbursements to the wards, both from the disbursing site (for example the pharmacy) and from the receiving side. During the two pilot projects a trial was carried out in which the value of disbursements was figured out from the disbursing side in the case of THK, and from the receiving side in the case of BHK. In the future more work is necessary to determine which measure is more reliable.

**D. ESTABLISHMENT OF CLINICAL INFORMATION SYSTEM**

The introduction of clinical information collation was carried out in the following order:

- Designing of an information collection sheet,
- Providing instruction on how to fill in the information collection sheet,
- Establishing a flow of information via the collection sheet,
- Instructing how to tabulate the flow of information gained through the collection sheet.
- Information from each Co-medical department is recorded each day by Cost Centre, and submitted as

monthly statistics, to the department in charge of cost accounting by the 10<sup>th</sup> of the following month. As the number of items to be filled was restricted it was possible to obtain such information from the existing ledger system (the number of X-ray films, the number of examinations, the number of ECG, etc.), and did not require further effort or more detailed data collection on the part of the personnel in charge. This was considered important in ensuring sustainability of the clinical data collation process.

#### **E. ESTABLISHMENT OF A CALCULATION SYSTEM**

As costs are calculated per cost centre, integration of financial and clinical information on a per cost centre basis, using a simple software programme MS EXCEL allows ease of calculation. In the case of individual cost elements such as personnel costs and material costs that are inputted to the cost centre directly data entry is carried out per cost centre each month. Where previously determined ratios are used to apportion costs such as fuel, water and electricity, then the calculations are automatically carried out by the system on a cost centre basis. Allocation of expenses from Indirect Departments and Auxiliary Clinical Departments are also carried out automatically in proportion to predetermined indices, such as the number of patients or the number of examinations.

This system also allows unit price to be determined per patient for each speciality, and for corresponding graphs to be produced to allow for comparison across specialities. While the computer programme automatically calculates the monthly costs, it is important that the personnel in charge of this unit be trained sufficiently so that they understand the calculation system fully and are able to apply the system in the future. This allows policy makers to gain the maximum benefit from the easy availability of per patient costs per speciality on a regular basis.

#### **6.1.3 FURTHER DEVELOPMENTS AT PILOT SITES**

The information collated through the managerial cost accounting system is currently reported at the regular financial meeting at the Teaching Hospital Kurunegala. The information has been reported as costs per ward or per speciality but as the members of the financial committee are still not very conversant with this analytical system no attempt has been made to relate costs to performance. The Hospital Director is currently considering whether to introduce a system whereby costs are compared across comparable wards (similar

specialities for instance). Such a process could then be further related to disbursement. While the availability of costs by ward and speciality may seem a great boon in improving hospital management and curtailing of costs, such comparisons may incur problems with staff, among staff and with unions. More work on improving the accuracy of cost estimates, and greater involvement of staff in this process are essential prerequisites in moving towards using this costing information more thoroughly for evaluation and allocation purposes.

## 6.2 SCALING UP OF THE PROGRAMME

### 6.2.1 INTRODUCTION OF MANAGERIAL COST ACCOUNTING PROGRAMME TO BASE HOSPITAL MARAWILA

Based on the experiences of initiating a managerial cost accounting system at THK and BHK, steps have now been taken to set up the accounting system at Base Hospital Marawila (BHM). In this context the following steps have already been taken.

#### A. ESTABLISHMENT OF COST CENTRES

The following cost centres have been identified in the context of BHM.

TABLE 6- 1: COST CENTRES AT THE BASE HOSPITAL MARAWILA

FINAL COST CENTERS (14)		
Ward -01 Medical Male	Ward -07 Obstetrics	Eye Unit
Ward -02 Medical Female	Ward -08 Obstetrics	Dental Unit
Ward -03 Surgical Male	Ward -09 Pediatrics	Out Patient Department (O.P.D)
Ward -04 Surgical Female	Bhikku Ward	Clinics
Ward -06 Gynaecology	Pre -Mature Baby Unit (PBU)	
INTERMEDIATE COST CENTERS (15)		
Operation Theater	Indoor Pharmacy	Blood Bank
Laboratory	OPD Pharmacy	Dressing Unit
X-Ray Unit	Clinic Pharmacy	Injection Unit
E.C.G. Unit	Drug Store	Malaria/Sputum Screening Unit
Surgical Store	CSSD	Kitchen
OVERHEAD COST CENTERS (13)		
General Stores	Security	Infection Control Unit
M.S. 's Office	General Office	Maintenance Unit
Administration Officer' s Office	Matron's room	Overseer Office
Medical Record Office	Medico Legal Unit / Mortuary	
Telephone Exchange	Health Education Unit	

#### B. ESTABLISHMENT OF DATA COLLECTION PROCEDURES

Procedures have already been identified for the collection of clinical information such as patients by speciality and surgical, x-ray and laboratory procedures as well information on resources such as personnel, drug allocations and utilities. Currently forms

have been prepared to support regular data collection at ward level, on patient numbers, specialities and procedures, drug usage etc.

**C. IDENTIFICATION OF PROBLEM AREAS**

In Marawila Base Hospital an attempt has also been made to identify problems with regard to implementing the costing system. For instance it has been realised that more staff are needed at the Pharmacy in order to maintain the detailed records on disbursement of drugs by ward necessitated by the managerial cost accounting system.

**D. FAMILIARIZATION OF STAFF**

The process of introducing the managerial hospital cost accounting system documented in Sinhala in the context of THK and BHK was utilized in initiating this costing system at Marawila Base Hospital.

**E. ADOPTING THE HOSPITALS IN THE NORTH WESTERN PROVINCE**

In June, hospital cost accounting was introduced at the Base Hospitals in the Puttalam District of the North Western Province. The workshop held before the introduction on the 28<sup>th</sup> of May was carried out in Sinhalese.

The original documents prepared for the initiation workshop with regard to hospital costing were in English, so in order to reinforce the understanding of the hospital staff, a manual was prepared in Sinhala covering the introduction of costing procedures, and was distributed to each Cost Centre.

**6.2.2 NEED FOR CAPACITY DEVELOPMENT**

Implementation of the cost accounting method at the hospitals requires capacity development for the personnel of the hospitals. There are 3 training areas:

1. Collection and tabulation of basic information
2. Consolidation of information and cost accounting
3. Utilisation of cost accounting results

Table below shows key areas of training, target trainees, and training programmes. It is necessary to establish a system that introduces cost accounting in stages. At the initial introduction stage, trainings will target the personnel of the hospital, which is chosen as a model for the others. Eventually, they will instruct the other hospitals once they gain enough knowledge and experiences.

**TABLE 6- 2: TRAINING PROGRAMME FOR CAPACITY DEVELOPMENT**

Stages	Training Programme	Target Trainees	Purpose
<b>1. Collection and tabulation of basic information</b>	<b>Financial Information</b> Learn how to tabulate existing accounting and salary information per facility and department.	Accountant, DPDHS Office and accounting staff	Understanding of the information and the tabulation method necessary for cost accounting
	<b>Clinical Information</b> Learn how to tabulate basic information from each Co-Medical department to allocate costs	Staff at Co-Medical department	Extraction of information from the existing ledger, understanding of the tabulation method
	<b>Drugs, Surgical consumables</b> Learn how to input and tabulate actual use and value of products, per Cost Centre	1~2 staff exclusively in charge of input, and Chief Pharmacist	Understanding how to input necessary information to a PC and verify
<b>2.Consolidation of information and cost accounting</b>	Collection and input of basic information, tabulation of cost accounting results, Preparation of reports, Maintenance of software	1 staff exclusively in charge of the cost accounting section at each hospital	Understanding of hospital cost accounting method, And PC operations for inputting data and PC software
<b>3.Utilization of cost accounting results</b>	Preparation of budget, business plan at the hospitals, DPDHS/PDHS offices, National MOH office	Director/management of the hospital, accountant/DPDHS, PDHS office, Planning / MOH, Finance / MOH, Others	Understanding and practice of budget preparation/business plan, and utilizing the cost results. Also includes examining appropriate budget allocation and personnel positioning by examining each facility's situation. Understanding and practice of other management and analysis techniques



### **6.2.3 APPLICATION OF DISEASE BASED COSTING**

Using the results of hospital cost accounting, disease-based cost accounting was carried out by tabulating the treatment process for 40 cases each at three sites (THK, BHK and CNTH) for three diseases/conditions (Asthma, Ischaemic Heart disease and Caesarean Operations). Direct costs (drug/medical material cost and doctor's personnel cost) were calculated on a case by case basis. Personnel costs were based on time study results. Hospital stay costs were calculated using per patient per day costs derived from the step down costing exercises at the THK and BHK. Investigation costs and X-ray costs, etc. were also calculated on the basis of hospital cost accounting.

When carrying out disease-based cost accounting or patient-based cost accounting, the accuracy improves as the share of costs that can be directly figured out increases. Calculating indirect costs for each patient or treatment protocol however is a difficult task and the availability of step down cost estimates at ward and speciality level is a great boon in carrying out disease based costing.

For example the unit price of Physiotherapy calculated for Sri Jayawardenapura General Hospital and the Teaching Hospital Kurunegala is likely to be made use of by a study being carried out by the Trauma Secretariat. Many more such instances are likely to occur in the future as costing studies continue to grow in popularity as a means of increasing the efficiency of health care provision and in providing the basis for justifying the setting up of new projects/treatment centres/treatment procedures.

### **6.3 POLICY CONSIDERATIONS**

The purpose of hospital department-based cost accounting is not merely the gaining of final unit cost results but the fact the implementation of a systematic accounting process itself results in improved efficiency. Three important points are worth noting in this regard.

Firstly, it is necessary to utilize information obtained from cost accounting, not only for the running of hospitals but also for the formulation of plans and policy making at each level of district, province and nation. At the level of a site where cost accounting is implemented, correct and precise input and recording of data is sought. Continuous utilization of information for budget-making and the preparation of an activity plan become an incentive for the staff in charge of the site, to carry on the cost accounting system and data recording in a systematic manner.

Secondly, it is necessary to institutionalize department-based cost accounting at hospitals, and to establish a system where accounting information flows continuously like the present financial accounting system. As a result of institutionalization, it is then possible for the central government to gather cost accounting results calculated using the same methodology from hospitals throughout the country. This will facilitate better planning, budgeting and decision making at the central level.

Thirdly, it is necessary for the cost accounting results to be fed into economic decision making, and for feedback to be provided to the cost accounting departments regarding the data needs of the country so that continuous improvements can be made in the data collection and evidence-based decision making loop. Disease-based costing as well as hospital-based costing is of importance for economic and managerial decision making and since the former draws on the latter it is of great importance that both these forms of costing go on simultaneously.