

Chapter 3

LITERATURE REVIEW & CASE STUDIES

Key Messages

- The review of costing studies relating to hospital and disease based costing revealed that significant gaps existed in the available costing data. This suggested that the creation of a systematic costing process that could be adapted and adopted for different levels of hospitals and diseases would be of importance in improving macro and micro level economic efficiency in the health sector.
- The survey of management needs revealed that the carrying out of regular budgeting and planning exercises depended on the existence of a specific unit to carry out such activities. Likewise though hospital management meetings were held, such discussions were not based on evidence. Systematising management cost accounting would be useful in both contexts
- The study of the pharmaceutical sector revealed that there were cost-related problems in the entire process ranging from the estimation of drug needs to the disbursement of such drugs to patients. Better technical procedures in estimating drug needs, systematic record keeping processes and greater interest in stock management were all identified as means of improving efficiency and achieving cost containment.
- The study on the private sector concluded that there was great interest in costing, financial and economic issues in private sector institutions. Greater involvement between health institution managers, clinicians and accounts was considered desirable in achieving accurate cost estimates, which could then form the basis of a rational pricing strategy in the private sector.

3.1 LITERATURE REVIEW OF COST STUDIES

This study sought to examine the range of existing costing literature in Sri Lanka as it related to hospital and disease costs. In addition, an attempt was made to evaluate different costing methodologies adopted in these studies given the constraints on data in the Sri Lankan context with a view to identifying appropriate methodology.

This literature review of cost studies began by classifying the Sri Lankan cost studies by study topic, costing methodology and data source. The different costing methodologies adopted in this study were evaluated, in the Sri Lankan context using a SWOT analysis.

In the case of hospital costs, since the empirical work for this study focused on three hospitals in Sri Lanka: Sri Jayawardenepura General Hospital, Teaching Hospital Kurunegala and Base Hospital Kuliypitiya, the literature survey too focused on similar hospital categories. In the costing of diseases similarly, studies reviewed were limited to five selected diseases: asthma, hypertension and heart diseases (NCDs), and diarrhoeal diseases and viral fever (communicable diseases).

Cost studies conducted in Sri Lanka in the period post 1990 were categorized under three different headings: by study area and topic, costing methodology and by source of data. Such categorization was important in identifying coverage and trends relating to the costing methodology as adopted in the Sri Lankan context.

3.1.1 COSTING METHODOLOGY

There seem to be four costing methodologies that can be considered as separate techniques even though studies sometimes combine these procedures. These are: a) *retrospective accounting*; b) *retrospective surveys*; c) *scenario building*; and d) *econometric analysis*.

A. RETROSPECTIVE ACCOUNTING

This refers to costing conducted for a past period based on ledger entries maintained by the hospital at central or ward level. Information used in such an exercise ranges from flow of funds to the hospital from the state, records of institutional earnings, and expenditure at hospital and ward level. Two approaches are commonly used: Costing by cost centres (i.e. costing ward by ward, laboratory etc.) and activity-based costing (ABC).

B. RETROSPECTIVE SURVEYS

These similarly estimate costs based on the responses of a sample, relating to a previous experience of healthcare expenditure over a specific time period or over an episode of illness.

c. SCENARIO BUILDING

The technique of Scenario Building involves *four* steps. The *first* is to list out all the known relevant physical or personal characteristics relating to the facility, the disease or the treatment procedure under consideration. *Secondly* the list of assumptions adopted has to be explicitly stated. These assumptions can be based on empirical evidence, theoretical know-how or the views of experts but need justification and supporting evidence where ever possible. The *third* step involves combining empirical information and assumptions to reach cost estimates. The *final* step involves validation of the cost estimates derived in this manner and the understanding of the limitations arising from the use of assumptions in the Scenario building technique.

d. ECONOMETRIC ANALYSIS

This mainly involves cross-section analysis, and can relate to either the use of international or national/regional information in extrapolating costing estimates for the country or specific institutions.

Most studies carried out in Sri Lanka involving systemic costs are based on a combination of retrospective accounting and scenario building to cover the gaps in the readily available database. Some studies, however, underestimate costs by ignoring capital costs since these are not freely available. Retrospective surveys are the main basis for indirect and household cost estimation. Scenario building techniques have been adopted in some studies for calculating lost earnings.

3.1.2 SWOT ANALYSIS OF STUDIES

Component 2 involved costing methodologies that corresponded to retrospective accounting and scenario building methodologies. The SWOT analysis was carried out on all four estimation techniques.

SWOT analysis of studies relating to the selected hospitals and diseases has identified certain areas for improving costing methodology. The areas for improvement under the different methodologies to be incorporated in the EBM study are discussed below.

A. WITH REGARD TO RETROSPECTIVE COST ACCOUNTING

- Understanding the importance of pre-planning of accounting procedures to support retrospective accounting
- Systematizing the accounting procedures in hospitals
- Regular recording of data
- Detailed record keeping including on capital costs

B. SYNTHESIZING RETROSPECTIVE COST ACCOUNTING AND

SCENARIO BUILDING

Carrying out scenario-building exercises at the selected hospitals could (i) reveal how well scenario-building performs in general (ii) draw on scenario building to validate apportioning techniques (i.e. utilities).

c. OTHER RELATED ISSUES

- Training/familiarization of hospital staff
- Familiarization of all hospital administrators with costing methodology and its uses
- Training of accountants
- Dissemination of cost information to the general public

3.1.3 REVIEW OF SELECTED SRI LANKAN COST STUDIES

A. HOSPITAL COSTING

Attanayake et al (2005) clearly illustrates the importance of *step-down cost accounting* but argues that such a procedure is only possible after undertaking an in-depth review of all the activities of the institution.

De Silva, Samarage and Somanathan (2006) conclude that outpatient hospital costs in tertiary care settings are higher than for lower level hospitals.

Costing studies done on the specific hospitals where costing procedures were implemented, the Teaching Hospitals of Sri Jayawardenapura (SJH) and Kurunegala (KTH) and the Base Hospital Kuliypitiya, are limited, so this review of cost studies widened its scope to consider studies done in all Teaching Hospitals and Base Hospitals including the above.

With regard to inpatient care, Kasturiratne (2003) finds the hospital 'hotel' costs (without considering treatment costs) that relate to the male and female wards of the Professorial Medical Unit of the Colombo North Teaching Hospital to be Rs. 505.70 per patient day. Costs of treating specific diseases (medication, investigations and therapeutic procedures) at this hospital per episode range from a median cost of Rs. 4919.20 for an average 5.2 day stay for Myocardial infarction to Rs. 678.40 for a 2.7 day stay for Asthma, with the average length of stay and costs for Ischemic Heart Disease, Stroke and Cirrhosis coming in between.

B. DISEASE COSTING

In Disease Costing, the five diseases examined in Attanayake (2005) were considered. Bias due to the non homogeneity of patients, use of multiple sources of treatment, complexity arising from patients co-morbidity, difficulty of finding patient samples in the private sector hospitals for diseases such as asthma and

diabetes and difficulties in accurately determining indirect costs, particularly in the subsistence sector were some of the problems encountered. The Costs estimated in each study and the methodology adopted are summarised in **Table 3- 1**.

TABLE 3- 1: COSTS ESTIMATED IN EACH STUDY

Study	Cost Estimated	Methodology	A	H	HD	D	VF
Attanayake (2002a)	Systemic Cost	Costing of protocols	+	+	+	+	
Attanayake (2002b)	Household costs	Household survey (respondents selected from those seeking public OPD care and snowballing to include private care)			+		
Attanayake (2005)	Direct/Indirect	Household survey (respondents selected from those seeking public OPD care)	+	+	+	+	+
Kasturiratne (2003)	Treatment cost	Patients at Professorial Unit of CNTH	+		+		
de Silva (1995)	Systemic Cost	Hospital data at Lady Ridgeway Hospital				+	
NCMH WGF (2006)	Cost to households of clinic attendance	Clinic attendees at NCTH Channel patients Durdans	+		+		

Note:

A	: Asthma	H	: Hypertension
VF	: Viral Fever	HD	: Heart Disease
D	: Diarrhoea		
NCMH WGF	: National Commission on Macroeconomics and Health Working Group on Financing		

The study of these diseases is complex, and resulted in the researchers having to restrict their focus and/or adopt certain modifications to the costing procedures. Some of the problems identified in the context of these studies (often cited by the researchers themselves) are listed below:

- In patient surveys avoiding bias due to non homogeneity of patients – difference in intensity of illness, age or even mere differences in personality can affect the expenditure pattern (e.g. distinction between ischemic heart disease and myocardial infarction in Kasturiratne, 2003; spending on special foods in Attanayake, 2005);

- Use of multiple sources of treatment – this creates problems at the stage of filling out the questionnaire (need for ensuring that the patient understands what costs one is trying to capture) and in presenting the results in disaggregated form as in public outpatient, public inpatient, public outpatient and inpatient, public plus private etc. In addition a need also exists, as recognized in Attanayake (2002b and 2005) to consider informal treatment and self treatment expenditure;¹
- Complexity arising from patients having more than one disease (i.e. Hypertension and Diabetes Mellitus; Asthma and respiratory infections);
- Difficulty of finding patient samples in the private sector hospitals for diseases such as Asthma and Diabetes which are often treated by Consultant Physicians. Community surveys would however be extremely costly if used to determine costs of NCDs, as large samples would have to be interviewed to gain sufficient sample size. This has encouraged the use of hospital OPD and inpatients as respondents;
- Difficulties in accurately determining indirect costs, particularly in the subsistence sector; and
- Lack of disaggregation of hospital cost records (i.e. electricity and water bills, cost of administration) has necessitated certain assumptions being incorporated in the costing exercises.

¹Attanayake N., 2005, Attanayake N., 2002

3.2 MANAGEMENT NEEDS SURVEY

3.2.1 SURVEY METHODOLOGY

During the period between December 2005 to January 2006, a questionnaire was sent to the management executives in the 26 line ministry hospitals (Directors, Deputy Directors), and their responses were sought regarding their perceived needs for the improvement of hospital management. This was done partly with the intention of selecting pilot hospitals for the project. The main content of the questionnaires were directed at finding out the problems faced by hospital managers and their utilization of basic information with special reference to the linkage between financial and clinical information.

Of a sample of 26, 18 responded (9 from 16 Teaching Hospitals, 6 from 7 General Hospitals and 3 from 3 Base Hospitals).

3.2.2 KEY FINDINGS

A. MANAGEMENT

The questionnaire dealt with different aspects of management including financial management. The questions were designed to analyze the management skills and innovative thinking of the executives. Majority (80%) indicated that the biggest problem they face is the lack of human resources, followed by overcrowding and a lack of buildings/equipment.

Problems that pertain to human resources are not only due to a shortage of the workforce but also due to weakness of management as revealed in the high absenteeism of hospital employees and low motivation. Strategies to tackle such problems were not proposed. Instead many responded that it needed the Ministry's authority to change the status quo. This shows a lack of initiative on the part of hospital management.

B. INFORMATION MANAGEMENT

Approximately 80% of the hospital executives answered that they "Always" or "Mostly" prepared the business plan and budgets based on clinical and financial information. However, 2 hospitals answered "Not commonly: one "Rarely"; and one even "Never".

It was found that the survey results closely related to the existence of relevant units that are responsible for planning and budgeting. The four hospitals that prepare neither a business plan nor a budget plan routinely did not have such units at the time of survey.

In a separate question, approximately 40% of the hospitals answered that no reports were routinely prepared updating patient statistics such as bed utilization rate etc.

The survey found that 90% of the hospitals either distribute circulars/notices among the staff members or place such documents on the message board, or use both methods.

c. MANAGEMENT COMMITTEE

All the targeted hospitals in the survey hold Management Committee meetings once a month or every other month. The average number of committee members is 10. This number varies from hospital to hospital, ranging from 6 and 13. In most hospitals, employee-related matters and physical development are commonly discussed. Other subject matters differ among hospitals, depending on the composition of the committee.

3.3 STUDY OF PROCEDURES AND ISSUES RELATING TO PHARMACEUTICAL SUPPLY AT CENTRAL AND PROVINCIAL LEVELS

Pharmaceutical supply is a major share of hospital costs, the measurement of which is the central objective of this JICA EBM Study. This section provides an overview of the procedures and issues related to pharmaceutical supply at Central and Provincial Levels with regard to Line and Base Hospitals. Understanding the complexities of the current pharmaceutical supply system will provide insights into improved methods of recording drug related cost and quantity information and suggestions for improvements in management that in turn could make the healthcare system more cost effective.

The research methodology adopted for this purposes is presented in section 3.3.2. This study focuses in particular on the North Western (Wayamba) Province as the hospitals being studied: the Teaching Hospital Kurunegala and Base Hospital Kuliyaipitiya, are in this province. It focuses in detail on both hospitals as procedures for drug disbursement vary significantly by type of hospital: Teaching Hospitals come under the Line Ministry and Base Hospitals are controlled by Provincial Health Ministries.

The next two sections (3.3.3 and 3.3.4), therefore, focus on the functioning of the MSD and the R-MSD (see the Pharmaceutical Supply report for details of other institutions involved in the supply, distribution and monitoring of pharmaceuticals in Sri Lanka).

Section 3.3.5 examines pharmaceutical supply management by focusing on the different activities involved in such a process: estimation, financing, procurement, storage, distribution, monitoring and quality assurance. The last section (**3.3.6**) critically examines the problems relating to the different strata involved in pharmaceutical supply management, and the recommendations for improving processes at the different levels, with special attention being paid to the financial implications of current weaknesses in the pharmaceutical distribution system and the more appropriate resource allocation patterns that could be achieved by improving the management system.

3.3.1 OVERVIEW OF SUPPLY SYSTEM

Under the current system the Director General of Health Services is the authorized officer to ensure the continuous availability of all medical requirements of all government hospitals in Sri Lanka. In keeping with the Cosmetics, Devices and Drugs Act No. 27 of 1980, with the approval of the Minister of Healthcare and Nutrition, this authority has been delegated to the Director of the Medical Supplies Division (MSD). The Cosmetics, Devices and Drugs Act No. 27 of 1980 (as amended by Act No. 38 of 1984) provide the legislative framework

to control the use of drugs in the country. The act controls activities such as registration, manufacture and importation of drugs in the country.

Sri Lanka has eight provinces, and each province is sub-divided into health regions. The Regional Director of Health Services administers all health activities in the region. In each region, there is a Regional Medical Supplies Division (R-MSD) through which all medical requirements of the provincially controlled hospitals in the region are administered, stored and distributed. Some hospitals come under the administrative purview of the Central Government and the medical requirements of these hospitals are supplied directly by the MSD. Similarly, the five specialized campaign institutions, under the Central Government, receive their medical requirements from the MSD.

3.3.2 STUDY METHODOLOGY

Understanding the pharmaceutical supply system at central, provincial and hospital level would allow the designing of more efficient recording and management systems that would result in cost curtailment. No systematic study existed of the overall procedure of pharmaceutical supply: estimation, procurement and drug management so this report fills that lacuna. Appropriate resource allocation is particularly important in the context of ensuring continuous availability of drugs for patients, since the current system results in shortages brought about by budgetary gaps.

The overall objective of this study is to propose improvements in the supply system of pharmaceutical items, by analyzing the existing system. In order to achieve this objective the study attempted to gain an overall understanding of the procedures of estimation, procurement, storage, distribution and accounting; to identify the issues affecting the operating of the present system and remedial actions for improving the pharmaceutical system.

Medical items are procured, stored and distributed by the Medical Supplies Division (MSD) of the Ministry of Health directly to Central Government Hospitals and through Regional MSDs (R-MSDs) to Provincial Council Hospitals. Here the analysis is limited to the MSD, the R-MSD for Kurunegala, one central government institution (Teaching Hospital Kurunegala) and one Provincial Council administered hospital (Base Hospital Kuliyaipitiya).

Primary data in this study were collected through interviews and discussions with relevant officers in the system such as hospital pharmacists, storekeepers at MSD and R-MSDs, accountants who are the key officers involved in financial management and the Assistant Directors at the MSDs who are involved in management. Secondary data were obtained from records maintained at MSD, R-MSD Kurunegala and Kurunegala Teaching Hospital in order to analyze the

pharmaceutical supply management system. Guidelines and procedures were extracted from circulars, manuals and handbooks.

Data and information analysis sought to address the following research questions:

- How does the existing method of estimation of drugs by hospital/region work?
- How does the existing method for ordering the national requirement of drugs by MSD work? Does it ensure the supply?
- How does the existing procedure for accepting, storing and distributing of drugs by MSD work?
- How does the existing procedure for accepting, storing and distributing of drugs by R-MSD work?
- How does the existing monitoring system of drugs supply work in hospitals/regions?
- How does the existing procedure of accepting, storing and issue of drugs to wards work at hospitals?
- How are records maintained? How efficient is the system?
- What are the problems faced in carrying out the activities listed above and what suggestions could be made for improvement?

The limitation of this study is that the sample includes merely one Teaching Hospital and one Base Hospital.

3.3.3 MEDICAL SUPPLIES DIVISION (MSD) IN THE MINISTRY OF HEALTH

The Medical Supplies Division (MSD) is the main pharmaceutical division under the direct administrative purview of the Central Government, where national requirements of all medical items are procured, stored and distributed. In addition to supplying the R-MSDs, there are 37 major hospitals under the Central Government to which medical items are supplied directly by the MSD. The MSD consists of four units, stores and a wharf section.

- Main Functions:
 - Studying the consolidated annual requirements of medical items
 - Placing indents for annual requirements of medical items with State Pharmaceutical Corporation (SPC)
 - Receipt of medical items from SPC and storage
 - Distribution of quarterly requirements of medical items to Regional Medical Supplies Division and the institutions under the Central Ministry
 - Maintenance of an effective drug management information system
 - Monitoring of consumption pattern of medical items
 - Quality assurance of medical items

- Attending Drug Review Committee meetings of hospitals
- Coordinating with sectoral and inter-sectoral agencies concerned with medical items
- Management of donated medical items
- In-service training for staff at different levels
- Organizing and attending SPC–MSD meetings to discuss supply of out-of-stock medical items
- Support, review, revise and disseminate rules, regulations and procedures to ensure scientific management of medical supplies
- Main Units:

The main activities of the units are listed below:

- Stock Control Unit: responsible for estimating drug needs, ordering pharmaceuticals, monitoring and controlling drug supplies, negotiating transactions with SPC and overseeing local purchase of drugs
- Stores: in charge of receiving, storing and issuing items
- Computer Unit: activities include developing software, maintenance of records of supply, storage and distribution of medical items and the maintenance of computer systems. The MSD has a Local Area Network to support inventory control functions and MIS
- Supply Branch: This section oversees the certifying of vouchers for payments to SPC and other suppliers, preparation of annual price lists and purchase and supply of cancer drugs from President's Fund
- Purchasing Unit: responsible for local purchase of medical items and certifying of vouchers for payments to local suppliers
- Dispatch Unit: Works in tandem with the stores in maintaining records relating to drug distribution, oversees the distribution of drugs to different institutions
- Wharf Section: responsible for donations of medical items from international agencies, international NGOs and donor countries involving activities such as documentation, port/air freight clearance and storage

3.3.4 REGIONAL MEDICAL SUPPLIES DIVISIONS (R-MSD) KURUNEGALA

In the supply system, there are 26 R-MSDs under the Provincial Councils which distribute medical items to hospitals in the regions: numbering 36 Base Hospitals, 159 District Hospitals, 90 Peripheral Units, 158 Rural Hospitals, 75 Central Dispenses with maternity Homes and 389 Central Dispensaries.

The study focused on the Regional Medical Supplies Division in Kurunegala, the area in which the hospitals under study are located. The R-MSD Kurunegala is under the administrative purview of the Deputy Provincial Director of Health Services – Kurunegala. The supply

of all medical items to government hospitals coming under the provincial council in the district are his/her responsibility. The supply and use of drugs is routinely monitored by the Divisional Pharmacist and in general by the Regional Drug Review Committee. He/she also directly supervises the activities of the stores with respect to drugs. The Divisional Registered Medical Officer directly supervises the activities of the stores regarding surgical/laboratory items. Supplies are sent from the Medical Supplies Division (MSD), Epidemiological Unit and the Family Health Bureau. Chief storekeeper is in charge of the stores and is assisted by two other store keepers and supporting staff.

The R-MSD in the Kurunegala district supports the activities of 2 Base Hospitals, 13 Rural Hospitals, 18 District Hospitals, 18 Peripheral Units, 2 Central Dispensaries with Maternity Homes, 50 Central Dispensaries, a Chest Clinic, a STD clinic, Municipal Council clinic in Kurunegala, 6 Adult Dental Clinics and 35 School Dental Clinics.

The Regional Drug Review Committee is responsible for monitoring pharmaceutical quality and usage in the region. The members of this committee are:

- Regional Director of Health Services - Chairman
- Divisional Pharmacist- Secretary
- Regional Dental Surgeon
- Officer in Charge of R-MSD
- Divisional Registered Medical Practitioner
- All Officers in Charge of institutions in the region
- Accountant/RDHS. office
- Regional Medical Officer/Anti Malaria Campaign
- Medical Officer/Respiratory Diseases Control Programme
- Medical Officer/Leprosy Campaign

Many problems faced by the Regional Medical Supplies Division in Kurunegala (and common to other R-MSDs as well) are listed in the last section.

3.3.5 DRUG SUPPLY MANAGEMENT

The different activities related with drug supply management are briefly listed here.

A. ESTIMATION

- Estimation of drug needs

In keeping with the Annual Work Plan of the MSD, computer diskettes with a listing of all Hospital Formulary Drugs (Stock Items) are distributed to all hospitals in May in order to estimate the annual requirement of drugs for the following year.

Two methods of estimating drug requirements are:

- The patient morbidity standard treatment method: this is based on the idea of rational prescribing (standardized protocols) and realistic morbidity records
- The adjusted consumption method: based on previous consumption pattern adjusted for any known variations in epidemiological/prescribing trends

Regional drug needs estimation involves the aggregation of institutional estimates. The estimates are prepared by the Divisional Pharmacist on the basis of institutional estimates. However, the financial allocation is not known at the time of the preparation of this list. Institutional estimates have to therefore be scrutinized and adjusted in consultation with the officers from the institutions. Institutional estimates are then consolidated to arrive at the regional estimate. They are compared with previous estimates and adjusted accordingly. The current R-MSD stock is not considered. Monthly consumption is arrived at by dividing the regional estimate by 12. This procedure has many weaknesses and contributes significantly to the problem of drug shortages and wastage, in turn affecting both patient welfare and cost of healthcare adversely.

The national estimate of drug needs is prepared by the MSD as a consolidated estimate of all central government institutions (hospitals and special campaigns) and Provincial Council regional estimates. In addition requirements of the medical units of the Ministry of Defence which also obtain supplies from MSD have to be included.

In the case of stock items that are basic needs for any hospital, supplementary estimates are accepted and complied with. However, institutions are asked to only submit their supplementary estimates after a mid year revision in July. In case of special drugs institutions have to remain within the estimates submitted.

- Estimation of Costs

Activity-based Costing (ABC) analysis for Categorization is adopted in estimating costs of pharmaceuticals and medical care items.

B. FINANCING OF MEDICAL SUPPLIES

The following procedures are followed with regard to the financing of medical supplies:

- In March – Year 1, Ministry of Health informs Secretary/Provincial Councils to prepare and forward the financial requirements for medical supplies for Year 2.
- Similarly Directors of Central Government Institutions are requested to prepare their financial requirements for

- medical supplies for Year 2 and forward it to the Secretary/Ministry of Health.
- Directors/Teaching Hospitals and specialized institutions are requested to indicate separately local purchase and medical gas requirements.
 - In April – Year 1 Secretary/Provincial Councils prepares the financial estimate for medical supplies for Year 2 and sends it to Secretary/Ministry of Health.
 - A consolidated statement is prepared by the Secretary/Ministry of Health and sent to the Director General/Budget – General Treasury
 - In November – Year 1 the budget is discussed and approved in Parliament.
 - Director General/Budget – General Treasury informs the Ministry of the approved financial allocation for Year 2.
 - Secretary/Provincial Council is informed by the Secretary Ministry of Health of the approved allocation with a copy being sent to the Director/Medical Supplies division in February/March of Year 2.
 - Secretary/Provincial Council informs each Provincial Director of Health Services of their financial allocation, which is then re-allocated by region.
 - Directors of Teaching Hospitals and specialized campaigns are informed of their allocation with a copy to the Director, Medical Supplies Division.
 - Based on the estimates prepared by Director/Teaching Hospitals and Specialized campaigns for local purchase and medical gases, Ministry allocates funds and informs accordingly.
 - Director, Medical Supplies Division supplies the medical requirements, and prepares monthly financial statements and sends these to all institutions concerned.

C. PROCUREMENT

- Procurement Policy

Considering financial constraints, nature of drugs, lack of storage facilities, short shelf life, high variations in annual demand, price factors etc the present system of supply is to procure the annual requirement of a drug in one consignment with deliveries being made from January that year. The SPC serves as the procurement agent for the MSD. The lead time required by SPC is eleven (11) months. Procedure varies for stock and non-stock items.

For stock items forecasts are made based on national estimates and national issues in the previous period and stocks in hand. In the case of special drugs (termed non-stock items) hospitals estimate their annual requirements based on past consumption patterns and procurements are done based on these requests. Local purchase of drugs at MSD occurs on

the basis of tenders, as does the purchase of surgical equipment and laboratory items. Technical evaluation committees report on the products prior to the tender board making their decision on the source of procurement. Composition of the tender board and its chairmanship depends on the value of the tender being called.

D. STORAGE

Two main activities are involved in this process:

1. Documentation
2. Storage: items may be stored by expiry date, batch number or as per label conditions.

E. DISTRIBUTION OF DRUGS

Distribution of drugs is done on a pre-planned quarterly programme basis with information relating to distribution schedules being sent to all institutions in advance. However issues are also made on submission of intermediate requests.

F. MONITORING

Monitoring of drug usage has to be carried out at all three levels: national, regional and hospital level on a systematic basis if drug shortages and wastage are to be avoided. The following measures can be taken in this regard:

- Preparing monthly out of Stock, Low Stock reports
- Holding a SPC–MSD meeting once a month to discuss the supply of out-of-stock items
- A weekly visit to be made by MSD officers to SPC to follow up on the decisions taken
- Mid year Analysis of supply/distribution

G. QUALITY ASSURANCE

The Drug Information Centre maintains and updates a database on drugs, accessible to medical staff. Reports of adverse reactions are examined by this centre with the Pharmacist of the Drug Information Centre functioning as the Secretary of the Adverse Drug Reaction Monitoring Committee.

The National Drug Quality Assurance Laboratory (NDQAL) under the Ministry of Healthcare and Nutrition is involved in the testing of quality of drugs and advocates the necessity to withdraw drugs where quality is found to be deficient.

The Adverse Drug Reaction Monitoring Committee comprises of the followings:

- Deputy Director General (Laboratory Services)
- Director - Medical Technology and Supplies

- Director - Medical Supplies Division
- Director - National Drug Quality Assurance Laboratory
- Professor of the Department of Pharmacology, Faculty of Medicine, University of Colombo

This committee meets once a month to discuss reports of adverse reactions to drugs. Complaints of adverse reactions are received by Director/MSD and all members are informed accordingly. Immediately on receipt of a complaint samples available at the MSD are sent to NDQAL for testing. Immediate measures are taken to withdraw drugs suspected of severe adverse reactions.

3.3.6 CRITICAL ANALYSIS OF PHARMACEUTICAL ISSUES

The inadequacies and shortcomings of the institutions at the different levels involved in the pharmaceutical supply process are highlighted together with suggestions for improving the process of drug supply management in the tables on the next few pages.

Such reforms in documentation and recording procedures and processes are of importance in the context of this study, as improving efficiency and quality of pharmaceuticals can enhance patient outcomes and contribute to cost curtailment.

TABLE 3- 2: PROBLEMS/WEAKNESSES/CHALLENGES & CONSTRAINTS

	National Level (MOH and MSD)	Regional Level	Hospital Level	Constraints/Challenges
Estimation	<ul style="list-style-type: none"> ➤ Estimates are prepared considering previous year's financial allocation. ➤ Estimates for the present year are prepared using prices from the previous year ➤ Actual consumption differs from forecast consumption ➤ Institutions give insufficient information to prepare accurate estimates ➤ Errors in institutional estimates ➤ Supplementary estimates of institutions not submitted on time. 	<ul style="list-style-type: none"> ➤ No attempt to verify estimates or even carry out cross-institutional comparisons ➤ Financial allocation is not known at the time of estimate preparation ➤ Estimation done on the basis of monthly consumption without considering financial allocation ➤ Supplementary estimates not prepared by institution ➤ No Divisional Medical Laboratory Technician to prepare estimates for laboratory chemicals and glassware 	<ul style="list-style-type: none"> ➤ Poor estimation procedures adopted resulting in drug shortages and wastage ➤ Wide variation in prescription patterns 	<ul style="list-style-type: none"> ➤ Training needed to improve estimation techniques ➤ Good governance to encourage officers to take responsibility for information provision and estimates ➤ Computer facilities needed to facilitate estimation and monitoring of stocks
Financial Management	<ul style="list-style-type: none"> ➤ Financial allocation for year 2006 is informed to provinces and central government institutions only in February/March ➤ Financial position is not discussed with accountants in region/hospitals by MSD. Officers ➤ Pricing done only on an annual basis ➤ Pricing formula does not consider stock in hand ➤ Pricing of locally produced goods done only on local market basis 	<ul style="list-style-type: none"> ➤ Lack of guidelines ➤ Lack of staff ➤ Not disaggregation of cost information by institution 	<ul style="list-style-type: none"> ➤ Lack of interest ➤ No monitoring ➤ Poor awareness of cost of drugs ➤ No group responsible for financial management 	<ul style="list-style-type: none"> ➤ Training needed on financial management ➤ Computerization at RMO and hospital level: necessitates hardware, software and training ➤ Awareness creation ➤ Need to devolve financial management responsibility to officers at hospital level.
Supply/Procurement	<ul style="list-style-type: none"> ➤ Long lead time required by SPC for the provision of drugs (11 months) ➤ Poor response by suppliers to urgent requests for drugs ➤ Lack of guidelines for procurement and supply of special drugs/replacements for withdrawn drugs/emergency drug needs ➤ Items not supplied according to schedule. ➤ Too many batches in a consignment ➤ Poor information flow on supply position 	<ul style="list-style-type: none"> ➤ Surplus/short expiry drugs wasted due to lack of monitoring system ➤ R-MSD invoices do not indicate Batch Number and expiry date 	<ul style="list-style-type: none"> ➤ Adequate buffer stock not maintained ➤ Drugs and surgical items are included in the same invoice 	<ul style="list-style-type: none"> ➤ Procedural shortcomings need to be addressed through the development of guidelines ➤ Good governance

	<ul style="list-style-type: none"> ➤ Poor monitoring of low stock items 			
Storage	<ul style="list-style-type: none"> ➤ Inadequacy of storage space ➤ Inadequate cold storage ➤ Poor storage leads to quality of drugs deteriorating ➤ Unserviceable stocks lying in stores ➤ Records of consignments lying outside stores not maintained. ➤ Goods Receipt Notes prepared by the storekeeper not checked and certified by other storekeepers. 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Inadequate storage facility (only two weeks requirement accepted from R-MSD due to lack of storage space) ➤ Only one weeks requirement stored at OPD/Indoor dispensary ➤ No record of batch numbers and expiry dates in stock registers. ➤ Bin/Lot cards not maintained ➤ No labourers assigned to stores 	<ul style="list-style-type: none"> ➤ More and better buildings ➤ Development of procedures for recording drug information ➤ Allocation of necessary staff
Distribution	<ul style="list-style-type: none"> ➤ Mal-distribution due to insufficient information ➤ Not keeping to distribution schedule ➤ Stock Transfer Vouchers prepared for issues lying in stores 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Computerization ➤ Better planning
Monitoring	<ul style="list-style-type: none"> ➤ SPC-MSD meeting only held monthly to revise supply of out of stock items. 	<ul style="list-style-type: none"> ➤ Lack of monitoring of supply/distribution of drugs, surgical items, laboratory items received by the region. 	<ul style="list-style-type: none"> ➤ Regular meetings of Drug Review Committee not held ➤ Quarterly drug returns not prepared. 	<ul style="list-style-type: none"> ➤ Better management practices ➤ Computerization
Quality Assurance	<ul style="list-style-type: none"> ➤ Supplies are not from reliable sources 	<ul style="list-style-type: none"> ➤ Circulars issued by MSD to withhold drugs are not followed up but left for the MSD to follow 	<ul style="list-style-type: none"> ➤ Quality Assurance circulars are not 	<ul style="list-style-type: none"> ➤ Better dissemination of information

<ul style="list-style-type: none"> ➤ Supplies not conforming to given specifications ➤ Tender boards focusing on price rather than quality ➤ Some institutions not responding to circulars issued on quality assurance ➤ Lack of follow-up on withheld drugs ➤ Quality testing not automatically done on the supplies from manufacturers whose products have been withdrawn from use in the past due to quality failure. 	<ul style="list-style-type: none"> ➤ Adverse drug reactions reported by institutions are not followed up ➤ Regional Drug Review Committee Meetings not held regularly. 	<ul style="list-style-type: none"> ➤ received on time ➤ Records relating to withheld/withdrawn drugs are not maintained. 	<ul style="list-style-type: none"> ➤ Better organization and cooperation at the Regional Level ➤ Systems and facilities for regular sharing of information at hospital level
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A. SUGGESTIONS FOR IMPROVEMENT

TABLE 3- 3: SUGGESTIONS FOR IMPROVEMENT

	National Level	Regional Level	Hospital Level	Cost Implications
Overall	<ul style="list-style-type: none"> ➤ Computer network connecting MSD, SPC, R-MSD, Teaching Hospitals and Base Hospitals to be established. 			<ul style="list-style-type: none"> ➤ Better information flows between the different strata would lead to greater efficiency and less wastage.
Estimation	<ul style="list-style-type: none"> ➤ Drug estimation to be done one year in advance. 	<ul style="list-style-type: none"> ➤ Divisional Pharmacist to be made responsible for providing accurate and timely information and valid estimates. 	<ul style="list-style-type: none"> ➤ Fix drug requirements of hospitals for 3 years and revise at the end of the period. ➤ Chief Pharmacist to be made responsible for providing accurate and timely information and valid estimates. ➤ Consultants to report on drug needs, so that estimates can be revised in line with their views. ➤ Consultants to be held responsible for estimation of special drugs. 	<ul style="list-style-type: none"> ➤ Poor estimation is leading to drug shortages and waste. Drug shortages could pose a heavy burden on patients in terms of either having to bear the drug costs themselves or doing without drugs/use of alternatives that may be less effective (longer illness and possibly greater costs in terms of treatment/hospitalization)

Financial Management

- SPC-Imports Department (DHS) section to be under administrative purview of Director – MSD
 - Letters of Credit to be established in time for supplies in January.
 - Continuous pricing system involving computer programme to be developed and implemented.
 - Worldwide Tenders to be called even for locally produced goods so that prices can be minimized through offering lower local prices.
- Computer system to be established at RMSD and issues to be made on computer printed invoices with description of item, batch number, expiry date, quantity and value.
 - Quarterly statement of value of issues made to be prepared and sent to each institution in the region.
 - Half-yearly meeting to be held with heads of all institutions in the region to discuss cost of medical supplies.
- Computer system should be established to record issues to wards/units.
 - Medical officers should be informed of price of medical items/drugs.
 - Purchase of vital stocks should be reimbursed by MSD.
 - Value of medical items consumed in each ward/unit should be informed to all Medical Officers of the wards/units every month.
 - Report detailing total finance allocation, amount utilized, value of issues to wards/units to date to be circulated among all Medical Officers(MOs)
 - Quarterly meetings of Medical Officers to be held to discuss these reports.
 - Decisions to control consumption of medical items to be made at the quarterly meeting of MOs and implemented.
 - Financial matters to be discussed at every drug review meetings.

Supply	<ul style="list-style-type: none"> ➤ A system of continuous reconciliation to of stocks to be carried out using a computer programme. ➤ Ministry to develop guidelines for procurement of special items. ➤ Fix order quantity for three years with SPC and revise at the end of period. Supplementary orders taken on an annual basis. ➤ MSD-SPC meeting to be held monthly to discuss supply of low stock items (in addition to out of stock items) 	<ul style="list-style-type: none"> ➤ Institutions to be requested to maintain records of items nearing expiry and to report on them to R-MSD 	<ul style="list-style-type: none"> ➤ Chief Pharmacist to check on supply of vital items weekly/monthly essential items and non-essential items on a quarterly basis and to be responsible for maintaining adequate stocks. ➤ Batch numbers to be indicated in the wards/unit drug request book when issuing drugs. ➤ Wards to maintain a record of all drugs/surgical items provided by patients. 	<ul style="list-style-type: none"> ➤ Better planning would allow for procurement of drugs and surgical goods at lower prices. ➤ Creating competition among suppliers would result in lower prices.
Storage	<ul style="list-style-type: none"> ➤ Expanding storage space at MSD ➤ Pharmacists to work in stores. ➤ Annual condemnation of unserviceable stock. 	<ul style="list-style-type: none"> ➤ Building and improving regional stores. ➤ Pharmacists to work in stores 	<ul style="list-style-type: none"> ➤ Building and improving hospital stores. ➤ Increasing cold storage space. ➤ Batch numbers/expiry dates to be recorded in all registers. ➤ Separate register to be maintained for special items. ➤ Stocks to be verified annually. ➤ Unserviceable items to be condemned annually 	<ul style="list-style-type: none"> ➤ Loss of money through drug spoilage, deterioration of quality necessitating drug withdrawal, poor efficacy of drugs is costly and inefficient.
Distribution	<ul style="list-style-type: none"> ➤ Ministry to develop guidelines/procedure for distribution of special items. ➤ Stock Transfer Vouchers to be prepared only when issues are made. 			<ul style="list-style-type: none"> ➤ Mal-distribution is costly in terms of both drug shortages and drug wastage.
Monitoring	<ul style="list-style-type: none"> ➤ Regular monitoring of drug supplies to prevent stock shortages and drug wastage. 	<ul style="list-style-type: none"> ➤ A medical Laboratory Technician (MLT) to be appointed as the Divisional MLT 	<ul style="list-style-type: none"> ➤ Monthly monitoring of supply and use of essential drugs. ➤ Mid- Year monitoring of all drugs supply and use ➤ Monthly meetings by the Drug Review Committee 	<ul style="list-style-type: none"> ➤ Prevention of drug wastage is cost effective. ➤ Monitoring contributes to better planning in the future.

Quality Assurance

➤ Blacklisting suppliers with a poor record regarding quality.

- Institutions and the R-MSD to maintain records of withheld/withdrawn drugs and to follow up on these issues
- Internal circulars about drug quality/withdrawal

➤ Maintain records of withheld/withdrawn items.

➤ Quality leads to greater efficacy and less damage in terms of adverse reactions.

3.4 COSTING OF PRIVATE HOSPITAL SERVICES

3.4.1 HOSPITAL COST ACCOUNTING

A. IMPORTANCE OF COSTING HOSPITAL SERVICES

Both public and private sector health care institutions, need accounting systems that enable hospital managers to produce an analysis of cost by service (product). Hospital services costing could be as simple as calculating per patient cost by dividing the total cost for patient care by total number of patients treated. This crude method however will not provide any comprehensive information on treatment costs, due to the differences and complexity of each treatment process. In a fee levying system, this method could not be justified at all.

Some essential features of a costing system are:

- the processes should be simple yet comprehensive and should be consistently adopted over long periods of time, with any changes in costing methods clearly publicized;
- the services should be clearly defined so that cost estimates could be prepared for each and every service variation (even if it is not always done in practice);
- the costing system should not complicate the patient care processes or compromise patient care in anyway;
- the administration cost of the costing system should not be a burden to patients or service providers: for the former would impact on the hospitals competitiveness while the latter would adversely affect its profit; and
- the accounting methods of costing must be based on verifiable and quantifiable information so that a third party should be able to verify and understand the costs.

The following sections discuss how costing processes could be and are adopted in private sector healthcare settings, with Durdans Hospital used as a case study.

B. DIFFERENCES IN TREATMENT PROTOCOL AND PATIENT RESPONSES

Developing a costing model for a hospital is a complex task. As an extremely wide range of services are provided, it is difficult to devise a uniform costing model appropriate to all services and all hospitals. Differences in methods and techniques adopted by clinicians treating similar conditions and individual responses of patients further complicate the situation. Therefore, even within the same hospital, the possibility exists for the emergence of two different costs for the same treatment process. In the private

sector this situation is further complicated by the range of treatment options available.

3.4.2 COSTING IN A PRIVATE SECTOR HOSPITAL

A. COSTING METHODOLOGY

Establishing a costing methodology and the management of costing procedures in private sector hospitals is extremely complex. To strike a balance in pricing while facing the dilemma of “competitive market challenges” and the provision of “quality Care” is a difficult task faced by private hospital managers.

Costing of services has a direct impact on pricing of services. “Price comparison”, prior to obtaining hospital services is a common practice by patients. Therefore, costing has to be done very carefully by qualified and experienced financial professionals, in order to maintain competitive pricing. Inputs of medical administrators to costing could be helpful to financial managers in computing more accurate costs to be used as the basis for pricing.

$$\text{Actual cost} + \text{Net contribution} = \text{Actual price}$$

Most of the time, Accountants propose pricing in such a way as to maintain a positive contribution. However there are instances when they propose pricing the service at less than the actual cost, leaving a negative contribution, in order to gain an advantage through market competition. Those strategic moves motivated by market competition, provide some benefits to patients, to obtain health services at competitive prices, and sometimes lead to reduction of prices ultimately. Occasionally however this may also lead to compromising of the quality of service, which is unethical. These “bad practices” will be carefully observed by the educated patients and sometimes they will reject those services, whereby the organization’s ultimate gain is a loss. Therefore, careful managers of health care services in the private sector are compelled to maintain a realistic costing policy while ensuring the quality of services. Simplified costing methodology is considered as a key feature in good financial management and control.

3.4.3 COSTING METHODOLOGY AT DURDANS HOSPITAL

A. INFORMATION FOR COSTING

Timely and accurate information is of utmost importance in operating a proper costing system. Manual operations almost always make costing processes complex and inaccurate. Managing large healthcare institutions necessitates a Structured Management Information System (MIS). A well connected

integrated MIS is essential to administer an appropriate and acceptable costing system.

Certain costs are simple and directly measurable. Delivering of tertiary health care is very complex as services are provided from various departments and units, and manual maintenance of accurate cost records is impossible. Therefore, a sophisticated records maintenance system is absolutely necessary in order to support the costing of health services.

At Durdans Hospital, Enterprise Resource Planning (ERP) System was implemented 5 years ago and maintenance of cost records have been made quite simple for the end user. All the services provided are entered into the system at the point of service delivery and the automated cost calculations are done by the system. This system is used by the hospital in all its financial operations including costing. The system is currently being extended to manage clinical information as well. Hence manual accounting has been minimized gradually. This system covers all departments of the hospital and final compilation and reconciliation has become quite simple.

B. CATEGORIZATION OF COSTS

There are different costing methodologies adopted by different private hospitals. At Durdans Hospital, Strategic Business Units (SBU) is used as the basic element of costing. The entire services of the hospital have been categorized into several SBUs and depending on the volumes of operations and clinical requirements a single SBU is divided into Sub-SBUs.

TABLE 3- 4: STRATEGIC BUSINESS UNITS AT DURDAN,S HOSPITAL

	SBU	Sub SBUs
1	Wards	Maternity Paediatric General Cardiac
2	OPD	General OPD Channel Consultation
3	Critical Care Units	Coronary Care Units General ICU Neonatal ICU Dialysis Unit Emergency Treatment Unit
4	Radiology Dept.	X-Ray Dept CT Scan Dept Ultra Sound Scan Dept. Mammography Unit
5	Operating Theatre (General)	In house procedures OPD Procedures Day cases

6	Durdans Heart Centre (a separate company under BOI)	Non invasive Cardiac Investigation Catheterization Lab Cardiac Operating Theatre Cardiac Surgical ICU
7	Non invasive Cardiac Investigation Catheterization Lab Cardiac Operating Theatre Cardiac Surgical ICU	Main Lab Satelite Laboratories (each one is a sub-SBU) Collection Centres
8	Others	Endoscopy Indoor Pharmacy Our Door Pharmacy Laundry Pantry

The services provided by the various SBUs are listed and costs are estimated for each sub-SBU separately. Pricing of each service is done according to the actual cost and market price. Certain services may have to be priced at less than the actual cost in order to keep the market edge, but the net gain of the SBU is maintained as a positive contribution.

c. MARK-UP ON PHARMACEUTICAL ITEMS

Patients as well as society frequently question the justification of a mark-up on pharmaceuticals supplied by private hospitals. In response, one has to analyse the costs involved in maintaining stores of pharmaceuticals. Those costs are

- Stockholding cost
- Space for storage and retail marketing
- Salaries of staff of relevant units
- Electricity
- Air Conditioning
- Maintenance of special conditions for certain drugs such as humidity and appropriate temperature levels
- Other infrastructure

In order to provide a complete health care package a fully stocked pharmacy is essential. This is not a visible phenomenon directly related with individual patient care but the provider is actually bearing a huge cost in maintaining pharmacy services and therefore, it is necessary to add at least a portion of these costs to the price of each pharmaceutical item provided to the patient through the hospital.

d. OUT SOURCING OF SERVICES

Out sourcing is a widely debated and discussed issue in this country and is widely practiced in developed countries. Redefining

out sourcing of health services to suit hospital systems is another challenge faced by health care managers. Considering the capital investment and direct and indirect costs, out sourcing has become a popular way of reducing certain costs.

In developing countries “payment on utilization basis” is becoming popular particularly for high tech diagnostics and therapeutic equipment. This would ease the burden of maintenance of the machine and managing manpower to operate them from the user (the hospital) and instead become just a payment on usage basis. Assurance of an uninterrupted service is then the responsibility of the supplier, and the ultimate beneficiary is the recipient of the service – the patient. Not only a reduction of capital cost but also the operational cost could be achieved through a properly designed out sourcing programme.

It should be noted that certain high tech diagnostics and therapeutic equipment available in the state sector are hardly used after routine working hours. Leasing out those services after working hours and on weekends to the private sector could be beneficial to both sectors, following a thorough feasibility study.

E. REVISION OF COSTS

Generally a cost review is done once a year and adjustments are done according to inflation rates. Net gains or losses made during the previous year are also evaluated prior to the revisions. Sometimes due to unexpected price increases due to the addition of new taxes and the significant depreciation of the rupee, cost revisions are done at other times in order to minimize losses but those instances are rare.

3.4.4 CONCLUSIONS RELATING TO COST ESTIMATES

Cost estimation is routinely carried out in the private sector in order to maintain the return on investments and to maintain profitability. Regular review of costs could result in cost-effective service to the patients as well as being beneficial to the hospital. Therefore, establishing a proper costing structure and methodology, maintenance of proper cost records and scientific evaluations of costs is essential for proper cost estimation.

It may not be easy to cost a product accurately in health care services as most of the disease processes are highly individualized. A careful study of several similar cases however would give broad guidelines for cost estimates. Therefore, the close involvement of medical administrators as well as accountants in costing processes is essential.

