

A REVIEW OF HOSPITAL COSTING STUDIES IN THE EASTERN CARIBBEAN



Issues, Pitfalls & Improving Practice

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Pan American Health
Organization

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LIST OF ACRONYMS & ABBREVIATIONS

ANOVA	Analysis of Variance
BVI	British Virgin Island
CDRC	Chronic Disease Research Centre
EC	Eastern Caribbean
DRGs	Diagnosis related groups
ECCB	Eastern Caribbean Central Bank
FHI	Family Health International
HERA	Health Research for Action
HEU	Health Economics Unit
HPMU	Health Policy Management Unit
HSV	Holiday, Sick or vacation Leave
Lab	Laboratory
MIS	Management Information System
MNS	Master Nursing Schedule
MoH	Ministry of Health
NHCDCS	National Hospital Cost Data Collection Study
ORG	Organisation
PAHO	Pan American Health Organisation
QEH	Queen Elizabeth Hospital
RV	Relative Value
RVU	Relative Value Unit
VH	Victoria Hospital
WB	World Bank
WHO	World Health Organisation

SECTION ONE

Introduction

1. BACKGROUND

Due to the ageing of the population and advances in medical technologies, extension of life with increasing prevalence of chronic diseases is a very real phenomenon of the era. Long term, costly and sustained health care utilisation under financially constrained conditions is observed as a result, presenting a major challenge to the region - Ministries of Health and care providers are under mounting pressure by governments and insurers to provide the most cost-effective care for patients. It is for this reason that the present climate of medicine is concerned to a large measure with cost containment and performance appraisal,

In aiming to achieve this goal, governments, insurance companies, intermediaries, large providers, consumer and physician groups are actively focused on the development and expansion of alternative care provision sites; sub-acute care; hospice; home health care; social, medical, and rehabilitative day care. To a major extent, developed and industrialised countries are able to make some headway in economic evaluation of options for setting priorities and defining the economic and service output components of care packages.

In the wake of increasing prevalence of chronic diseases including HIV/AIDS, the region is experiencing increasing demand for care and greater expectation of the medical technologies by those who demand care. Thus, rapidly escalating cost of health care is being experienced at all levels of the public health system. Coupled with the concomitant reduction in available financial resources, the region is faced with the need to find responsive, cost-effective, and equitable solutions to health care provision. Therefore, it is of utmost importance, now more than ever, for countries of the region to develop standardised approaches in the development of policies and strategies for cost containment and cost recovery, such as fees for service, social and health insurance schemes, etc. It is of the utmost importance that this move known as the health reform of the region should be undertaken in a united stance if it is to achieve successful outcomes. This therefore requires to some degree consensus between regional MoHs in the approaches that will be used to effectively assess and plan future health care delivery. Cost analyses, cost effectiveness and cost benefit studies are key in planning and monitoring the effectiveness of the policies and programmes implemented. The need therefore for reorientation of MOH systems towards using information on health needs, epidemiology, utilisation and costs is obvious.

For countries of the Eastern Caribbean, decision-making processes for the health reform have proved slow due, in part, to incomplete and inaccurate, resource utilisation and cost information required for the economic evaluation of care options. Simultaneously, improvements in reimbursement strategies such as the introduction of national health insurance schemes across the region are slow to materialise due to lack of information on service costs (based on expenditure and

service activity) vs. service charges (pricing). It is within the context of this background that this review has been formulated.

1.1 INTRODUCTION

Simple hospital cost analyses involves the allocation of direct and indirect costs to final products of services rendered by the hospital. It is a technique, which promotes effective financial management practices. It provides vital information on operational performance by cost centre (or service centre) necessary for

- Budgeting,
- Profitability analysis, ensuring that costs do not exceed available revenues and subsidies
- Budget variance analysis
- Programme/Service Planning & forecasting

Most importantly, and in the context of the Caribbean Health reform, knowledge of costs of hospital services is urgently required for the

- Improvements in allocative and technical efficiency (i.e. identifying areas of wastage, inefficient price scheduling, projection of future resource requirements and hence costs, and other health financing and policy concerns)
- Service expansion/contraction
- Contracting out of services
- Cost effectiveness of programmes

Table 3 (section 2) displays some elements of the strategic approach which require the input of hospital cost analyses findings to inform St Lucia's Health Reform Initiative.

The countries reviewed in this study are Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines, Anguilla, British Virgin Islands, Barbados and Montserrat.

Within the region, a number of methodologies have been developed to estimate cost of hospital services as accurately as possible with the information available. However, for various reasons discussed later, most of these methods have not been applied either by hospital management or health ministries in systematic ways to generate periodic profiles of service costs. The need to assimilate, standardise and computerise the approaches used is of utmost importance for the reasons given above, but also for ensuring a continuous evaluation and benchmarking practice among health care providers and decision makers.

The level of cost detail at all levels of health sectors differ from county to country according to the structure and accounting practices of the health services. These differences are extensive between regions but not observed to a great extent, within regions. However, within regions assumptions applied to the costing approaches were different in many respects and were apparent throughout the study.

This study explores the use of public sector health costing information in deriving costs of hospital services, and generally the use of such information in management operations. At the outset, based on findings elsewhere, it was expected that EC regional hospital costing studies would be sparse, or at best only a few studies would be complete or demonstrate robustness in the methods employed, while other studies would demonstrate gaps in the methods used thereby producing 'rough estimates in their output.

1.1.1 STUDY PURPOSE

This study aims

- To facilitate improvements in, and effective use of hospital financial and utilisation data and;
- To improve the capacity for Ministries of Health in the EC to cost their hospital services, for resource allocation, cost recovery and reimbursement, and service evaluation purposes

1.1.2 GOAL

- To provide a standardised approach for comparison of hospital services and costs across the Eastern Caribbean region, and internationally, for benchmarking purposes

1.1.3 SPECIFIC OBJECTIVES

This goal translate to the following objectives of the study:

- To identify the strengths and weaknesses of recent methods of costing of hospital services applied in the Eastern Caribbean (the study area) through a review of various reports and studies, and key informant interviews.
- To recommend standardised costing methodologies for the hospitals in the study area that are realistic and achievable. – Methods and approaches will be based on the availability and existing structure of relevant data.

-
- To test these recommendations through the development of a spreadsheet model/application based on an appropriate software platform, and an accompanying manual to implement this methodology
 - To pilot the methodology by applying the spreadsheet model to representatives of a selected Ministry of Health.

1.1.4 Beneficiaries & Outputs

The recommendations made will provide a model for performing costing of hospital services. The model will be transferable across the spectrum of hospital services in the Eastern Caribbean region.

It is envisaged that a broad spectrum of organisations involved in health care planning and the reform will benefit in the long term from the outcomes of this study;

- Health services
- MOH planning and financing
- Insurers
- External consultants and NGOs
- Research institutes in the Caribbean

This review is part one of four part study in which the planned outputs for the entire study include ;

- PART 1: A descriptive review of the costing approaches used across hospitals in the region.
- PART 1: Recommendations for standardising costing methodologies based on the current or planned information infrastructure within the regional hospitals
- PART 2: Spread sheet model to implement the recommended methodology
- PART 3: An accompanying manual to facilitate use of the spreadsheet model
- PART3: Recommendations for improved data requirements and collection methods for the improved costing of health services
- PART 3: Recommendations for standardised reporting and dissemination strategies for benchmarking and performance appraisal
- PART 3: Recommendations for manpower needs in order to apply and sustain of costing exercises
- * PART 4: Outcomes of a pilot application of the model at a test bed site.

SECTION TWO

Methods & Overview

2. REVIEW METHODS

2.1 LITERATURE

Due to the scarcity of studies undertaken within the Eastern Caribbean region, An initial review took in the whole of the Caribbean and Latin America and also included articles from developing countries in Africa and south East Asia depending on the level of relevance. Only studies undertaken in the last 10 years were reviewed.

Although the focus of this paper is to review cost analyses, literature covering studies in economic evaluations (whether cost effectiveness, cost benefit or cost utility) were reviewed. The criteria for inclusion of literature reviewed were as follows;

- Studies undertaken within the last 10 years (based on the assumption and recommendations derived from older studies)
- Any type of economic evaluation that included a hospital cost analyses exercise as a significant part of the study
- Studies undertaken with the Caribbean, Latin America, and developing countries
- Studies undertaken in developed areas were only included if they offered a novel perspective on the costing approach
- Studies that exhibited apparent gaps or strengths according to the fundamentals of cost analyses.
- Published guidelines on costing methodologies up to 20 years old

2.1.1 *Method*

Both grey and published literature was included in the review.

A search of Medline, NIH, and Kings fund databases was conducted to retrieve literature published in journals. An exhaustive search of institutions' publications lists was also undertaken to search for published documents for sale and for unpublished documents that were available upon request. Contact was made via phone calls and email messages with investigators who were identified through retrieved studies as having undertaken costing exercises, but whose work remained within the domain of the executing government.

2.1.2 **Results:**

Currently there exists, very little literature specifically on hospital costs in developing countries. Most studies have been conducted by aid organisations and are concentrated within Africa, and to a lesser extent, south East Asia. Very few studies have been conducted in the Caribbean and Latin America Region over the past 20 years. It is significant to note that only about 1% of hospital studies identified were published, the rest remain in the domain of the organisation that funded or undertook the study. Surprisingly, a small number of consulting firms who undertook hospital costing studies made the detailed papers available free of charge as a portable document format (PDF) files that could be downloaded via the internet.

As for papers published in journals, which focused on economic evaluation or cost of a specific hospital service(s), very few papers detailed the costing approaches used, in particular, the methods used to derive overhead and capital costs. In fact, most studies omitted to cost overheads or capital, only addressing the direct costs at the out set of the studies. Tables 1A and 1B summarise the literature of costing exercises selected for this review.

A large number of relevant guidelines targeting methodological issues have been produced over the past 20 years. These took the forms of books, discussion papers and case studies. Many of these exist in the published domain and others are available upon request, sometimes at a standard price, from the donor agencies of governments for which they were conducted.

Table 1A: Costing literature selected for this review

Country	Description of costing	Year	Type	Publication Source
Tanzania	Hospital services	1998	paper	Health Policy & Planning
Ifakara, Tanzania	Hospital services	1991	report	MoH
Zimbabwe	HIV/AIDS care	2000	paper	Health Policy & Planning
England	Orthopaedic surgery	1996	paper	J. of the Royal Soc. Med.
Ecuador	Hospital services	1993	report	Abt. Associates
Dominican Republic	Hospital Services	1996	Paper	Soc. Sci. Medicine
Malawi	Hospital services	1991	Report	World Bank
Developing countries	2 part review	1995	paper	Health Policy & Planning
Ivory coast	Health Services	1995	report	WHO
Omar	Hospital services	1995	paper	Journal
Watch MF, Smith I	Antiemetic therapy	1994	paper	Journal

Table 1B: Literature on aspects of costing methodologies selected for this review

Author(s)	Methodological Focus	Year	Source
Barnum H, Kutzin J	Public hospitals in developing countries	1993	WHO report
Bell B	Gold Coast hospital clinical costing handbook	1995	MOH Report
Bernam HJ, Weeks L	Financial management of hospitals		Book
Clements, RM	Canadian hospital accounting manual	1984	MOH Report
	Cost accounting		Book
Creese A, Parker J	Cost analysis	1994	
Drummond MF, Stoddard B	Health Economic: ..for clinicians	1987	Journal
Drummond MF et al	Economic Evaluation of health care Programmes	1987	Book
Drummond MF	Review of cost analyses	1985	Journal
Garrattini G, Pagano E	Model for calculating ward costs		Journal
Hall J, Mooney G	Economic appraisal for doctors I/II	1990	Journal
Hanson K, Gilson L	Bamako technical series - Financing	1993	UNICEF
Heidemann EG	Use of Standards		WHO
JacksonT	Hospital inpatient care	2000	Journal
Janowitz B et al	Costing Family Planning Services	1994	FHI Report
Over M	Health sector analysis	1996	WB Report
Australian Govt	National hospital cost data collection project	1996	MOH Report
Udvarheyli S et al	Review	1992	Journal
Shepherd D et al	Analysis of hospitals costs	2000	WHO

2.2 HOSPITAL COSTING STUDIES

2.2.1 *Method*

Detailed survey instruments (Annex 1) were sent out to Hospital Administrators and to financial controllers in the EC hospitals. Telephone interviews were conducted with key informants within MOH administration and in some cases with informants from the planning units. (See the acknowledgement for list of contacts).

The criteria for inclusion of regional hospital costing studies reviewed were;

- Studies undertaken in the last 10 years
- Only completed studies

- Any type of economic evaluation that included the hospital cost analyses exercise as a significant part of the study
- Studies of hospitals within the EC
- Studies undertaken in other Caribbean areas were only include of they offered a novel perspective on the costing approach

2.2.2

Results

All identified studies were undertaken between 1994 and 1999. Anguilla, BVI and Antigua provided no feedback in terms of telephone interviews, survey completion (despite phone calls) and tracing of existing reports on studies that may have been undertaken. A study undertaken in 1994 in BVI was identified but was unable to be sourced directly from the Peebles hospital where the study was undertaken, the BVI MOH or the donor agency that funded the study. Table 2 summarises the studies that were identified and fulfilled the inclusion criteria.

Despite the importance of hospital expenditure to overall financial management of health systems and for informing health reform planning, very little existed by the way of completed hospital studies undertaken in the Caribbean and Latin American region. Only a few organisation and academic institutions were actively involved in undertaking hospital costing studies on behalf of governments. The general pattern was that countries were observed as either actively undertaking costing studies and laying the framework for repeat studies (many of which had undertaken more than one study over the past 20 years), or not performing any hospital costing activity at all. The reasons for these were elucidated through the surveys and are discussed in the next section.

Table 2: Summarisation of Hospital costing studies identified

Hospital	Country	Year	Final product(s) (unit cost of?)	Responsible unit*
Glendon	Montserrat	1994	All	HPMU
Victoria	St Lucia	199	All	HPMU
Kingstown	St Vincent	1997	All	HEU
Princess Margaret	Dominica	1994	All	HPMU
JN France	St Kitts	1994	All	HPMU
Peebles	BVI	1994	All	HPMU
QEH	Barbados	1996	All	BUSPH
QEH	Barbados	1998	Dialysis CC	CDRC
QEH	Barbados	2001	Diabetes	CDRC
St Georges	Grenada	1999	All	KPMG
JN France	St Kitts	1998	All	ECCB
Victoria	St. Lucia	1996	All	HERA
St Jude	St Lucia	2000	All	HERA

* see list of abbreviation and acronyms

2.3 FRAMEWORK FOR THE ASSESSMENT HOSPITAL COSTING STUDIES

Seven general steps for computing unit costs have been defined by a number of authors (Hanson and Gilson 1991). However, with increasing use of spreadsheet costing models and clinical costing applications, it is recommended that other distinct steps must be incorporated into the process. The resulting nine steps are as follows:

1. Set the Framework: Define the purpose, objectives, viewpoint and assumptions
2. Define the final product(s)
3. Define the cost centres
4. Classify costs components of each input
5. Identify the full cost for each input
6. Assign inputs to cost centres
7. Allocate all costs to final cost centres
8. Compute unit cost for each final cost centre
9. Report results

It is important to note that there is no right or wrong way to estimate costs. What is important is the usefulness of the results. According to Drummond (Drummond *et al*, 1987), two questions apply, when one is assessing the ‘usefulness’ of a costing exercise:

1. “Is the methodology employed in the study appropriate, and are the results valid?”
2. If the results are valid are they useful to me in my setting?

To ensure validity of the final results it is important that the methodology is separated into discrete steps such as those described above. Then for each step, devise an approach that is valid in its consistency with the methods and definitions of the previous steps. Thereby, rendering the overall approach ‘true’ to the assumptions, viewpoints, purpose and definitions that frame the analysis. This will without a doubt, lend validity to the exercise.

Of the hospitals reviewed, a common approach was followed: from data deficient hospitals to the more data comprehensive hospitals. In general, the steps listed above were followed but not necessarily in the given order and steps were not always clearly defined. A small number of studies omitted to demonstrate the importance of steps 1 to 3 as pre-requisites to the costing exercise itself.

It is understood, however, that it is unrealistic to expect all studies to satisfy all requirements that contribute to strengthening (optimising the validity and reliability of results) the analysis. For a variety of reasons, often beyond the control of the investigator(s), many studies will not satisfy all criteria.

Therefore, this review does not intend to criticise, but aims to fill in the gaps, organise thought and promote discussion in developing common bases for addressing the problematic areas that arise in costing exercises.

This review is not by any means, a lesson in costing methods, the author assumes that readers are conversant with, or are learning the approaches to costing and appropriate methodologies. The author also assumes that the readers possess an interest in conducting, guiding or supervising hospital costing studies.

A comparative approach has been adopted, using the findings from the wide literature review and publications on methodological guidelines to lend strength to the assessment of the Eastern Caribbean hospital costing studies.

This review assesses the strengths and weaknesses of approaches to hospital cost analyses undertaken in the region within the context of 5 broad and fundamental principles drawn from the nine steps of the costing exercise necessary for producing valid and reliable costing results. These are defined below.

1. Specify viewpoint and purpose (and objectives): A clearly specified and answerable research question and an explicit perspective of the analysis. This sets the scene for the costing exercise by guiding the researchers in choosing or justifying methods to be applied. Although many investigators specify the purpose with a question, a clear statement suffices. With respect to the selected hospital costing studies, possible points of view include Ministries of Health, district health authorities, provider units, patients, society or insurers. Many government led studies will have multiple points of views and purpose. This is observed in St Lucia where a health reform is underway and the full cost of hospital services would be required for more than one purpose. Table 3 displays just some of the strategies that the St. Lucian Government have devised to tackle the issue of effective Health sector financing. The table shows that a number of strategies will rely on full and detailed costing at all levels of care.
2. Make clear statement of assumptions: All costing studies to varying extents incorporate estimates and assumptions into the methods used. In order to accurately account for differences observed, for instance, between the cost of competing service options or priorities, assumptions and sources of estimates must be clearly stated. Statements of assumptions are vital for maintaining reproducibility of the studies undertaken.

3. Clearly define links between the inputs, outputs and the organisational layout: this can only be established by defining the cost centres and cost components of the exercise in terms of how they relate to the final and intermediate products.
4. Systematically determine cost components included in the exercise: This is the most significant part of any costing exercise and involves comprehensive consideration and classification of costs (resource implications), using appropriate units of measurement and valuation. By defining the purpose and objectives of the analyses, the framework is established for deciding on what types of costs, economic or financial (see section 5) are to be included and how costs will be allocated to cost centres. For instance, it may not be worth investing time, effort and money in considering costs that are small and insignificant relative to the overall cost and therefore unlikely to make a difference to the overall study result. The categories however must still be specified and addressed but not in great detail such as tracking paperwork and records to decide to which specific cost centres to allocate these costs. General key informant discussion would suffice under such a scenario. As a general rule of thumb therefore; the more important a cost item is, in terms of order of magnitude or contribution to cost variations observed in that service, the greater the effort should be made to estimate or apportion the cost accurately. Take drug costs for example, in estimating the drug costs for a specific cost centre such as a medical ward or department, if the study purpose is to identify areas of wastage or variations in resource use across direct cost centres, then it would be necessary to exclude the variable direct costs such as drugs, laboratory tests etc from the per diem (or bed-day) cost and calculate these separately according to actual usage. If the actual usage is not available, then it may be necessary within time and cost constraints to observe or review a sample of patient record for the department log book. This approach is explained further in section 5.
5. Consider capital costs: Perform valid adjustments for differential timing (i.e. the techniques of discounting and amortisation of capital outlay during a defined study period). Another pertinent question in deciding how to address costs is the whether to incorporate the opportunity cost of capital such as buildings, land, equipment and vehicles into the analyses. Many studies have chosen not to, and just addressed the amortisation of capital i.e. the depreciation expense. The decision as to whether to include capital items and to what extent is dependent on the purpose of the costing exercise and the approach being used, i.e. financial or economic. (see section 6)
6. Undertake sensitivity analyses: A sensitivity analysis tests how responsive the results of a study are to changes in assumptions and the magnitude of key parameters. If all the above fundamentals have been adhered to then it is

pertinent to undertake a sensitivity analyses to compare results when adjustment to estimates or assumptions are modified. This would be extremely important in the case of using the cost analyses to inform the programme or service planning process. For instance, it would be necessary to derive estimates of unit cost under different discount rates, with and without opportunity costs, with and without capital, with and without non market items, and so on. For example, in the case of St Lucia, a number of strategies in table 3 will rely on full and detailed costing at all levels of care. It is apparent that for comparison purposes, methods will have to be standardised, and assumptions and estimates justified. Instead of repeating studies for each of the issues at hand, it would be more cost effective approach for investigators to vary parameters of assumptions and estimates and therefore, detect changes in the costs of services in response to the inputted changes. Changes to cost parameters could include the incorporation of cost components previously omitted from cost calculations. Analyses of variance is often advisable to assess the statistical significance of changing the magnitude of cost parameters or introducing a different costing approach.

2.3.1. *Limitations to the review*

Not all the surveys were returned and as a result, proxy phone interviews were conducted with the next best informant. Obviously face-face contact would have been the best approach, but available resources prohibited this.

Table 3: Health Sector Financing in St Lucia – Justification for Cost Analyses

Issues	Strategies
How will health services be financed?	<p><i>Assess capital needs and recurrent cost of services</i></p> <p><i>Ascertain the cost of health service. Implement financial reform in the health sector</i></p> <p><input type="checkbox"/> <i>cost recovery – User charges that reflect the cost of providing public health care or recovery of proportion of consultants private practice fees (to compensate for salaries paid for non hospital activities)</i></p> <p><input type="checkbox"/> <i>cost containment – tighter controls over budgets and supplies</i></p>
How should health funds be allocated for the provision of health care services?	<p><i>NHI- will pay hospital bills and reimburse clients (NHI should not be saddled with excessive debt especially during the early stages of its operation).</i></p>
How can the Ministry of Health reduce inefficiencies?	<p><i>Separate service provision costs from administration costs</i></p> <p><i>Tie budgets to desired outputs and outcomes</i></p> <p><i>Develop ratios between Health Reform outcomes and desired outputs.</i></p> <p><i>Develop recording systems to monitor expenditure</i></p> <p><i>Allocate finance to cost effective operations</i></p>
How should health providers and institutions be compensated for services?	<p><i>Fee for service – This method must be properly controlled</i></p>
What should be the role of the Government of Saint Lucia in the provision of health care services?	<p><i>Determine total financial requirements of health care services.</i></p>
How should the finance component of the health system be organized?	<p><i>Decentralization of health services to health regions in order to provide greater autonomy to manage budgets and operate as statutory institutions</i></p> <p><i>Develop National Health Insurance as the major financial component of the health system for public sector funding</i></p>
The relationship between capital and recurrent expenditure	<p><i>Conduct optional appraisals i.e. include capital and recurrent cost implications in all financial estimates and project reports</i></p>
The escalating cost of health service provision	<p><i>Establish a National Insurance Scheme</i></p> <p><i>Make use of earmarked taxes in the provision of certain services</i></p> <p><i>Institute user fees for the use of government institutions by private health professionals.</i></p> <p><i>Monitor and evaluate expenditure patterns in health institutions</i></p> <p><i>Greater regulation for public and private sector activities eg. fees charged, types of services provided, activities of hospital personnel.</i></p>

2.4 GENERAL OBSERVATIONS

A cost analysis is an essential part of any economic evaluation exercise whether the aim is to estimate the unit cost of services or to compare the cost of two programme/service options and related outputs, as in cost effectiveness and cost benefit studies. It is well documented that the most common difficulties associated with such studies are experienced during the data collection phase (Udverhelyn 1992). As observed in Udverhelyn's meta-analysis of 77 cost-effectiveness analyses publications, the most common deficiencies of the costing exercise in most studies reviewed were associated with identifying and quantifying costs associated with overheads and labour and capital

Of the literature and regional studies reviewed, the common difficulties were as follows;

- Perspectives of the analyses were not stated
- Costs components were insufficiently identified and quantified, particularly overheads and labour
- Allowances for differential timing of capital costs were not fully considered
- Failure to perform sensitivity analyses in the case of economic costing
- Wide variation in the understanding and application of economic costing methods

Hospitals for which costing studies were identified appeared to be more actively involved in exploring ways of improving on their accounting practices and structure of financial information to facilitate cost identification for management and reimbursement purposes. For hospitals that were not actively undertaking costing activities, the general trend observed was that they found it hard to commence such studies in the face of unclear and deficient cost and utilisation data. One hospital, which did attempt costing in the face of extremely incomplete cost data, was the Glendon hospital in Montserrat and St. Georges' Hospital, Grenada.

MOH personnel from Grenada expressed difficulties in identifying expenditure from the vote book. However upon further discussions, it was revealed if effort and time was spent undertaking a detailed inspection of the vote book vouchers, this difficulty could be overridden. Therefore, it was in fact, time and cost constraints that were the biggest barriers to undertaking costing exercises.

As expected, apparent deficiencies with respect to availability of data at hospital level was observed in all studies reviewed. As a result, investigators were forced to devise or adopt approaches to apportion or estimate costs at the hospital department level (refs). For instance, many hospitals used interviewer or self-administered survey methods or roster reviews to estimate direct labour costs. However it was

noted that across the board, both within the EC and internationally, methods in survey designs, data collection methods and data collected differed extensively in their composition and structure of raw data.

Unfortunately, this has resulted in the non-comparability of cost analysis results between ‘like’ hospitals within regions and internationally due to the existing differences in economic conditions (e.g. countries of southern Africa). *The greatest deficiencies therefore, were the non- standardisation of cost apportionment, cost centre definition and data required to feed into costs within regional or ‘like’ hospitals.*

This problem is observed to a significant extent in the EC because, although most hospitals possess similar data structure at the aggregate levels such as MOH, activity and cost data at the hospital level is not only deficient, but is also collated or grouped in varying forms depending mainly on the hospital practice, force of habit, abilities of staff in data recording, etc. Essentially, no standards for raw data collection exist. To compound the problem even further, it was found in all the EC hospitals that all the pre-requisites of a clinical costing system were missing.

Pre requisites of hospital accounting systems

1. *A chart of accounts relating to the functional organisational layout*
2. *Departments identified as cost centres*
3. *Accurate accounting system that collects financial data by cost centres (departments) with the data displayed by expense and revenue items identified from a chart of accounts*
4. *Up- to-date management information system (M.I.S) that collects non-financial (service and utilisation statistics) by cost centres.*

Variations between costing practices at EC hospitals were observed mainly in the following areas:

- Types of labour activity identified and costed through surveys (i.e. what constitutes 100% of Doctors’ time?. And how does the survey define the splits? Are private consulting times considered?)

-
- Cost centre definition: important when comparing like hospitals to be able to relate differences in costs derived for similar cost centres back to the scope of activities undertaken in those cost centres.
 - Identification, classification of recurrent and capital cost items
 - Apportionment of overhead, capital and ancillary costs to final (clinical service) cost centres
 - Bases of allocation differed according to the next best variable available from hospital infrastructure and demographic data.

The need to undertake this standardisation process for the sake of ‘benchmarking’ and for effective use of costing information processes has been recognised in Australia for the past 8 years. As a result, the national Hospital Cost data collection study (NHCDCS) was initiated in 1997 and sets out national standards;

- For defining staff activities that make up personnel costs
- Defining cost centres (cost centre mapping)
- Options for identification and apportionment of overhead costs and ancillary costs
- Cost definitions and categories
- Monitoring the utilisation of final products
- Recording infrastructure, demographic and utilisation data
- Definition of final products and units of measurement

SECTION THREE

Setting the Costing Framework – Purpose, Viewpoint and Assumptions

3 SETTING THE COSTING FRAMEWORK

3.1 *Purpose and objectives of the analyses*

Purpose & Objectives: Of the fourteen studies reviewed, three did not clearly define the study purpose (Fairbanks 1996), (Huff-Rousselle) and (LaFoucade 1997), the word ‘purpose’ was interchanged with the term ‘objective’ in one other study (Lucas 1994). In general, the purpose of the studies was to derive the total cost and unit costs of all clinical services. In one two part study (HERA 2000) on Victoria Hospital and St Jude’s Hospital, St Lucia, a second ‘objective’ was ...”to compare the unit costs of both hospitals” and a third, “ ... to advise on where economies of scale and/or savings could be made for the same level of output”. Terms of reference were also given. Again, the earlier Victoria Hospital study (Huff-Rousselle 1996) compared findings against results of an earlier (1987) study conducted at the same hospital. Three hospitals detailed a set of recommendations (refs), while 2 studies (refs) gave an interpretation of the findings. It was obvious from the recommendations given; that the popular assumption was that information was to be used for managing or setting the health budget. However, a number of informants from the MOH’s surveyed specified the need to use cost information in setting fees for the purpose of cost recovery.

The exceptions to this generalisation were the studies conducted at Victoria Hospital, St. Lucia (HERA 2000) 1 and at Kingstown Hospital, St Vincent & the Grenadines (LaFoucade 1997). The investigators of the Kingstown study clearly tied the results of the cost analyses back to the goals of the national health insurance project - under which the costing was performed. They clearly stated what the results would be used for and the intended beneficiaries. In doing so, a framework for deciding on the most valid methodologies to adopt was developed.

3.2 *Viewpoint*

Although it was apparent that all studies were undertaken from the view-point of the provider unit (MOH and Hospital) this was not stated in all reports.

3.3 *Assumptions*

By definition, assumptions are generally never 100% certain and are instead made on varying levels of accuracy. Assumptions must be based on ‘concepts that are tangible or sound’ to be statistically valid or at an acceptable level of accuracy. It is therefore important for the sake of argument and reproducibility of results that assumptions made in the costing studies are always cited and the bases for assumptions highlighted. This exercise also ensures the transferability and reproducibility of methods, and comparability of results in future studies undertaken

in the in the same setting. Assumptions are made at two levels. In setting the framework for the study, major assumptions are as important as the purpose. They may be simply that expense is used as a proxy for costs. The second level assumptions arise at methodological parts of the study. It may be that one clinic session is 3 hours in duration, or that junior nurses remain true to their rosters and do not move between departments or cost centres at random or that a discount rate of 3% is realistic.

Many of the studies did not cite major assumptions at all with the exception of (LaFoucade 1997). In addition, the methodological assumptions were often not clearly stated. Despite the investigators of the HERA studies producing very detailed and descriptive sections on the costing framework and methods, it appeared that any major assumptions were simply forgotten. Assumptions on the methodological levels were explained in detail which also included explanations of the bases on which assumptions were made.

“.....It is therefore important for the sake of argument and reproducibility of results that assumptions made in the costing studies are always cited and the bases for assumptions highlighted”.

In the same way, Huff-Rousselle provided the methodology in great detail, but omitted to cite any major assumptions. . Lucas (1998) cited the estimates made on hospital infrastructure as the studies only assumptions. However, it was unlikely that this was the only set of assumptions as the studies main limitations was cited as the “...lack of detailed financial information on hospital operations.....where detailed information was lacking assumptions were made by the Advisor and hospital administrator”.

SECTION FOUR

Definition of Final Products & Costs Centres

4 PRODUCT DEFINITION

Once the purpose of the study has been specified the next step is to list the intermediate and final products:

- Final product: these may be unit or (total) cost of ward or unit cost of a specific service (department) or unit cost of treating a specified disease group e.g. HIV
- Intermediate product: products that are generated as a necessary input to deriving the final product (output). e.g. drugs prescribed

The choice of final products is dependent on:

1. The purpose of analyses; If the purpose is to estimate cost of service provision in the hospital across all departments then the final product would be separate unit cost of each department. Alternatively, if it is to compare the cost of treatment of specific diseases in different settings then the final product would be unit cost of treatment, and if the purpose was to compare the cost of treating inpatients in two different settings in the same hospital e.g. GP step down-ward and a normal acute inpatient ward then the final product would be separate unit cost for each ward being studied. If the study purpose was to calculate an average (unit) cost of care in one hospital compared with another of similar caseload, Diagnosis related groups (DRGs) etc. one would define the final product as the unit cost of hospital inpatient service for each hospital being studied.
2. The level of data available: This is the key factor that determines the study methods, and thereby also determines the final product resulting from the methods applied. The greater the level of detail of existing data, the greater the level of accuracy of the final product i.e. if ward level data exists then one can compute unit cost by ward at ease, with no great deal of effort required to undertake further data collection. If one were to define final product at ward or disease group level, but only department level data was available, 2 approaches would suffice;
 - Exclude intermediate products (drugs, x-rays, labs, etc) from the department totals and then apportion the total cost of a particular department across wards based on activity levels of each ward derived through observation of activity across a short time period. This will give the total cost for each ward. The total cost may be different for each ward based on the differences in activity levels however; the unit cost will be the same value for each ward. A unit cost for each

intermediate department output is identified separately. For example, unit (average) cost of lab tests, average cost of x-ray, average cost of physiotherapist interventions are calculated and then apportioned to wards or disease groups using a basis that defines percentage distribution to that ward or disease group. The final products at ward level will be the total costs for each ward plus the total costs associated with the level of consumption of intermediate products for each ward divided by the activity level. The estimation of the level of consumption by ward or department is discussed in great detail in section 5.

Bear in mind that while it may be possible to derive unit cost of ward or disease group in the face of data being available at department level only, that additional time and resources would have to be committed to undertaking detailed data collection. These two factors are key in choosing the level at which to define cost centres and is discussed in section 4.1 below.

All studies reviewed, clearly tied the purpose (where given) back to the final product definition. Although only one study gave clear definitions of final products (Huff- Rousselle, 1996), all demonstrated in their results, the final products (output) activity to be defined as the separate unit costs of hospital services. It was clear that these final products were derived within the parameters of hospital organisational structure (e.g. cost centres or service departments, see section 4.1), but not necessarily within the constraints of data availability for a few of the studies reviewed (Gill 1994) (Gill/Percy 1994) (Lucas 1998).

“.....the choice of final product depends mainly on 2 factors: the purpose on analysis and the structure of available data..... these factors, in turn define the methods to be used in deriving the cost of the final product”.

For instance, in the St. Kitts study (Lucas 1998), investigators defined final product based on hospital structure rather than on data availability. This was because data at the lower level of detail was extremely sparse, so rather than just calculate the unit cost of hospital inpatient care (which would have been of little use to the clients) the investigators filled in data gaps through detailed discussions, surveys and observational exercises.

4.1 COST CENTRE DEFINITION

Cost centre definition in any hospital cost accounting systems represents the types of services that are delivered to the hospital, location and organisation of services, and the relationship with the final products in the accounting system. Assignment of cost centres under these factors is mainly for managerial purposes. These are three types of cost centres;

- Direct (or patient care) - i.e. those cost centres that provide services directly to patients and thus generate the final product of service,
- Indirect (overhead) - those cost centres whose services are spread across a number of other hospital cost centres and cannot be directly linked to the final product
- Intermediate – those cost centres directly linked to the generation of an intermediate product. These are usually ancillary cost centres such as laboratory, radiology, pharmacy, physiotherapy, social work, and outpatient.

Many studies observe the fact that hospitals provide both inpatient and outpatient services as a routine function of daily operations. Both services require the input of intermediate products. Therefore outpatient services, which would include physiotherapy, chiropody, dialysis unit etc. are designated as final cost centres in such studies (REF).

In general, most of the studies reviewed defined the cost centres. However, the studies undertaken at the Victoria hospital (HERA 2000), (Huff –Rousselle HPMU 1996) and at the QEH (Adomakoh 1998) were the only studies in which the cost centres were clearly defined. Clear definitions consisted of descriptions of activity and location of many of the cost centres defined. Cost centre type was also specified according to final, intermediate or overhead cost centre. Employing a fairly dogmatic approach to cost definitions as observed in these studies is extremely important as the definitions and costing methods provide the framework for cost

“.....Employing a fairly dogmatic approach to cost definitions as observed in these studies is extremely important as the definitions and costing methods provide the framework for cost Models.....”.

Models, which would be important and useful spin off from all the studies reviewed to allow subsequent costing of the hospital services. The Earlier QEH study (Fairbanks 1996) was extremely sparse and provided little detail on cost centres until the presentation of results whereby footnotes were added.

In the Victoria Hospital (Huff-Rousselle 1996) study, reasons for merging one or two services into one cost centre (cost centre mapping) were provided in detail. Given that cost centre levels varied in terms of data structure and availability, it was necessary at times to merge cost centres where service statistics did not differentiate between cost centres. All studies (except Fairbanks 1996 and Lucas 1998) provided information on this ‘mapping’ process, but again, the Victoria Hospital and QEH studies did so in greater detail.

This was not stated at all in the St. Kitts (1994) study and was made apparent under the ‘allocation of cost’ heading.

Most of the hospitals reviewed assigned the inpatient cost centres by department or specialty. Only Glendon, St Kitts and JN France broke down the Medical, surgical wards into the designated units in line with the hospitals’ management and organisational structure. These were male and female wards specifically. This observation will be common for the smaller bedded hospitals since due the low bed capacity, only one or two wards make up a clinical inpatient department. In actual fact therefore, except for the male and female medical and surgical wards, the other wards existed as department level cost centres.

On closer inspection of the larger hospitals possessing more complete data, it was noted that despite the fact that statistics on utilisation, floor space, laundry, meals and drugs existed at ward level within these hospitals (VH 1996, VH 2000, QEH 1996, QEH 1998), inpatient cost centres were defined at department level. Some reasons as to why this approach was taken may include:

- i. To maintain standards for the comparability of costs across like hospitals – it is easier to assign costs at department level since some it is more likely that many hospitals are not able to separate statistics at ward level.
- ii. Department cost centres were reflective of the management structure, thereby, maintaining the management function of the hospital
- iii. Data availability: Although a proportion of the available data existed at ward/unit level, a larger proportion of data that significantly contributed to the accuracy of the final product did not e.g. staff time, drugs, diagnostics, etc. To obtain such information at an acceptable level of accuracy would require additional resources (see previous section).

If the larger hospitals were to define their final cost centres at ward instead of department level, then it would be necessary to track movements of staff both nurses and doctors across the wards since it would be highly likely that nurses are moved between wards in the same department despite the roster allotment, and doctors may spend more time in a particular ward that houses patients

requiring greater treatment intensity. For instance, gastro-enterology or cardiology patients generally require greater clinical input than general medical patients and in some hospitals tend to be housed in particular medical wards perhaps with more acute general medical patients while the majority of less acute general medical patients are housed in others.

Therefore consumption of physician time, supplies, drugs and other ancillary service resources may be significantly varied across wards within a department, thus highlighting differences in total costs at this level. Garratini (1999) demonstrates this concept in a detailed costing at ward level undertaken at an Italian hospital. Costs variation between ophthalmology, Cardiology and general medicine were demonstrated and showed the general medicine service was shown to be at least four time less costly than the cardiology service (both within the medical department) to run.

If the decision is made to assign cost centres at ward level, it must also be decided that it will be necessary to reflect differences in resource consumption due to variations in activity and treatment intensities. In this way, the most accurate approach (under time and cost constraints) to assessing staff costs by cost centre would be to observe staff movements over a given timeframe or to survey the nursing staff through questionnaires. This approach is supported by recently produced National hospital costing handbooks in both Grenada (KPMG 1998) and Australia (NHCDC 1997). The Grenada study went on to suggest a second level of allocation to direct cost centres – they mapped the unit level cost centres to department level and “rolled up” the costs to reflect department/specialty level costs. This method is valid in theory, and in particular is used in the design of clinical costing information systems whereby costs are tracked at the lowest levels of activity and rolled up to department or specialty level. However in this particular study, data was extremely deficient at the unit and ward level, rendering the first stage allocation to wards or units as a fruitless exercise. The second stage allocation to specialty level would have achieved the purpose of the study.

At department level cost centre, a less challenging review of the roster for a defined period within the study period would be sufficient bases for identifying the cost of nursing input across final cost centres.

Cost centre definition is vital and is dependent on the purpose of the study. If the final results are to be used to explore areas of wastage the ward/unit level cost centre will identify this in greater detail. If however, the purpose is to compare costs between hospitals with similar case-mix and utilisation rates, the department level cost centre is more appropriate as the spectrum of clinical activity within departments or specialties is likely to be more comparable between departments than at ward level.

SECTION FIVE

Classification of Costs

5 DETERMINATION OF COST COMPONENTS INCLUDED IN THE EXERCISE

The issue of deciding which cost components (inputs) to include in the analyses is of utmost importance when deciding how to 'fit' the methodology to the purpose of the study.

Firstly, what is actually being costed? Is it all resources (service inputs) required to deliver a defined unit of service (output) regardless of whether or not the resource is provider expenditure? Or is it only those resources purchased by the provider(s) that are required to produce a unit of service that are considered? Economists traditionally adopt the former approach when undertaking costing exercises. Conversely, accountants usually adopt the latter 'financial costing' approach.

The approach chosen is dependent on the purpose and viewpoint of the analysis. For instance, if the purpose of the exercise is to compare expenditure against hospital budget allocations or to explore the affordability of the service, only actual expenditure would be required. (i.e. using shadow price instead of Market prices), ignoring non-hospital costs. Conversely, if the purpose is to address sustainability or consider duplicating the service elsewhere then the cost of all resources consumed must be considered.

It appears that all studies lean towards the financial approach, which was apparent in the methods chosen to cost donated goods and capital items, discussed later on in this section and in section 6.

Financial costs represent actual expenditure on goods purchased in order to provide a given service. In this respect, all that is required is the level of expenditure on the goods purchased. However, from the economic viewpoint the value of using resources that could have been used for some alternative means is considered in the exercise and is known as the opportunity or economic cost. Economic costing approach differs from financial costing in the way certain expenditure items are addressed;

- Donated goods and services (non-market items) - If the purpose of costing is to estimate cost of providing services under a given health programme (or even building a new hospital), then programme sustainability must be assessed. Therefore, all donated items that are used up in the study period or deemed necessary, must be 'valued' in the event that the responsibility of purchasing the resource shifts back to the provider. The studies undertaken in the larger hospitals - The Victoria hospital study (Huff-Rousselle, 1996) addressed all donated item costs by performing detail interviews with key

personnel and inspection of off-budget sources. However, the cost of donated goods such as small equipment and supplies were omitted from the study since they donations were “of no significant value “(not deemed to be vital or necessary for the services provided) to the hospital. Within Kingstown hospital (LaFoucade), and the smaller hospitals the issue of donated goods and services was not addressed at all.

- Other inputs whose prices are incorrect or distorted: For instance, in the case of the purchase of drugs or equipment at subsidised rates from the supplier. This is a common process in developing, and to a lesser extent, middle-income regions. For instance, in the case of the purchase of drugs, a government may pay the shadow price for particular drugs that are either less than or greater than the market price (real price). In many countries the import prices are subsidised under some form of agreement in the purchasing contract. Such agreements are usually continued and renewable for the foreseeable future or until a change in political standing whereby prices may become inflated due to political tying to certain suppliers, or distorted due to devaluation or unrealistic exchange rates. Due to these possible price fluctuations, researchers have more often adopted the more pragmatic approach and used the market price in the costing exercise. However, in the regional studies, it appeared that as expenditure was extracted directly from the vote book, shadow prices were inadvertently used to cost any recurrent items such as drugs, laboratory supplies and small equipment such as computers and incorporated into the final cost.
- Valuation of capital items. Again, most researchers will choose to use the current market price of an item, particularly for small furniture and equipment, and also for larger capital items which have shorter useful life e.g. vehicle in developing region or areas where roads may be poorly finished. In the case of buildings and other longer lasting items (over 20 years of useful life) if the capital has been donated then its capital replacement cost may be omitted altogether. It was not clear in any of the studies reviewed, whether market price or shadow price was taken as the replacement cost of capital. It is expected that current market price was used. Capital items are discussed in section 6 in more detail below.

All studies were conducted in local currency or the regional standard dollar, the EC dollar. If regional comparisons are to be made, this approach is appropriate. However if differences in cost of various components of service inputs (such as staffing and capital) between regions are the focus, then converting all unit, total costs to the US dollar is advised.

5.1 CLASSIFICATION OF COSTS

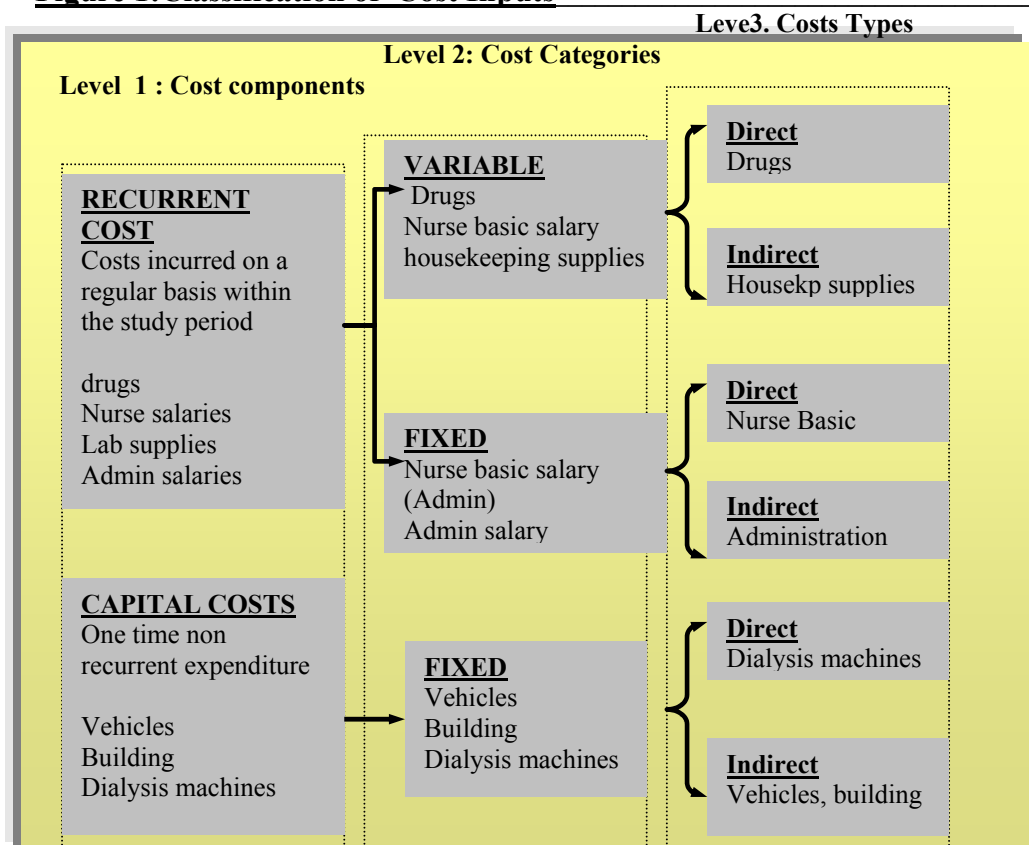
Most studies classify inputs according to 2 levels of costs:

1. At the first level, costs associated with inputs are either recurrent cost items - which are incurred on a regular basis such as drugs and clinical staff salaries and may vary in magnitude from one period to another as a result of changes in activity of service utilisation activity.
2. Capital items are one-time non-recurrent expenditure.

Recurrent items are either variable or fixed at the second level of classification (figure 1), while capital cost components always fall into the fixed cost category.

At the third level in most studies is the distinction between overhead (or indirect costs as referred to by hospital administrator) costs and direct costs. Direct costs are those costs associated with items directly attributable to an intermediate or final product, while indirect costs are those which may contribute to the running of the hospital but are not directly linked to the a particular product or cost centre. Figure 1 shows the classification diagram of cost inputs. One study (KPMG 1998), defined overheads as a cost type distinct and separate from indirect costs.

Figure 1: Classification of Cost Inputs



No methodological publications retrieved through literature searches supports this concept, in fact, Drummond (1982) specifies overheads and indirect costs to be the same cost type. Indirect and direct costs are further separated into cost types of fixed, semi-fixed or variable costs. Economists tend to use fixed and variable cost types only.

Variable costs are those that vary directly with the activity levels in the direct cost centres such as the cost of drug, lab tests, dressings etc. Figure 1 shows the steps in classification of cost inputs. The methods chosen to estimate the variable cost component for each cost centre is extremely important, what ever the purpose of the exercise. This is because variable costs are driven not only by patient numbers, but are influenced significantly by severity of illness i.e. distribution pattern of case-mix groups (CMG) or diagnosis related group (DRG) of the patient load in each cost centre. Section 5.6 discusses the treatment of intermediate cost centres in greater detail.

Fixed costs are those costs that are unaffected at cost centre level by in-year changes in clinical activity. Such costs include administrative input, capital equipment, etc. Cost centre definition dictates the classification of some variable direct costs, to a significant extent in some cases. For instance, using nursing basic salary as an example, if department cost centres are used instead of ward cost centres then nursing basic salary costs are fixed as they are unlikely to change within the financial period as a result of tight budget controls, union laws and established contractual agreements. However if the cost centres are classified at unit/ward level then moving staff between wards *within the same department* as a result of changes in ward activity levels is a very likely possibility and makes it necessary to classify nursing basic salary costs as variable.

It is important to note that other nursing salary cost items such as casual, temporary and overtime salary are usually assigned as variable since it is highly likely that at either ward or department cost centre level any additional staffing required will arise out of the casual, temporary or overtime staff budget essentially, the variable aspects of nursing salary costs.

The KPMG Study chose to identify a third category - semi fixed costs, separate from fixed costs and have recommended the use of this cost type in hospital costing studies. However, in a review of the National costing manual for Australian hospitals which was produced with assistance from the same institution that produced the Grenada study, semi fixed costs were addressed in detailed discussions and consensus reached to exclude it as a separate cost category. While Drummond (1986) refers only to fixed and variable costs.

In turn, as seen in the previous section on cost centres, classification of cost components determines the methods to be used in the direct allocation exercise. Another example as to how cost classification drives allocation when capital costs

are either direct or indirect is shown in table 4, which demonstrates the definitions of categories and type of costs through an example of cost analyses of dialysis services (adapted to include more detail from Adomakoh 1998).

Table 4. Cost categories associated with dialysis provision.

Hospital level (cost type)	Component	Cost category	Cost Items
Case level (direct)	Recurrent	Variable (recurrent)	Inpatient and AKU* : Drugs, lab tests, x-rays and other diagnostic interventions
Unit level (direct)	Recurrent	Variable (recurrent)	Dialysis unit: Dialysis - related Supplies, supplies, Physician and nurses income social workers income, dietician income Operating and recovery Room Anaesthetists income, surgeon's income, theatre nurses' income, surgical supplies Inpatient direct nursing care (income), doctors care
Unit level (Direct)	Capital	Fixed	Dialysis unit Equipment, Building (AKU) replacement costs
Institutional level (Overhead)	Indirect (overhead)	Variable	All support services - Plant operation, housekeeping, Dietary, medical records, laundry, medical aid scheme, transportation
	Capital	Fixed	Plant equipment, other equipment, building etc associated with support services
Other	Direct	Variable	Emergency Ambulance service (separate Budget)

*AKU: Artificial Kidney Unit

In this example, capital costs incurred are both direct in the case of the dialysis machines (capital fixed direct cost) at the level of the final cost centre (dialysis unit) and overhead (indirect) in the case of plant equipment, building and vehicles at the level of the institution or overhead cost centres (capital fixed indirect costs).

If the decision is made to define inpatient final cost centres at ward level, then the decision to identify those direct (fixed and variable) components responsible for cost differences between wards must be made also. Otherwise cost differences between like wards will only be attributable to bed-days and not treatment patterns, patient case mix, capital intensity, etc.

Cost classification enables more effective budget and profitability analyses, for instance splitting the total cost components into fixed and variable (controllable) costs areas of inefficient allocation or utilisation of resources may be identified

Overall, three of the fourteen regional studies (HERA 2000) (Adomakoh 1998) (KPMG 1998) clearly classified the costs according to categories and cost types although terminology was slightly different between the studies.

5.2 ALLOCATION OF MOH RECURRENT EXPENDITURE TO HOSPITAL AGGREGATE COST CENTRE LEVEL.

The general trends observed among most hospitals in the region is that of the 'vote book' system in the Ministry of Health whereby, budget allocations are set by votes, and expenditure linked to the budget is recorded through 'vouchers'. A small number of studies (Huff-Rousselle 1996) (Adomakoh 1998,1999) (Fairbanks 1996), for time-saving purposes, used the revised recurrent budget values as a proxy for expenditure as a proxy for cost. However, this was not the case in the St Kitts study (Lucas 1998). In this case, data was sourced from the previous (to the study year) financial period FY97 actual budget expenditure; In general, non-recurrent hospital costs were identified through interviews with key administrative personnel.

5.3 ALLOCATION OF ALL IDENTIFIED HOSPITAL EXPENDITURE TO HOSPITAL DEPARTMENT (COST CENTRE) LEVEL

As mentioned in section 2.4 - general observation, the common finding with all studies undertaken in developing country was the deficiencies with respect to availability of data. Gilson and Rushby state in their study of a Tanzanian Hospital, that their own analysis did not coincide with the full range of medical support and cost centres. The problems in data availability range from the complete lack of data on activity and unreliability of what does exist in some African countries to the existence of complete high level (aggregate) cash books or expenditure records. At hospital level, fixed asset registers, materials management records (i.e. records of supplies distribution from store to cost centres), failed to exist all together, or existed to a limited extent in inaccurate forms in many of the hospitals reviewed. In addition, *none of the EC Hospitals studies, or developing country studies have developed any standards for apportioning costs which would allow costs to be allocated to different departments or cost centres.* Essentially, the shortcomings of the manual and computerised accounting systems hospital –wide were major obstacles to allocating expenditure across departments. In the absence of the prerequisites of an accounting system (box 1) which would track consumption of line items to cost centres, most investigators developed manual expense profiles (chart of accounts) of hospital recurrent expenditure using different bases to allocate costs directly to cost centres

In the St Kitts study that used the FY97 actual budget expenditure (section 5.2), the costs were not scaled to realistically reflect the changes in service activity from the observed year to the study year. In the same study, industry standards were often used to apportion costs across overhead departments only. For instance, the second largest category of expense - other operating costs were allocated based on standards that were not clearly stated or justified.

Upon review of the expenditure practices, most study investigators were able to estimate actual expenditure through detailed reviews of the vouchers obtained from the vote book.

Approaches used to develop the direct expense profiles by cost centre were;

- Apportionment of expenditure to overhead and intermediate departments only, while addressing direct cost centre allocations including staffing in a later part of the exercise (in the step-down application).
- Apportionment mainly to Overhead and Intermediate departments, but some direct costs were allocated directly to the responsible final cost centre. e.g. doctors, nurses salaries, renal dialysis supplies, direct capital, prosthesis, surgical equipment, etc.

The approaches used were dependent on availability of accurate data sources. These may be retrospective, prospective (through observation) or even through reliable informant interviews. The investigators of the Grenada study (KPMG 1998) and the Victoria hospital (Huff–Rousselle) study performed direct allocation of overhead costs to a number of direct and indirect departments. For instance, housekeeping costs were allocated directly based on interviews with key staff on the hours spent by housekeeping staff in each particular cost centre or department. Other studies allocated housekeeping directly to housekeeping cost centres for later allocation to final cost centres using the step-down approach and floor space as a basis for allocation.

In a study undertaken in the Dominican Republic (Lewis 1996), all expenditure on a large randomly selected sample of patients across all final cost centres was calculated through direct observation by applying a set of survey instruments. The study measures and costs all hospital staff time, in kind goods (including drugs, medical supplies, reagents, etc), overheads and capital depreciation expenses related to the treatment of each patient. Estimates were therefore directly allocated to the final cost centres. The purpose of the exercise was to show as accurately as possible actual activity based costs versus budget costs in order to identify areas of wasted and over-budgeting. Another study purpose was to assess the accuracy of results against those obtained through other costing methods. The results showed gross over budgeting (50%) across all cost centres. This finding demonstrates why it is important in costing exercises to identify actual expenditure as opposed to

budgeted figures, and to allocate as many expenditure items directly to cost centres before the step-down process.

5.4 IDENTIFICATION AND TREATMENT OF PERSONNEL COSTS

It is a common observation across studies worldwide that personnel costs including allowances, overtime and other non-pensionable personnel costs generally consume between 40% and 70% of total hospital costs. For the studies reviewed, this ranged from 56% of total costs at QEH (450 bed teaching hospital) to 80% at the JN France St. Kitts (152 bed general hospital). This is interesting to note, and differences can be accounted for based on a number of reasons. The most likely reason being that MOH and Hospital staffing costs are lower for Doctors at the QEH since as a teaching hospital, the University of the West Indies bear almost one third of the total medical and surgical doctors and laboratory salary costs. However, if this difference was to be observed between 2 teaching hospitals demonstrating similar bed totals and occupancy rates, then detailed and accurate cost identification would be required to account for the observed differences.

Of the studies reviewed, three general approaches were noted:

- i. Use of administrative data:
Sources included prospective duty rosters showing which staff members are assigned to which cost centres (departments). This captures those staff that typically working in one cost centre. Those staff identified as moving frequently between cost centres may be interviewed, or surveyed.
- ii. Direct measurement through observation
Alternatively, a detailed and comprehensive observational approach may be used. Data collectors will be hired to follow medical and nursing staff over a short period of time and record the time spent with each patient. This approach is extremely useful for (i) identifying areas of wastage and staff down time (Lewis 1995) and (ii) developing profiles of cost consumption for patients by ward, by diagnosis or even by disease severity (i.e. intensive, acute, and step-down) as demonstrated by Hensher (1994).
- iii. Combined approach:
This involves the use of administrative data and verification of unclear findings with interviews and/or direct observation. This is the most

common approach, and was observed in the majority of regional and non-regional studies reviewed

In comparing the approaches, the administrative approach on its own is the simplest approach but it has limitations for the identification of ‘floating’ staff. In combination with interviews, the approach is more comprehensive than the roster only approach, and less costly than the direct observation approach. The direct measurement approach is extremely comprehensive. However accuracy of the final costs may be questioned based on the premise that direct observation over a short time period does not capture seasonal variations, and hence changes in demand for care across cost centres. For instance, a respiratory consultant or registrar may spend more time in casualty during the flu/asthma season and less time on the medical ward, compared with other seasons. Therefore, as described above, this method is more useful to identify specific wastage in staffing allocations or to track patient utilisation by disease group from admission to discharge over a short time period.

5.4.1 Allocation of nursing salary costs:

Of the total personnel expenditure, between 50% and 70 % is attributable to nursing staff. It is therefore critical to the accuracy of the final unit cost of each cost centre that the distribution of nurse staffing input is captured as precisely as possible. Most studies reviewed allocated nursing staff through reviews of the roster of allocated staff time. Most studies verified the roster patterns with discussions with nursing administration staff and/or the accountant. One study went into further detail and identified costs by permanent, temporary, overtime, holiday and sick pay all to varying levels of detail (KPMG 1998). Most rosters raised grey areas with respect to the allocation of nurses at night, or nurses that were split between departments such as orthopaedics and casualty as observed in the QEH study (1996) and between casualty and theatre as observed in the Glendon study (Gill 1996). The investigators of Glendon Hospital study dealt with this problem of night shifts by apportioning nurse costs to medical and surgical wards using the same proportions observed in the day shift splits. The problem of identifying splits between casualty and theatre was a bit more complicated since the posts specified joint assignments for such nurses. Subsequently, the investigators apportioned costs on an equal basis. However, given the large throughput of patients in casualty, compared with theatre, the nursing time and cost allocations were most probably inaccurate. Ideally, the best approach would have been as described by #3 above; to have coupled the roster review with interviews with selected staff. The same investigators in undertaking a similar study in the Princess Margaret Hospital (PMH) did in fact use the more ideal approach of consulting with the matron, the Medical Director and the Accountant) in the event that direct observation was too costly to undertake.

Holiday, sick-leave, Vacation (HSV) training/study leave and maternity leave costs were identified, separated from the regular nursing costs, and redistributed on the basis of the split pattern observed for the distribution of regular staff time or costs. This was also the approach used by Huff-Rousselle (1996). Huff-Rousselle used a combination of sources to identify the distribution of regular nursing times across final cost centres - a retrospective review of the master nursing schedule (MNS) of where and when nurses worked, which was incomplete, the Payroll printouts for each employee obtained from the treasury department, and consultations with key staff. A 12-week retrospective (weeks randomly chosen across each month) sample was also reviewed from the MNS.

In some cases, (QEH, 1996, 1998, 1999 and Grenada 1998) non regular (non-pensionable) nursing costs such as overtime, temporary and casual staffing costs, existed as sub heads within the personnel emoluments expenditure head (or line item). A similar approach as observed for the distribution of leave costs was used for allocating these costs.

Inconsistent with the simplified approach of allocation of regular nursing costs used by the investigators of the Glendon hospital study (described above) was the observation that great effort was put into identifying and excluding the vacation, sick leave and maternity leave components of nursing costs from the regular nursing costs and these were then allocated as described above. In actual fact, it was less important to undertake this exercise than to carry out interviews/observation with key staff that moved between cost centres on a daily basis. The HSV is important if the contribution of leave pay to total costs must be identified for temporary or casual staff budgeting purposes. Otherwise, the cost still remains a cost component of the final product, as it is presumed that training, vacation and maternity leave are all required activities or inputs that facilitate effective output (product generation) by staff.

It is important to note that if the roster is inspected and deemed to be at an acceptable level of accuracy in the reflection of the staffing distribution across cost centres, then only interviews with key informants will be sufficient to account for movement of staff between cost centres. If however the roster does not is an gross understatement or over-statement of actual staffing levels then these areas must be identified. For instance if more staff are allocated to cost centres than indicated on the rosters, then the expenditure sub head or budgeted line item responsible for this must be identified. In the Kingstown study (La Foucade 1997), it was noted that the high number of resignations and hiring resulted and greater number of staff appearing on the payroll than on the rosters. However the salary costs paid out were stable and 'balanced out' to equal the same man-hours across cost centre as provided in the roster during the one-year study period. As a result the review of the roster and consultation with the Principal Nursing officer was all that was required to estimate the distribution across the final cost centres.

The significance of defining staffing costs by fixed and variable categories was demonstrated by Huff-Rousselle (1996). In this case the investigator assigned the administrative sisters, matron and the night ward sisters were assigned to the nursing administration cost centre. Also despite the hiring and resignation of nursing staff across cost centres, these cost were treated as fixed since despite the increase in staff numbers the costs remained fixed.

5.4.2 Allocation of doctors costs:

Most studies undertook direct observation and interviews with administrative and senior level doctors combined with reviews of rosters where these were available. Interviews were an important component of the identification of costs across cost centres since a number of doctors within specialties undertook duties between cost centres. For instance medical or surgical doctors of varying skill levels worked between the wards, outpatients and casualty department. Two approaches could be employed to accurately identify the time distribution across the cost centres:

1. Obtain through discussions and roster reviews, a profile of distribution of staff time by level (e.g. consultant, registrar, Intern) for the broad specialties (incorporating the sub specialties) of medicine, surgery and paediatrics. The Glendon study adopted this approach whereby the Consultant total hospital time comprised of six half day sessions, and Junior doctors (reg. and interns), ten half day sessions comprising of clinics, ward rounds, surgeries, inpatient care, etc. The rest of the half days for the week were assumed to comprise of administration, training and private practice. These additional activities were not included in their final cost. By interviewing the medical staff allocations of time were made to the appropriate cost centres. For instance if a consultant took two outpatient clinics a week then 2/6 of the total consultant salaries for the specialty observed would be allocated to outpatient cost centre. It is important to note as with the nursing roster, certain staffing allocations are fixed on the roster. That is to say that although staff movement is observed as some junior staff rotate through casualty, and wards and theatre on a periodic basis, the salaries for each cost centre remain fixed for this staffing input. That is, the input is presumed to be provided at a fixed level over the study period. This was the more common approach observed across the studies reviewed. Huff Rousselle used the most detailed consultative approach, whereby each doctor was interviewed. Under time and cost constraints, an alternative to the more costly face-to-face interviews would be to send out user-friendly self-administered questionnaires.
2. A second approach would be to establish the general pattern of staffing levels across each final cost centre, either through interviews with a permanent staff member (or cost centre manager) within each cost centre or through general observation. For instance, consultation with the theatre

nurse would reveal the general doctor staffing activity levels for say general surgery, ophthalmic surgery, orthopaedic surgery, etc. (as broken down according to the distribution of cost centres). It is important to note, however, that the problems that arise with general observation of nursing staff as described above also apply to the observation of all other staff. These two approaches may not be as accurate as the approach of direct consultation with the doctors themselves or the review of the roster. Particularly since in the case of financial costing the costs identified may not reconcile back to the total doctors salary.

On the subject of Financial costing versus economic costing, the importance of identifying all costs incurred by the hospital by cost centre versus the importance of ‘valuing’ the actual inputs must be established at the outset of the study. For instance the Glendon study, as described above, excluded 4 half-day sessions of consultants’ time from the final costs based on the assumption (through not stated) that the activities undertaken are not directly related to the final product. Hence, the allocation of doctors’ salaries was made on the basis of an estimate of the percentage time spent performing duties at the hospital (the economic approach) rather than the actual full time worked. Other investigators may argue that all costs incurred by the hospital must be captured and distributed accordingly. Alternatively it can also be argued that training and administration are overhead (indirect costs) that contribute to the final product by facilitating (improving, make more efficient) the input provided by the doctors.

There is also an argument for including private consulting time other than the financial one - In some hospitals, private consulting funds are established as a revenue generating /cost recovery strategy to compensate doctors who undertake private practice. In addition, further revenue is generated by private bed-days spent in public hospitals (although it can be argued that the revenues do not reflect cost). Some investigators therefore, work on the assumption that the time spent in private practice, not contributing to the final product of the public hospital is compensated for or cancelled out by the revenue generated. Another argument is that the consultants may not accept hospital posts if they were not able to undertake private practice and therefore the arrangement is a part and parcel of the job description and total salary.

The study by Lewis (1995) observed actual staffing activity levels across cost centres and noted that only 12% of doctors time was accounted for contributing to the generation of the final product. It was not clear as to whether, through observation, administration or training time was captured. Or was absence from clinical areas taken to mean absence from any activity that directly or indirectly contributed to the final product?

The KPMG study (1998) used a very simplified approach to apportioning doctors’ full time salary across the final cost centres: The investigators used the percentage

distribution figures of other direct staff across the final cost centres to distribute the total doctors' salary (including allowances and overheads) across the final cost centres.

The HERA study in Grenada (2000) did not dwell sufficiently on the issue of distribution of nursing costs or doctors costs across final cost centres. Instead discussions were held with the most available source for information, the chief accountant (who had time allocated towards informing the project). However, this may not have been the most accurate source of information. In hindsight, in order to compensate for the cost and time constraints that prohibited the undertaking of detailed measurement or interviews with medical and nursing staff, the investigators should have steered effort towards the staff administrators (e.g. personnel officers/administrators, matron, and specialty heads).

5.4.3 Allocation of other personnel salary costs

Selected overhead department staff were also interviewed in many of the studies reviewed to identify their time distribution pattern across the all cost centres. Such staff included, maid services (female attendants) from housekeeping (Huff-Rousselle 1996), Auxiliaries and Aides (Huff-Rousselle 1996, Adomakoh 1998), and Orderlies (male attendants) (Huff-Rousselle 1996). In addition staff who worked in other MOH areas were identified and associated time, hence costs, deducted accordingly. These included maintenance staff ((Huff-Rousselle 1996) and Emergency Ambulance staff (Adomakoh 1998).

Remaining personnel salary costs were allocated to the responsible cost centre for further allocation to remaining cost centres using the step-down approach.

5.5 IDENTIFICATION AND TREATMENT OF OFF BUDGET COSTS

Only one study identified off budget costs (Huff-Rousselle 1996). The question that arises is ‘include?’ or ‘do not include?’

If one off budget item is identified and costed, then all off budget items must be treated in the same way. Be consistent to ensure validity or results.

For instance if capital items not paid for by the hospital or donated free of cost to the hospital are included in the costing exercise, then all donated goods, services that contribute to the hospital services must be considered (section 6.2). In the same way, all maintenance, ambulance services, drugs consumed but not identified through the hospital expenditure records or budget estimates must be included.

The decision depends on the purpose and viewpoint of the study. If it is to estimate the cost to the hospital then only hospital cost may be considered. If the viewpoint is at government level, then all costs must be considered but it is advisable to show results both with and without donated items. If the viewpoint is the health service then all health service items must be costed, showing unit costs with and without off- budget costs. If the purpose is to address programme sustainability at the government level then all resources must be valued.

In the St Kitts Study (Lucas 1998) the off budget costs formed a significant amounts hospital resource, both direct and indirect. It was extremely difficult to source information on the centrally managed resources - Pharmaceutical supplies and drugs, support services, administrative services and purchase of medical and diagnostic equipment were not adequately identified and as a result these costs were not adequately quantified. Under such constraints of poor data availability, observational methods as described by Lewis (Lewis 1996) are suggested in order to attain an acceptable degree of accuracy in the final estimates.

5.7 ALLOCATION OF THE SUPPORT COSTS TO DIRECT (FINAL) COST CENTRES – TREATMENT OF OVERHEAD COSTS

All but one study used the step-down approach to apportion overheads to the final cost centres. Glendon study did not use the step-down method of allocating overheads to direct cost centres. The study did not explain why it chose the less favoured method of direct allocation, ignoring the interaction of the overheads *between* the overhead departments although, across the board, most hospital costing

studies do not justify the use of one method of overhead allocation over another. It appeared however, in the Glendon study that the method of direct allocation of expenditure to cost centres the preferred methods due to gaps in the infra-structural data. Perhaps the investigators did not feel that suitable or valid statistics existed to perform an accurate step-down allocation method that would consider the interaction between overhead departments was to be employed. This is indeed a thought to bear in mind, particularly since most investigators of the smaller hospital of the studies reviewed chose the step-down approach in the face of deficient statistics, using estimates generated by discussions with key informants.

Laundry was allocated in the QEH study (Fairbanks 1996) by actual proportion of laundry (kg) done per cost centre (manually recorded data was available by ward), while other studies used either inpatient days or floor space (assuming no of beds correlates with size of unit). Both these allocation variables have their limitations: using inpatient days tended to ignore laundry consumption by day units and overhead departments e.g. physiotherapy, radiology, laboratory, maintenance, housekeeping, etc. Likewise, using floor space as an allocation basis makes an assumption that may not be always accurate. For instance take the dialysis unit at the QEH; the floor space is only 0.45% of the total hospital floor space, hence would consume 0.45% of the estimated laundry costs. However the daily patient turnover is extremely high and laundry is generated during each dialysis session. The actual proportion of laundry services consumed by the QEH dialysis unit was 8% of the total laundry turned over during the financial period. The same pattern was observed for the NICU at QEH. Transport costs were also not realistically allocated. It is important to re-emphasise that the most accurate methods for allocation of all costs to final costs centres in the absence of a materials management and accounting system, is through direct observation of resource consumption by the final cost centres. As this approach proves significantly more time consuming and costly, the allocation approach is favoured. Across the region both approaches are used in combination to derive unit costs.

The St Kitts Study (Lucas 1998) used industry standards to apportion selected overhead costs to final cost centres in the first instance. For example, the study stated that according to industry standards, inpatient cost centres consume about 60% of the costs of dietary, medical records and laundry. This approach would be valid if based on standards derived from a number of regional observations or observations from similar hospital in other regions. However, as was the case in the direct apportionment of operating costs, the investigators did not cite the source of the standards, making it impossible for subsequent studies to make valid choices regarding which standards to use and which are outdated and creating a hindrance to the reproducibility of the study.

Other studies have also chosen to address selected overhead services separately from those apportioned in the step-down allocation. For instance, the Australian costing handbook (NHCDCS 1997) and the KPMG study model (1998) suggested

the weighting of dietary consumption across final cost centres. This is based on the observation that intensive care services may consume more resources in the production of parenteral nutrition provided to critical patients compared with the production of a staple breakfast, lunch or dinner. Conversely, the surgical wards may consume only one meal per day per patient on the day of surgery compared with the medical wards. It is important to point out however, that parenteral nutrition does not consume resource allocated to dietary and its distribution is in no way associated with the dietary department. Therefore this was not a valid assumption by the KPMG group. A brief interview with key informants would justify the validity of weighting the meals consumed by surgical wards. This approach was only adopted in the Grenada study, but should be explored elsewhere, particularly for those hospitals in which costing practices are being established such as the Victoria hospital, St. Lucia. Studies elsewhere (Omar, 1995) have shown that kitchen resources contribute significantly to the overall annual expenditure of public hospitals compared with private hospitals. It is therefore very important to identify the areas of high consumption in order to investigate areas of wastage or over production. Such information is also very important in planning cost recovery strategies, for instance through the generation of fees for private/staff catering services in the public hospital setting.

Maintenance services are commonly apportioned to remaining cost centres based upon cost centre square footage. However, it may be more appropriate to apportion costs based on the capital consumption of each department according to the premise that the more equipment a department has, the more likely it is to require maintenance services. For instance, a relatively small unit such as renal dialysis or NICU are commonly extremely capital intensive in relation to other final cost centres that consume significantly larger floor space (e.g. medical outpatients department). If floor space was used as the allocation basis then the renal dialysis unit would have consumed only 0.45% of the total maintenance costs despite consuming 32% of the total capital expenditure. For NICU, according to the floor space distribution, would have consumed 0.43% of the total maintenance costs despite consuming 28% of the capital costs incurred by the hospital. This highlights several issues;

- i. If maintenance costs for some direct capital items such as dialysis machines and incubators are donated (part of a supplier's agreement), should its value be reflected in the overall maintenance costs? (this is addressed in section 6.2)
- ii. If capital allocation basis is to be used to apportion maintenance costs, it is important that actual share of capital is identified for each cost centre (this is discussed in section 6.1)
- iii. If 'donated' capital maintenance costs *are* excluded for the total maintenance expenditure, than the contribution of the associated capital

items *must be excluded* from the cost centre capital expenditure distribution pattern prior to allocation based on capital consumption.

5.6 TREATMENT OF ANCILLARY (INTERMEDIATE) COST CENTRE COSTS

Variations in unit cost estimates of final cost centres are due mainly to the use of intermediate products such as drugs, laboratory tests, diagnostics and other ancillary clinic services such as physiotherapy. Therefore it is critical that costs are identified accurately. The problem of measuring the variations in clinical activity in the final cost centres is dealt with to some degree by deriving unit cost for intermediate cost centres themselves which is separated and excluded from the unit cost of final cost centres and then linking costs of the activity provided by the intermediate cost centre to the final cost centre. Some studies (HERA 1998) will also established direct medical and nursing salaries as a separate intermediate cost centre. In such cases, therefore, the final cost centres will only encompass the ‘hotel’ costs. In cases where salaries are not captured in a separate cost centre, the final cost centres will encompass the hotel costs and the associated medical and nursing contributions that have usually been based on actual activity.

Many of the studies reviewed adopted the approach suggested by Hull, Hirsh, Sackett and Stoddart (1982) which estimates the unit cost of the final cost centres separate and distinct from the costs incurred from utilisation of products from the intermediate cost centres. For example, unit costs for final cost centres did not include the cost of laboratory, pharmacy, radiology and often staffing resource consumption. In this way, only the hotel costs are considered in the final cost centres (i.e. recurrent overheads, recurrent non-medical direct costs and capital costs are considered), while the laboratory is considered to be a final cost centre, and lab tests, a final product. In estimating the unit cost of laboratory, the direct costs were estimated through direct allocation of recurrent expenditure items. Interviewee surveys and /or observational methods were used to allocate direct staffing and direct capital items. From this, the operating cost for the laboratory cost centre is derived exclusive of overhead costs. Overhead costs were then apportioned to the cost centres through the step-down method to arrive at the total cost for the laboratory cost centre. The total number of tests performed is the denominator used to derive the unit cost per test. The unit cost per test can then be used to estimate consumption by cost centre, provided that there is available data on test consumption by final cost centre. This is not usually the case across all final cost centres in the regional studies reviewed. In fact, only specific specialist units such as respiratory unit, gastroenterology unit and dialysis units often record all tests and prescribing activity for each patient in unit log books. It is for this reason that unit

cost of intermediate departments are best separated from the unit costs of final cost centres.

These intermediate items usually account for a large share of the cost per patient and therefore the way in which they are estimated is vital to the accuracy of the final unit cost. The above method is the more popular and accepted approach across the region.

Alternatively, some studies have opted not to treat the intermediate items as final products and have therefore adopted one of two possible approaches:

1. Apportion ancillary service (intermediate) costs as overheads to the final cost centres during the step-down allocation. In employing this approach an assumption is made that data on the quantity of intermediate products consumed by final cost centre is available. Therefore, this is used as the allocation basis for distributing the cost of the intermediate department across final cost centres.

In the absence of existing data of intermediate product consumption by ward, one may be able to estimate the actual consumption, and therefore cost, of these products either through surveys or by undertaking a review of manual records (patients records, lab records, physiotherapy records, etc). Consideration must be given to the length of the period surveyed and sample size chosen on which the cost extrapolations will be based. If the disease group consists of an unrealistically small number of patients seen during the study period, then it may be necessary to track all the patients across the entire study period (Adomakoh 1998). If the final product is unit cost at ward level, then a valid sample size would be chosen.

2. In one study, intermediate costs are assigned directly to final centres (through reviews of actual expenditure/utilisation by cost centre such as ward stock) and to intermediate cost centres for those costs that cannot be identified by cost centre. Overheads incurred by the intermediate cost centres are either ignored or are apportioned through the step-down method. Rousselle (1996) used this approach and overheads were allocated accordingly. However in a previous costing study (1990) undertaken in the same hospital, prescription costs only were considered and allocated only to the pharmacy cost centre, not to final cost centres, overheads were ignored. Alternatively, in a later 1995 study, prescription costs were allocated to both final cost centres (based on ward stock issue records, observation, etc of a 10% random sample) and to the pharmacy cost centre. The distribution pattern of costs across the sample to the final

cost centres was used as a basis for allocating the salary, capital and overhead associated with pharmacy to those final cost centres.

The St Kitts study used this approach in a modified form. For instance pharmacy costs could not be identified at final cost centre level, so all pharmacy related costs were apportioned to the pharmacy cost centre. These values only reflected the cost associated with the dispensing services. The actual costs of drugs and associated overheads including capital were omitted due to difficulties in identifying the costs since they were managed through central administration. As mentioned above and in section 5.5, under such constraining circumstances of data unavailability, the most accurate but more costly and lengthy approach would be to track utilisation over a defined period of time as demonstrated by Lewis (1990,1996) and Kutzin (1989). It is important however to document the limitations of this sampling approach – essentially, the short time period over which the observations were conducted failed to capture seasonal variations in utilisation patterns. Hence, the trade off between study time and costs versus accuracy must be decided. A suggested modification to this approach to employ a random sampling of patient records across a retrospective 1 year period and trace utilisation pattern for the sampled patients.

In the Dominica study (Gill 1994) expressed no confidence in the accuracy of estimated pharmacy costs. This was due to the fact that current data was so incomplete that prescribing activity for five years prior to the study year, scaled up by 10% was used to derive estimates of costs per prescription for each cost centre.

In more detailed studies, more than one unit cost for the intermediate cost centre may be derived. For instance, in the case of lab tests, each test is weighted relative to the least costly lab test based on a past, possibly external data source that provides details on the relative costliness of the tests performed. This is usually a price list which may be based on fees charged or detailed costing of each test performed. The weighted value for each test is multiplied by the total number of that test produced to give a weighted value unit. The weighted value units are summed and each individual weighted value unit is expressed as a proportion of the summed figure. The unit cost per test is derived by multiplying the total cost identified for the laboratory cost centre by the calculated proportion of the weighted value unit for each test. This was the approach used by investigators of the Grenada study (KPMG 1996) and of the Victoria Hospital study (1996). In the Grenada study those tests that were similar in nature (in resource consumption, duration, etc) were grouped and each group treated as described above. The unit costs would then reflect the cost per test by resource group. The investigators of the Victoria study did not roll-up the tests and applied weights based on existing records of the relative cost of each test performed in the laboratory. This approach is becoming popular for costing pharmacy products (associated with dispensing, drug costs, overheads) in Africa and in Australia as a time and cost saving means of costing drug categories.

In the method the term for the weighted values which are proportions of the total weighted values is often referred to as relative value (RV), while the product of the relative value and the number of tests performed is often termed the relative value unit (RVU). Table 5 shows the relationships.

Although this method is simple in its application the conceptions behind the method is extremely technical and in-depth; for instance, if assumptions are not valid or the data source for the relative costliness of the tests or other output is not a true reflection for the study, then the results may be completely skewed from the true costs for each output. For example, the data source used in the VH study was derived 2 years prior through a detailed review of the costs of performing each test. Observational methods were used to capture actual staffing, supplies and materials input; while the step-down method was used to apportion overhead costs to the lab and distributed across the tests based on the proportion of direct costs consumed by each type of test. Was the price list generated, a true reflection of the relative costliness of each test? If it was, then the relative value unit approach was valid.

Table 5: Unit costs of microbiology tests using relative values

Test name	Cost/test	# tests	Weights (RV)	Weight *# tests (RVU)	% allocation	Allocation of lab costs	Cost per test
Urinalysis	\$10.00	2,036	2.00	4,072	1.06%	\$15,806.95	\$7.76
Parasites	\$19.00	1,723	3.80	6547	1.70%	\$25,416.11	\$14.75
AFB	\$19.00	448	3.80	1702.40	0.44%	\$6,608.48	\$14.75
Culture	\$38.00	3,828	7.60	29,092.80	7.55%	\$112,934.26	\$29.50
Chlamydia	\$66.00	0	13.20	0	0.00%	\$0.00	\$0.00

If however, the list was not a true reflection of the relative costliness of tests, then it should not have been used as a basis for deriving relative value units and subsequent unit cost per test. It is possible that the relative costliness was not truly reflected particularly since staffing input was viewed as a direct cost. However, staff in laboratories generally stagger the types of tests and therefore are usually processing more than one batch of tests at any given time. This means that the staffing input is *shared* and as a result staffing should have been treated as an overhead. Treating staff as a direct input would have resulted in double counting of the available staff time, and thus given a total staffing costs over and above the actual cost of staffing expended for the laboratory. As such, the total resource consumption per test may have been over-stated. A great deal of attention must be paid to the validity of the relative costliness data source. In most cases, it is recommended that the data source is a private laboratory.

This was observed in the KPMG study (1998) where the investigators used a price (charge) list sourced from a private unit. It was assumed that the prices were generated based on ‘thinking’ and discussions on the amount of resources one test

used over another. Hence the list was seen as providing valid information of relative costliness of tests.

SECTION SIX

Consideration of Capital Costs

6.1 ALLOCATION OF THE COST OF CAPITAL ITEMS:

Including the cost of capital items in a costing exercise depends on the purpose of the analyses. As described in the literature review, the general trend among costing studies undertaken in developing and middle income regions is to include all capital items identified and amortised the cost to reflect the annual contribution. Many investigators however, have chosen the simpler route of incorporating the entire cost of an item purchased during the study period in the final unit costs, while ignoring the cost of capital purchased prior to the study period. Alternatively, capital expenditure may have been ignored altogether. In general, studies conducted at the smaller institutions namely, Glendon, JN France and Peebles, ignored capital expenditure and this therefore was excluded from the final unit costs for reasons that were not clearly stated. Perhaps this was due to sparsity of available data or time and cost limitations of the project. The latter is more likely, since in the absence of suitable documentation on capital expenditure linked to the study hospital, one would seek to develop a department (cost centre) checklist on capital item costs, age of item and useful life.

The necessity and the extent to which the calculation of capital cost will ‘strengthen’ the results should be determined. For instance, it was determined in the Glendon (Gill 1994) study that only recurrent costs would be considered. However in a broad exercise, annualised capital costs were determined to be equivalent to 30% of recurrent costs. Ignoring this 30% component would significantly underestimated the ‘true’ unit costs of service and the investigators should have considered addressing outcomes of unit cost with and without annualisation. This would be necessary since it can be argued that allocating the annual cost of capital to the expenditure for the period studied will more accurately reflect unit cost particularly when it is derived to be compared against unit costs in other regional hospitals (in this case, VH, St Lucia and Cornwall Jamaica).

Only significantly small proportion of studies reviewed undertook key informant discussions with administration and plant engineers to derive a list of capital items across cost centres. Two studies (KPMG 1998) (Huff Rousselle 1996) attempted to identify those intermediate or final cost centres that were capital intensive consuming significantly more capital costs than other cost centres. Adomakoh (1998) identified capital equipment directly contributing to the unit cost of the final product. If allocations are to be as accurate as possible within time and cost constraints, a valid approach to identifying cost centres housing the bulk of fixed direct capital would be through key informant discussion with plant and operations or administrative staff as undertaken in the Grenada study described above. Where this was not undertaken, identified capital was either costed directly to the overhead

cost centres and apportioned as overheads to the final cost centres or cost of capital estimated as a proportion of recurrent costs.

To have ignored capital cost in the larger hospital studies may have resulted in the derivation of grossly underestimated unit costs particularly in the case of capital-intensive final cost centres. For instance, in the Victoria Hospital study (Huff – Rousselle 1996), the investigators identified capital items across all direct and overhead departments through interviews with maintenance and plant engineers. The dialysis department was most costly in terms of capital medical equipment costs contributing to 35% of total hospital medical equipment costs. While 20% of total annual replacement cost of hospital capital was attributable to the dialysis unit. Omitting this component from the dialysis unit would reflect an inaccurate relationship in the magnitude of unit cost across the final cost centres.

Consider an alternative approach to identifying capital cost for each cost centre; specifically, the application of an allocation basis to the total capital cost identified. For example, some studies have allocated total medical equipment costs on the basis of floor space based on the assumption that the greater the work area, the more likely to require more equipment or staff salaries may be used based on the assumption that the greater the amount of staff per unit, the more likely to be more equipment. These two assumptions may be true in the case of allocating the cost of small capital items (non clinical) such as computers, telephones, desks etc whereby administration, outpatients and emergency departments which may be significantly larger than dialysis units, radiology departments and cardiology units may incur a greater proportion of non clinical equipment costs. However, if the floor space had been used as an allocation basis in the QEH dialysis study (Adomakoh 1998) then the Dialysis unit medical equipment cost would have contributed to a mere 0.45% of the annual replacement cost of medical equipment capital in comparison to the 32% that was the actual proportion. Also, if staff salaries had been used as an allocation basis, then the estimate of dialysis unit capital medical equipment would have been 0.9% of total medical equipment cost.

The St Kitts Study (Lucas 1998) identifies the laboratory, radiology and pharmacy as capital intensive cost centres, then cited problems in obtaining information of capital and operational costs. Consequently, no estimates were computed for these cost centres.

Although the investigators of the Kingstown General hospital (KGH) study clearly set the framework for establishing appropriate methodologies, and throughout the report detailed descriptions of cost derivation were provided. This level of detail was not provided, however in the treatment of capital costs although reference to a previous study elsewhere (Victoria Hospital 1993) was made. Information on how capital items were identified and the rates used in estimating annual depreciation costs would have been consistent with the rest of the study. It would not be clear to a lay reader as to why capital was chosen not to be addressed in the case study of

Kingstown General Hospital. According to the study details overhead cost are included in the cost analyses and therefore it would be expected that capital items are also considered. It can only be assumed that by nature of the study purpose, the study adopted a financial accounting approach whereby only hospital-incurred expenses were addressed. Therefore, capital costs (incurred during the study period and prior to it) were not addressed sufficiently because perhaps the expenses were not incurred by the health service (MOH or Hospital).

As it should never be left to the audience to make assumptions regarding methods used in cost analyses, it is important that the methods chosen to allocate the cost of capital should be justified. Also if the study is to be replicated for say, financial management purposes and comparisons of results undertaken, methods must also be comparable.

In the Victoria Hospital study, the issue of capital cost allocation was addressed in great detail. Methodological issues and effects of incorporating capital were discussed at length. In fact, this study directly dealt with the issues described above by performing two sets of cost allocation exercises. One without amortisation of capital, and one with amortisation of capital. Although not stated, the study assumed a straight-line depreciation of capital items, thereby choosing not to address inflation. Where capital costs were included, the straight-line depreciation method was used and opportunity costs were not addressed sufficiently.

As mentioned in section 5, it was not clear whether shadow price or market price was used in any of the studies. This is a very important aspect since, as shown above, capital costs in one unit alone can form a significant contribution to total cost of service. In the dialysis (Victoria hospital) (QEH) example again, suppose the dialysis machines had been supplied free of cost to the hospital by suppliers (in exchange of an agreement to purchase a minimum quantity of dialysing fluid per machine) as is often the case on developing and middle income countries. The decision as to whether to use the existing market price or to cost the machines at zero cost must be made and justified by the study purpose.

6.2 DONATED GOODS

Donated goods may include;

The recurrent direct items such as bandages, syringes and even drugs. Most studies did not attempt to identify or differentiate between donated recurrent items. However, as most studies used actual expenditure as a proxy for cost, it is likely that the costs associated with these were excluded. The most valid method, regardless of whether the economic or financial approach was taken, would be to

include all recurrent donated items since it is likely that such items may not be supplied on a permanent basis and may in fact be linked to term agreements issued by suppliers. This is critical, particularly if issues of sustainability or reimbursement are being addressed by the hospital

The second type of donated item is donated capital. These may include, buildings, equipment and vehicles. As mentioned in section 4, only one investigator chose to discuss donated items (Huff-Rousselle 1996), and all studies chose to ignore all donated items with the exception of the QEH dialysis study (Adomakoh 1998). Perhaps, within the context of the perceived purpose across most studies, this was the correct approach; as it was only the actual cost to the hospital that was required in the final estimates of unit cost.

However, it is likely that there were some possible inconsistencies, but these were not clear as not enough information on donated goods was provided in any of the studies; in addition, studies which addressed capital did not cite whether donated capital items were included or ignored with one exception. It was likely that since most of the studies identified capital through discussions, all capital identified were costed regardless of the donated status. If this was the case, for those studies, recurrent donated items should also have been identified. There are a few important reasons as to why donated items should be considered, particularly in developing countries:

If the donated item can be transferred to another use (not likely in the case of donated medical equipment or recurrent donated items) then opportunity cost associated with the next best use within the same hospital or elsewhere must be considered. Such items may include existing buildings, and vehicles. In considering whether to incorporate opportunity cost, it must be established through discussion, if the government are able to reallocate donations to other health services with less donations or more urgent requirements.

Secondly, especially in the case of short life span capital such as vehicles or old, long-term capital such buildings, the need to replace/refurbish the items in the near future will be very apparent and replacement costs must therefore be estimated.

Lastly, if hospitals of similar size and case-mix are to be compared, all inputs regardless of expenditure should be costed to compensate for those hospitals that receive more donations during a study period than another thereby preventing biased results which could incorrectly assume inefficiencies in the hospital with less donations.

SECTION SEVEN

The Final Results

7.1 DERIVING THE UNIT COST OF FINAL COST CENTRES

All studies used the same approach to derive the unit cost of final cost centres: The total cost calculated for each final cost centre was divided by the total unit of activity (or total utilisation) for that cost centre. All studies used the same units of activity to derive unit costs. Bed-days were used for the inpatient wards; visits, for the outpatient wards; interventions/operations were used for operating theatre and recovery room; tests, for laboratory; examinations for x-ray, treatments for renal dialysis, prescriptions for pharmacy; and trips for ambulance service. For the labour ward, in cases where this was treated as a separate cost centre, number of deliveries was used. Final product used in the studies is summarised in table 6.

Table 6: Unit of activity used for the definition final products.

Cost centre (CC)	Cost centre type	Unit of activity
All inpatient ward CC	Inpatient	Patient days, and/or Discharge
All outpatient specialty clinic CC	Outpatient	visits
Emergency	Outpatient	ER visits
laboratory	Ancillary Service	Test
Radiology	Ancillary Service	X-ray
Pharmacy	Ancillary	prescription
Social services	Ancillary	Intervention
Physiotherapy	Ancillary	Treatment
Operating theatre	Ancillary	Intervention
Recovery room	Ancillary	Intervention
Dialysis	Outpatient	Treatment
Labour ward	Inpatient	deliveries

One may argue that, delivery by caesarean section could have been weighted relative to vaginal deliveries and a unit cost derived for both types (#caesarean deliveries and # vaginal deliveries). However if the study purpose was to derive unit cost of each final cost centre then this approach is not too significant. But, in all fairness, if the study is to be fully comprehensive, the best approach is to maintain the comparability by deriving the unit cost per delivery, then to also display a unit cost for both types of deliveries. Only one study (Fairbanks 1996) separated the labour unit from the obstetrics ward and used bed-days for the obstetric ward and

number of deliveries to derive unit cost for the labour ward. The Gendon study (Gill 1994) cited two unit costs for each final cost centre, cost per patient day and cost per discharge while the JN France study (Lucas 1998) cited cost per bed-day and cost per case.

The RVU approach for deriving *intermediate cost centres* as described in section 5.6 has been used increasingly outside of the region to calculate unit cost of *final cost centres* as opposed to intermediate cost centres, using external unit cost data (from other hospitals, literature, regional standards, etc) on the relative costliness of the cost centres. This approach has many limitations in that the relative costliness of final cost centres in the external data is likely to differ extensively from those in the study hospital, based purely on the fact of internal resource distribution such as staffing patterns and levels, number beds, physician practices and the relative structure of the cost centres.

Due to the possible inaccuracies, this approach to deriving **final cost centre** unit cost *should only be used when the direct allocation and step-down method is prevented due to lack of data on recurrent, capital and overhead expenditure.*

This is because, the direct allocation combined with the step down approach addresses the interaction of overheads across the cost centres and through a variety of methods including direct observation and enables the apportionment of all components into the total cost per cost centre, based on activity levels, to reflect the differences in resource consumption in each cost centre. It would then be appropriate to derive unit cost by dividing the cost centre total cost by a defined unit of output activity.

If the step-down method was prevented due to poor data, and only the total hospital expenditure and the activity in each cost centre was available, it would not be a valid approach to simply apportion the total hospital expenditure to cost centres based on the activity levels in each. This assumes that all patients in all cost centres are the same. Highly unlikely. Also, there will not be a common basis for apportioning the total expenditure, as the units of output (activity) will differ across the final cost centres. Under such conditions, the relative value unit calculations would be the most valid approach to estimating unit cost per final cost centre.

One author demonstrated the possible discrepancies that can arise from using external sources for relative costliness to calculate the unit cost of final cost centres, by comparing the RVU approach with the direct allocation and step-down approach: The RVU method understated the unit cost for medical care by 14% and overstated the unit cost for maternity by 10%. While the unit cost for surgery was the same for both. Therefore the relative costliness was inaccurate in that the step-down method (remember is based on actual expenditure of the study hospital) showed that the medical care unit cost was 1% less than the average inpatient day

and not 19% less, while maternity was less costly than the average inpatient cost, not equally costly as specified by the external data source.

7.2 SENSITIVITY ANALYSES

Most of the studies dealt with some degree of uncertainty or imprecision of data or methodological arguments by incorporating assumptions into the study design. However, the more uncertain an assumption the greater the need to test or to understand the effect of variations to the standards defined by the applied assumption. What is the effect of varying the uncertain or non-defined parameters commonly used to guide the studies? For instance what was the effect on the unit cost of varying the discount rate, the length of useful life of capital, the industry standards for apportionment of overheads, the scaling up of activity levels (in the case of using out of date activity data). Most studies made assumptions, however as described in section 3.3 most studies did not cite critical assumptions or uncertainties and subsequently, these only became apparent in within the context of methods applied in deriving costs. As a result, the need to address the sensitivity of assumptions was not identified in most of the studies. In fact, the Victoria hospital study (Huff-Rousselle 1996) and the QEH study (Adomakoh, 1998,1999) were the only studies that addressed the effect of variations, not however, to the fullest possible extent that are afforded such studies. Despite the non-exhaustive approach to the sensitivity analyses, the methods used did demonstrate thorough reworking of the analysis under different assumptions and estimates, the sensitivity of results and conclusion to such changes. An analysis of the variance (ANOVA) under the varied conditions would have provided a statistical measure of the significance, and hence sensitivity of the results to the changes.

7.2 PRESENTATION OF THE FINAL RESULTS

There are two important points to bear in mind when concluding a costing study; Firstly, the presentation of the unit cost of final cost centres should be very clear to beneficiaries. That is, the results should be laid out in a user-friendly format. Where intermediate costs are separated for the unit costs of final cost centres, the relationships based on activity of the final costs centres must be clearly defined. The Victoria Hospital study (1996) and the QEH study (1996) are good examples of tabulated unit costs of final cost centres and intermediate cost centres. These are displayed In Annex 2.

The tabulated presentation of the results of the St Lucia study undertaken at Victoria Hospital (HERA 2000) was slightly confusing. For instance, in the table displayed the unit of activity was cited for each final and intermediate cost centre i.e. # admission for wards, and # interventions for operating theatre. However instead of citing beside this column, the associated activity levels as measured by the cited indicator, the number of personnel per department was provided. Thus,

the table failed to provide a clear insight into the total costs and the activity levels in each cost centre. The 1996 Victoria hospital study provided an in-depth presentation of the results of sensitive analyses in tabulated form comparing the unit costs with and without depreciation and amortisation of capital equipment. The results also presented comparisons of unit costs estimated for each final cost centres for the previous 2 studies undertaken in 1990 and 1989. For the laboratory, the costs per test were also provided and associated weighted values displayed.

The presentation of the results of the Glendon Hospital study was sparse and short of any commentary for the purpose of interpretation of results. Likewise, the Princess Margaret and JN France studies did not adequately present the results. The most probable reason could be due to the fact that these hospitals demonstrated apparent gaps in activity data availability.

The QEH studies, the Kingstown Hospital study and the Victoria Hospital studies were the only ones that provided commentary or discussion on the major findings and possible implications for resource allocation decisions. Graphical presentations were given were required to demonstrate the variations in the magnitude of costs associated with the various inputs or cost categories. For instance, the contributions of direct and indirect resources to the unit cost per department was tabulated and discussed in a number of these studies (Annex 2).

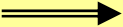




The presentation of the results of the Kingstown study was clear, comprehensive, yet concise and therefore easily interpreted by its users. Total costs and unit cost per final cost centre were cited, with and without depreciation. In addition, major cost components that contributed to the total cost of hospital care (e.g. staff costs) were broken down to reflect the resource distribution across cost centres.

A point to remember in the final presentation is that a comprehensive study should provide results and discussion in a way that would allow the user to interpret the findings within the context of the study hospital.

For instance, following a further analyses to show the cost savings generated by changing resource consumption, an incremental analysis was conducted in the QEH 1998 study to show the additional cost that would be incurred as a result of varying service activity.

Graphical displays of costs by cost centre are always advisable as they provide a quick visual comparison of costs between cost centres. Only 2 studies provided graphical representation of the results (Huff Rouselle 1996, Adomakoh 1998).

The box provides a summary of suggested results tables and charts.

Tables	Chart
Unit cost by cost centres showing the columns: cost centre, the total cost, the total of the unit of activity, the unit cost	 Chart of Unit cost by cost centre, Total cost by cost centre
Breakdown of staff costs by cost centres with columns: cost centre, Doctor, nursing, ancillary, support, other, total cost.	 staff costs by type by cost centres
Breakdown of direct and indirect costs by cost centre	 Breakdown of direct and indirect costs by cost centre
Breakdown of fixed and variable costs by cost centre (should be similar to previous row)	 Fixed and variable costs by cost centre
Breakdown of variable costs by cost component by cost centre i.e. columns: cost centre, drug cost, lab cost, x-ray cost, staff cost by cost centre	 Cost of drug cost, lab cost, x-ray cost, staff cost by cost centre

SECTION EIGHT

**Conclusions & Recommendations for regional
standardised methodologies tailored to the
level of existing data.**

8 CONCLUSIONS:

Approaches to costing are generally the same across hospitals in the Eastern Caribbean region. However, the application of the methods used, differ to varied extents. As stated in section 2.4. variations between costing practices at EC hospitals were observed mainly in the following areas:

- Types of labour activity identified and costed through surveys (i.e. what constitutes 100% of Doctors' time?. And how does the survey define the splits? Are private consulting times considered?
- Cost centre definition: important when comparing like hospitals to be able to relate differences in costs derived for similar cost centres back to the scope of activities undertaken in those cost centres.
- Identification, classification of recurrent and capital cost items
- Apportionment of overhead, capital and ancillary costs to final (clinical service) cost centres
- Bases of allocation differed according to the next best variable available from hospital infrastructure and demographic data.

As a result of such variations, the need to undertake a standardisation process for the sake of 'benchmarking' and for the effective use of costing information processes must be recognised as an urgent priority. Indeed, this has been recognised. In more developed an industrialised regions for the past decade, and measure have been incorporated in response to this. For instance, as cited in 2.4 the National Hospital Cost data collection study was initiated in 1997 and sets out national standards (NHCDCS);

- For defining staff activities that make up personnel costs
- Defining cost centres (cost centre mapping)
- Options for identification and apportionment of overhead costs and ancillary costs
- Cost definitions and categories
- Monitoring the utilisation of final products
- Recording infrastructure, demographic and utilisation data
- Definition of final products and units of measurement

The recommendations stated are made bearing in mind that

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1. Studies must be simple yet valid enough to be conducted on a periodic basis by hospital administrative or MOH personnel without the input of external investigators.
 2. Results must be comparable across the regional hospitals and therefore the similar approaches must be followed for studies with similar viewpoints and purpose.
 3. The studies must also be easily reproducible, and hence within the confines of the available data sources.
 4. Finally, the results must be easily interpretable by the users.

The standardisation concept encourages one general approach but *does not* aim to ensure that one set of methods only is followed; it aims to ensure that if the study purpose is the same for a group of hospitals, that a common language will be derived for elucidating the final results. For instance, cost centres must be described, defined and mapped to standard department names if costing on department level cost centres is undertaken.

The definition of cost centre type will drive the methods; the description will allow for the identification of differences in the final cost when comparing similar hospitals or even periodic studies in the same hospital; mapping to a standard cost centre name maintains the consistency for the sake of comparison given that descriptions have been provided. In line with this urgent requirement for standardisation of raw data, is the urgent need for hospital information systems (MIS) linked to provider level and MOH administration/accounting systems in the first instance. If a full comprehensive and valid costing of health services is to be achieved, this MIS must extend to the community level care. Attempts *have* been made in the past to implement information systems in the Caribbean region for the purpose of costing. However, a major reason for failure has been the existence or failure to establish information needs (Adomakoh 1999), poor data collection processes and standards. Indeed, this has been the reason for the failure of pilot implementation of clinical costing and other health information systems in industrialised regions also¹. Section 2.4 displayed the prerequisites of a comprehensive system.

Also, this standardisation is not intended to limit the degree of detail and accuracy that can be gained from more detailed cost studies, this must be maintained, albeit through external investigators, as such lengthy processes required to ensure detail are usually not within the remit of the administrative staff in the regional hospitals.

¹ TRANSITION® II Clinical costing system was highly successful in USA, however the pilot failed in most hospitals across Queensland Australia. Following full scaled up implementaion in the successful sites, there are only 45% of hospitals using the system now. The difference between the successes and failures were; a comprehensive data collection, standardisation and training team and the implementation of collection processes.

A long term, and cost-effective alternative to the periodic use of short term external investigators would be to introduce the concept of a clinical costing unit/decision support unit within hospitals and comprising of personnel skills in accountancy/health planning & financing, information technology, information management and an administrative clinician. The role of this core team would be to identify costing and activity based information systems that capture service utilisation, financial, supplies, and staffing activity; implement and manage the system; conduct clinical costing studies informed by the output of the information systems on an ongoing basis; and provide periodic reports for management and planning purposes.

8.1 RECOMMENDATIONS FOR REGIONAL STANDARDISED METHODOLOGIES TAILORED TO THE LEVEL OF EXISTING DATA.

Given that the levels of data availability and the structure of available data are extremely varied in the EC, one specific standardised methodological approach will not enable the efficient costing across all regional hospitals. Therefore, recommendations for a standardised methodology must incorporate decision analysis approach to standardisation. This will enable investigators to optimise the overall costing methodology employed by synchronising the approaches used in each step of the costing process, to arrive at the most valid result possible under the conditions defined throughout this review.

In addition, the purpose for the costing studies are often multifaceted and varied in the EC, and as mentioned in several parts of this report, the study purpose drives the methods used.

Based on the findings of this review and the strengths and weaknesses observed, this report defines broad recommendations for studies that have been translated into a standardised approach (not method) displayed in table 9;

Hospital costing studies for tackling health reform issues should;

- Be undertaken from the viewpoint of the provider,
- Be undertaken for the purpose of deriving costs (unit, total cost, cost of inputs by category, etc) at the department cost centre level (as opposed to disease group, patient level).
- Use the financial approach regardless as to whether the study is undertaken for financial management purposes, identification of areas of wastage, or for addressing issues of programme sustainability or reproducibility.

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- Should always address capital items
 - Should address donated goods when it is a capital item goods or services that will ultimately require replacement in order to sustain an existing service (with replacement purchased goods or replacement paid staff). Ignore one-off donations that will not be missed.

Table 9 presents

- I. The main issues, which are the major variations observed in costing approaches.
- II. The mitigating conditions of data availability and assumptions that contributed to the methodological decisions, and
- III. Methodological recommendations for addressing these issues under the conditions are cited.

This table can then be translated into a decision analysis tree for addressing unexpected methodological problems that may arise during the costing exercise.

Table 9: Recommendations for standardisation of costing processes

ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
Define Cost Inputs to be included in the study	Data exists as budget or expenditure items from MOH, Provider or Treasury	Financial approach chosen	<p>Include all costs incurred by the provider.</p> <p>Use shadow prices (actual paid)</p> <p>Aim to show final costs with and without off budget costs depending on the purpose</p>	Remember to state the purpose and viewpoint and to justify the exclusion of certain costs. This will, in turn, justify the financial approach
		Economic approach chosen	<p>Include the 'value' of all resources consumed by the final cost centres.</p> <p>Therefore, use market prices</p> <p>Include off budget, capital and donated items</p>	Remember to state the purpose and viewpoint and to justify the inclusion of certain costs. This will, in turn, justify the economic approach
ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
Allocation of MOH Recurrent Expenditure to hospital level	Data exists as budget or expenditure items from MOH and/or Provider	Time and resources have been designated for the detailed review of expenditure sub- items (sub heads)	<p>If hospital accounts dept. possesses breakdowns of all sub heads this is the best source. The next best source is through a detailed review of the expenditure heads and sub heads attributed to the provider output.</p> <p>Use the hospital revised estimates for the study FY. If expenditure is unavailable, then use the previous years revised or actual estimates and scale to reflect the <u>hospital utilisation of the study year.</u></p>	Remember to state assumptions clearly, e.g. expenditure is used as a proxy for cost
		Time and resource constraints limit detailed investigation of expenditure items		

ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
<p>Define Hospital cost centres</p>	<p>Greater portion of activity data exists at the level of departments such as medical, surgical, orthopaedics, laboratory, etc (insignificant amount may exist at ward level)</p>	<p>Available activity data must be linked to the final cost centres.</p>	<p>Define cost centres by department</p>	<p>Remember to define the costs centres in line with the purpose, and the organisational structure in the cited order as well as the data structure. Also remember to define the Allocation factors that will be used in the step down allocation stage (if planned). This preliminary planning helps the investigator to focus on the validity of the methods in fulfilling the desired purpose(s).</p>
<p>Greater proportion of activity data exists at the level of unit such as biochemistry, pathology, haematology cost centres, etc instead of one laboratory cost centres. This was not observed in the regional hospitals.</p>	<p>Available activity data must be linked to the final cost centres.</p>	<p>Define cost centres by unit and wards</p>	<p>Allocation factors that will be used in the step down allocation stage (if planned). This preliminary planning helps the investigator to focus on the validity of the methods in fulfilling the desired purpose(s).</p>	
ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
<p>First stage Allocation of all identified hospital expenditure sub-heads to cost centre level (development of the hospital recurrent expenditure profile)</p>	<p>Identified expenditure data from MOH vouchers or sub heads breakdown sourced from hospital accounts. Activity data and infrastructural data available.</p>	<p>Vouchers must be complete in that the total sum identified reconciles back to the expenditure figure. If not, then gaps must be addressed through inspection of alternative data sources including interviews.</p>	<p>The general rule is to apportion as many costs as can be identified directly to the responsible cost centre. For instance, dialysis supplies to dialysis unit, x-ray and laundry supplies to laundry, and prostheses to surgery, other supplies to stores, etc.</p> <p>Where activity or infrastructural data gaps exist, undertake direct observation on a sample and/or interviews with key informants. In all cases, exclude all personnel</p> <p>Identify those items that must be 'sliced' prior to allocation by a variable e.g. food inputs to dietary</p>	<p>Reflect activity as accurately as possible. Therefore, identify those overhead departments that have relatively intensive activity in selected cost centres and apportion through direct allocation</p> <p>Consider donated goods: Link the inclusion of donated items back to the purpose and the replacement status of the identified donated items.</p> <p>If using manual methods, exclude the direct allocation to intermediate cost centres. If using a model perform the exercise together. costs. These are addressed at an</p>

ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	intermediate stage. STATEMENTS
<p>Intermediate stage: Identification of personnel input and direct allocation to final and overhead cost centres</p>	<p>Available expense data on personnel emoluments for all hospital services broken down by established (pensionable) unestablished, temporary, casual, etc). Staff list of salaries by name and level are unavailable. General list of salary scales is available. Staff duty roster available for some staff categories</p>	<p>Time and cost constraints apply</p>	<p>Where available, use duty rosters to apportion nursing costs based on the distribution of nurses across the cost centres.</p> <p>If possible verify rosters through consultations with key informants to aid in identifying and establishing the time, hence cost distribution of staff who serve more than one cost centre.</p> <p>If no roster exists, and findings through key informant discussions are not consistent, then review a retrospective duties list of actual staff allocations (if available).</p> <p>Identify and allocate costs associated with staff leave. Use an allocation basis that reflects the time/cost distribution of the permanent staff (for the leave posts identified) across the cost centres.</p> <p>Use rosters and interviews to allocate doctor time.</p> <p>If financial approach then distribute the total salary cost across the cost centres</p> <p>If the economic approach is followed, then only distribute the proportion of the salaries that</p>	

ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
<p>Intermediate stage: Identification of Capital items and direct allocation to final and overhead cost centres</p>	<p>Available expense data on personnel emoluments for all hospital services broken down by established (pensionable) unestablished, temporary, casual, etc). Staff list of salaries by name and level are unavailable. Staff duty roster available for some staff categories</p> <p>DATA STRUCTURE Available data sources for newly purchased (in study period) capital items and existing capital.</p>	<p>Additional time and costs factored into the scope of the study</p> <p>CONDITION Financial approach</p>	<p>related to hospital output activities</p> <p>RECOMMENDED APPROACH In the absence of documented records, use the observational approach, but be aware of the seasonal variations in activity. Therefore extrapolate findings more accurately by predicting changes to observed activity levels through key informant discussions or past duties lists.</p> <p>RECOMMENDED APPROACH Include all identified capital items in the allocation process. If list is unavailable then identify locations and costs through key informant interviews. Perform amortisation and depreciation of the replacement cost of capital remember to incorporate the opportunity cost of capital. Use direct allocation to apportion the amortised values of direct capital items across the responsible cost centres as identified in the interviews. The indirect capital items e.g. building should be apportioned directly based on a logical allocation factor.</p>	<p>STATEMENTS Link the method of calculating capital replacement costs and annualised amount to the purpose. This will define whether opportunity cost should be incorporated and whether to use shadow or market prices.</p>

Intermediate stage: Identification of personnel input and direct allocation to final and overhead cost centres	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
<p>Intermediate stage: Allocation of direct recurrent costs to intermediate cost centres</p>	<p>Intermediate cost centre has list of intermediate output consumption by final cost centres;</p> <p>or</p> <p>List of direct cost of each type of output (e.g. tests) and associated consumption of the output for a similar hospital is available</p>		<p>Use the first stage direct allocation method to apportion direct recurrent costs from the hospital budget or MOH expenditure sub heads to the cost centre as performed in the first stage allocation to other cost centres (above). Identify activity lists i.e. number of tests (outputs) performed by department. If this is unavailable, then a sample of data can be obtained from alternative source such as direct observation, department records or interviews</p>	
<p>End of first stage allocation</p>				
ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
<p>Second stage allocation: of hospital recurrent expenditure from the overhead cost centres to the final cost centres.</p>	<p>Activity data available for all intermediate and final cost centres.</p> <p>Infrastructural data e.g. floor space available for hospital</p>		<p>Use the step down approach to allocate the costs directly allocated to the overhead (indirect) departments to the final cost and intermediate centres. If data does not exist, use the information generated from the direct observation and interviews with key informants as described in the first stage allocation.</p>	

End of Second Stage Allocation				
ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
<p>Calculation of unit cost – intermediate cost centres</p>	<p>Intermediate cost centre (or in some cases, the final cost centre) has list of intermediate output consumed by all final cost centres. The intermediate cost centre also has the total amount spent (from step-down)</p>	<p>To include the intermediate costs in the unit cost of the final cost centre</p>	<p>Express the quantity of intermediate output generated by each final cost centre as proportions of the total intermediate output consumed hospital-wide. Multiply this proportion by the total costs incurred by the intermediate cost centre to give the share of intermediate costs across each final cost centres.</p>	
<p>ISSUE</p>	<p>Intermediate cost centre has no existing cost or price list of outputs, and only has the total number of outputs produced and in some cases the quantity of intermediate output consumed by final cost centres</p>	<p>To derive the unit cost for the intermediate cost centre, and therefore exclude it from the unit costs of the final cost centres</p>	<p>The unit (average) cost per intermediate output can be derived by dividing the total cost consumption of the intermediate cost centre by the total intermediate output generated</p> <p>If quantity of intermediate output consumed by final cost centre is available, then multiply the unit cost by the total quantity of intermediate output consumed to give the share of intermediate cost centre costs consumed by each final cost centre.</p>	<p>It is better to use this approach than the one cited above to measure the contribution of intermediate costs to selected costs centres where intermediate output activity is available: so if intermediate output was measured for a sample of patients in other cost centres this approach will allow the estimation of an intermediate cost for that cost centre that will be comparable to the estimates for the existing cost centres.</p>

ISSUE	DATA STRUCTURE	CONDITION	RECOMMENDED APPROACH	STATEMENTS
	<p>A list of cost of each type of output (e.g. tests) and associated quantities of the output consumed hospital – wide <i>for a similar hospital is available.</i></p> <p>The only available data for the intermediate cost centre is the intermediate output activity by type of output. E.g. number of tests performed by name of test, in a laboratory cost centre.</p>	<p>To derive the unit cost for the intermediate cost centre, and therefore exclude it from the unit costs of the final cost centres</p>	<p>For instance, in the case of lab tests (output), weight each test relative to the least costly lab test based on the external cost list that provides details on the relative costliness of the tests performed. (This is usually a price list which may be based on fees charged or detailed costing of each test performed). Multiply the weighted value for each test by the total number of that test produced, to give a weighted value unit. Sum the weighted value units and express each individual weighted value unit as a proportion of the summed figure. Derive the unit cost per test by multiplying the total cost identified for the laboratory cost centre by the calculated proportion of the weighted value unit for each test.</p>	
<p>Calculation of the final product - unit costs of final cost centres</p>	<p>DATA STRUCTURE</p>	<p>CONDITION</p>	<p>RECOMMENDED APPROACH</p> <p>Calculate the unit cost for each final cost centre by dividing the total cost by the total unit of activity for that cost centre.</p>	<p>STATEMENTS</p> <p>The format of the final product should be linked to the original study purpose</p>

9 REFERENCES

9.1 *Methodological issues*

Adomakoh S. Defining Health Information Needs in Barbados. Mar 1999. CDRC study funded by the Barbados Mutual Insurance Co.

Barnum H, Kutzin J. Public Hospitals in developing countries: resource use, cost, financing. Baltimore, MD, Johns Hopkins University Press 1993.

Beck EJ, Beecham J, Mandalia S, Griffith R, Walters MD, Boulton M, Miller DL. What is the cost of getting the price wrong? J Public Health Med 1999 Sep;21(3):311-7

Bell B. Gold Coast Hospital Clinical Costing Handbook, 2nd edn 1995.

Berman HJ, Weeks L. Financial Management of Hospitals. Ann Arbor, MI, Health Administration Press

Clements, R M (1974) The Canadian Hospital accounting manual. Livingston Printing, Toronto.

Cost accounting: a managerial emphasis (5th Edn) Prentice Hall, Englewood cliffs NJ

Creese A and Parker J (1994) Cost analysis in Primary health care: A training manual for programme managers. WHO Geneva

Drummond MF, Stoddard G, Labelle R, et al. Health economics: an introduction for clinicians. Ann Intern Med 1987; 107: 88-92.

Drummond MF, Stoddard G, Torrance GW. Methods for the economic evaluation of health care programmes. Oxford: Oxford University Press, 1987: Critical assessment of economic evaluation: 18-38.

Drummond MF. Survey of cost-effectiveness and cost-benefit analyses in industrialized countries. World Health Stat Q 1985; 38: 383-401.

Garrattini, Guiliani G, pagano E. A model for calculating costs of hospital wards: an Italian experience. J Manag Med 1999;12(2-3):71-82

Hall J, Mooney G. What every doctor should know about economics. Part 1. The benefits of costing. Med J Aust 1990; 152: 29-31.

Hall J, Mooney G. What every doctor should know about economics. Part 2. The benefits of economic appraisal. Med J Aust 1990; 152: 80-82.

Hanson K , Gilson L. (1993) Cost, resource use and finance methodology for Basic Health Services. Bamako Initiative Technical Report Series Number 16. UNICEF New York.

Heidemann EG The contemporary use of standards in health care. Geneva .WHO

Jackson T. Cost estimates for hospital inpatient care in Australia: evaluation of alternative sources. Aust N Z J Public Health 2000 Jun; 24(3):234 -41

Janowitz B. and Bratt JH. (1994) Methods for Costing Family Planning Services. United Nations Population Fund and Family Health International

Over M. Economics for health sector analysis: concepts and cases. Economic Development Institute of the World Bank, Washington DC.

Richardson, A W and Gafni A (1983) Treatment of capital costs in evaluating health care programmes. Cost and management Nov-Dec 26-30

The National Hospital cost data collection study. Reference manual Spetember 1997. Queensland health, Australia.

Udvarhelyi S, Colditz GA, Rai A, et al. Cost-effectiveness and cost-benefit analyses in the medical literature; are the methods being used correctly? Ann Intern Med 1992; 116: 238-244.

Watcha MF, Smith I. Cost-effectiveness analysis of antiemetic therapy for ambulatory surgery. J Clin Anesth 1994; 6: 370-377.

9.2

Non- regional studies

Flessa S. The costs of hospital services: a case study of Evangelical Lutheran Church hospitals in Tanzania. Health Policy Plan 1998 Dec;13(4):397-407

Gilson L, Rushby J. 1991. Recurrent cost analysis of selected patient care centres in St. Francis District Designated Hospital. Ifakara. Working pape . Ifakara.

Hansen K, Chapman G, Chitsike I, Kasilo O, Mwaluko G. The costs of HIV/AIDS care at government hospitals in Zimbabwe. *Health Policy Plan* 2000 Dec;15(4):432-40

Hensher M, Fulop N, Ujah S. Economics of early Discharge after Orthopaedic Surgery. *Journal of the Royal Society of Medicine*. Oct 1996,89(10): 548-551

LaForgia. GM, Balarezo M. (1993). Cost recovery in Public sector hospitals in Ecuador. Bethesda, MD. Abt Associates (Health Financing and Sustainability Technical note 28)

Lewis M, LaForgia GM, Sulvetta MB. (1996). Measuring Public Hospital Cost. Empirical Evidence from the Dominican Republic. *Soc Sci Med* Jul;43(2):221-34

Mills A. (1991). The cost of the district Hospital; a case study from Malawi. Washington DC, World Bank.

Mills A. The economics of hospitals in developing countries Part I Expenditure patterns. *Health Policy and Planning*. 5(2): 107 –17.

Mills A. The economics of hospitals in developing countries Part II Costs and sources of income. *Health Policy and Planning* 5(3): 203 –18.

Ojo K et al (1995). Cost Analysis of health services in Sierra Leone. Annex III. A case study of Connaught Hospital and Waterloo Community Health Centre. Geneva. WHO

Omar AO (1995) et al. Costs, resource utilisation and financing of public and private hospitals in Uganda

9.3 Regional Hospital Studies (Unpublished)

Adomakoh S. The economic cost of dialysis at the Queen Elizabeth Hospital, Barbados. (submitted for publication)

Belle T, Adomakoh S. (2001). The economic cost of Diabetes to the Queen Elizabeth Hospital, Barbados. (unpublished)

Fairbanks A et al. (1996). The Barbados Health Sector. An Economic Analysis. Centre for International Health, Boston University.

Huff –Rousselle M et al.(1996). Victoria Hospital Costing Study. Health Care policy and planning Management project , Report 44.

HERA (2000). Health Sector Study St. Lucia Volume I

HERA (2000). Health Sector Study. St Lucia Volume II

KPMG. (1998) Government of Grenada Costing Handbook. April 1998

La Foucade A. (1997).St. Vincent and the Grenadines National Health Insurance Project. Health Economics Unit, University of the West Indies, Trinidad.

La Foucade A. (1996) Estimating the cost of Selected Hospital Services in Jamaica.

Llewlynn G. (1994) Hospital Costing Study: Glendon Hospital, Montserrat. Health Care policy and planning Management project , Report 15.

Llewlynn G. (1994) Hospital Costing Study: Peebles Hospital, Tortola, BVI. Health Care policy and planning Management project , Report 12

Llewlynn G. (1994) Hospital Costing Study: Princess Margaret Hospital, Dominica. Health Care policy and planning Management project , Report 10.

Lucas G. (1994) Hospital Costing Study: JN France General Hospital, St Kitts. PAHO/WHO.

Trisolini MG. (1992). Methods for cost analysis, cost recovery and cost control for a public hospital in a developing country. Victoria Hospital , St Lucia. Int J Health plan Man, 7:103-132

Wasek, Glenn, Keehn, A Chase R, Morairty D, Hanover K, Gatter M, Campbell P. (1992) Victoria Hospital Cost Recovery and Accounting Project. Modelling of Health Care Initiatives at Victoria Hospital, St Lucia. John Snow inc.

ANNEX 1

Hospital Costing Survey

ANNEX 1

Hospital Costing Survey

Page 1- Summary of costing studies undertaken

1. Name of Hospital: _____

2. Parish/district: _____

3. Country: _____

4. Name of respondent _____

5. Title _____

6. Department _____

7. Contact number: Phone: _____ Fax: _____

E-mail: _____

8. Today's Date: / / Mon/Day/Year

9. Has your institution ever conducted a costing study (include incomplete studies)? Yes No

10. If no, is there a reason for not undertaking such studies (you may tick more than one)

No need to

data is incomplete

Data is unreliable

11. When was the last one undertaken?

12. How many studies have been conducted in the last ten years

1 between 2 and 5 2 5 to 10 3 greater than 10 4

13. These studies were undertaken

Yearly when required 2 5 yearly 3

14. If any of the studies were conducted to cost specific hospital services only, please give details of which clinical areas that were costed (e.g. write "all services" if it was to calculate the average unit cost of all direct hospital services).

15. How does your Ministry of Health (MOH) record spending within health care institutions ?

Please tick the statement that best applies to your MOH. accounting practice.

- Spending by each institution (hospitals, polyclinics, homes, etc) is easily identified
- Spending by each hospital (if more than one hospital exists) is easily identified, but not within each primary care institution such as polyclinics or tertiary care institutions such as nursing homes. These are pooled within MOH accounts.
- Spending by any of the institutions is not easily identifiable as line item accounts are pooled (as in the 'vote' book system) and represent total spending.

If possible, give details: _____

PLEASE USE THE FOLLOWING PAGES (photocopy the following pages to provide blank copies) TO PROVIDE OUTLINE DETAILS OF EACH OF THE COSTING STUDIES UNDERTAKEN WITHIN SINCE 1985 (COMPLETED STUDIES ONLY).

23. How were overhead costs estimated?

Stepdown method

Other method (please give a brief description)

24. Capital Costs:

Were replacement costs of capital included in the analyses?

Yes No

Were building costs included in the analyses?

Yes No

Were equipment costs included in the analyses?

Yes No

Were vehicle costs included in the analyses?

Yes No

Was opportunity cost of capital included in the analyses?

Yes No

25. How were capital costs estimated? If yes, to any part of 24, please give a brief description

26. Were donated goods included in the analyses?

Yes No

27. How were donated item costs estimated? If yes, to any part of 26, please give a brief description

28. Were staffing costs estimated?

Yes No

29. If yes to 26, how were staffing costs identified for each direct (clinical care) department?

30. If possible please mail or e-mail us a copy of the report. If this is not possible please provide a brief outline of study :

31. Were the study objectives achieved? Yes No

32. If no, why not?

33. Was the study used at all to inform decision making in management or planning initiatives? Yes No

34. If no to 31, why not?

THANK YOU FOR YOUR PATIENCE AND COOPERATION. WE WOULD BE EXTREMELY GRATEFUL IF YOU COULD ASSIST US FURTHER BY MAILING OR E-MALING US A FULL COPY OF THE REPORT YOU HAVE JUST DESCRIBED TO US .

Yes No, not available

THANK YOU FOR YOUR TIME

SARAH ADOMAKOH

ANNEX