CHAPTER 3

LITERATURE REVIEW

This chapter consists of two parts. The first part reviews the method of cost calculation and cost recovery. The second part is about the previous studies on health at the border.

3.1 Method of Cost Calculation and Cost Recovery

The terms of cost and expense have been used in a variety of ways. Basic to notion of cost is the sacrifice or exchange of one thing for another in an economic transaction. Thus, the term of cost refers to an outlay of cash or other assets or services, or the incurring of liability in exchange for goods or services.

According to the economic theory, the cost of good or services is the value of the resources spent for the acquisition of those goods or services, which may be expressed as a monetary or non-monetary value. Conceptually, several definitions of the notion of cost are possible; economists often distinguish between accounting cost and opportunity or social cost. The accounting cost of goods or services may be defined as the monetary value of actual expenditure for the acquisition of those goods or services. Opportunity cost defined as the best alternative foregone.

However, the terms of cost and expense are used interchangeably. In financial accounting, a cost is classified in various definitions which depend on their objectives such as fixed cost, variable cost, implicit cost, explicit cost, opportunity cost, relevant cost, incremental cost, sunk cost, medical cost and non-medical cost.

Cost analysis is the measurement of resource used to produce service. Number and type of services and number and type of units within organization affect the degree of difficulty. Economists use the total cost analysis for possible applications in providing information for management to achieve its dual objectives of controlling costs, setting price for user charge, planning, budgeting and evaluate for performance of organization

management. Ultimately, the objective of cost is the unit of service for which we wish to know the cost such as cost of patient visit, hospital day cost, admission cost or cost per procedure.

Cost calculation is not simple and many times, not straightforward. Information is often unavailable, and the organization's process can be complex. Managers and accountants are often at a loss on how to approach a particular cost calculation exercise. They lack general cost calculation guidelines that can be applied to a variety of situations across many different organizations.

The basic goal of cost calculation is to determine total costs of each cost centers in organization. The total cost should be determined and reported to health care financial managers for management within organization and also reporting to external organizations.

The American Hospital Association defines health care services cost calculation is the apportionment or allocation of costs of the non-revenue producing cost centers to each other. And allocation to revenue producing cost centers on the basic of the statistical data that measure the amount of service rendered by each cost centers to other cost centers. The prerequisites for cost calculation are up to date organization chart which separating the cost centers, and accurate hospital financial and cost information system.

For cost calculation, firstly, the organization is a key element of cost calculation which should ideally be consistent with the locus of authority and responsibility in the organization. Cost centers must be clearly identified. The relationships between each cost center must be identified so the services that provided to other cost centers are clear. In other words, the order in which costs are distributed from one cost center to other cost centers must be delineated.

The second is the chart of accounts is consistent with the organization structure. An updating of the chart of accounts is the first step toward achieving an accurate information system. The third are concerns the accuracy and adequacy of the organization's information system that must be able to correctly match direct costs with cost center incurring those costs. In other words, the information necessary for reclassifications and adjustments must be readily available in the accounting system.

In addition, another important aspect of the information system is the non-financial data. Cost calculation depends on knowing the quantity of services provide by or to other cost centers. The quality of services shared by separate cost centers is usually represented by non-monetary statistical data, which portray the activity level of service in each cost center. These activity measures should be clerically feasible to compile and should be meaningful measures of the most important service provided by that cost center. Examples of such non-monetary measures include square footage, pounds of laundry and number of instrument set which withdraw from supply.

For cost estimating, there are five steps approaches are as follow respects:

3.1.1 Cost Centers and Grouping

Cost centers are the category of cost, usually a unit of an organization for which we want to analyze costs or revenue. Types of cost centers are as follows:

(1) Non-Revenue Producing Cost Center: NRPCC or Non-charging directly to patients such as administration organization, human resource, house keeping and laundry.

(2) Revenue producing Cost Center: RPCC or charging to patients for their services such as radiation, laboratory, surgery room, pharmacy and rehabilitation organization.

(3) Patient Service Area: PS such as outpatient department, In-patient department, health promotion and communicable disease prevention and control.

3.1.2 Cost Classification

The total cost of the activities of a health facility is the sum of the costs incurred by all the departments of the health facility. In order to analyze the share of each department, service or activity in the total costs of the health facility, a distinction must make between direct and indirect costs.

(1) Direct costs may be defined in relation to a given activity, a medical service or a hospital department. The direct costs of a medical service are the costs relating to the provision of that service alone. Direct cost is divided into three parts; labor cost, material cost and capital cost.

Labor cost is expenses paid to the employees in return of services rendered, including other monetary fringe benefit such as wage, salary and overtime.

Material cost is the costs of all raw materials used to manufacture the finished product.

Capital cost an economic resource that provides benefits to a company over one or more years beyond the period of acquisition.

The equation of total direct cost is

Total Direct Cost = Labor Cost + Material Cost + Capital Cost

(2) Indirect costs are more difficult to identify. These are the costs of goods and services used jointly for several activities or by several departments of the health facility, and which cannot therefore be attributed in their totality to one department, service or activity.

3.1.3 Allocation Criteria for Cost Estimation

After cost centers have been designed, the accounting system must be accurate enough to accumulate and assign appropriately all financial data to the various cost centers. Total costs should be defined as the total financial requirement including both direct and indirect costs of the organization.

The direct costs (labor cost, material cost and capital cost) are generally easy to trace to individual cost centers. However, the total cost of patient service areas must also including the indirect costs, which are not directly traceable to the specific service. The allocation is used to determine total cost of each final cost center.

Cost allocation means the process of apportioning costs from support cost centers to revenue producing cost center. In allocation criteria of costs, the direct cost (NRPCC and RPCC) that is Transient Cost Center (TCCs) are allocate to indirect cost of

organization relating on service, or support to patient service (Absorbing Cost Center–ACCs). Then, total cost of ACCs is equal to direct cost of ACCs plus indirect cost that allocated from TCCs (NRPCC and RPCC).

In figure 3.1 illustrates a simplified model of how services flow between health care departments. Each of these flows of service could be used as a basic for cost estimation technique.

The goal is to choose bases of allocation for solving reciprocal service allocation problem that most accurately reflect the consumption of resources. There are four basic methods of cost allocation technique which are commonly used in cost analysis. These method are include as follows:

Method 1   The Direct apportionment method

Method 2   The Step-down method

Method 3   The Double distribution method

Method 4   Algebraic or reciprocal method

These four methods primary differ in the manner which costs are allocated from non-revenue cost centers. They differ in terms of which flows are recognized as dominant.

3.1.3.1 The Direct Apportionment Method

In the direct allocation method, the costs of non-revenue are allocated directly to revenue cost centers or to patient services. This method ignores the fact that most non-revenue cost centers also provides services to other non-revenue cost centers as well as revenue cost centers as well.

Figure 3.2 illustrates the flow of cost allocations when using the direct allocation method. The costs of non-revenue cost centers are allocated directly to revenue cost centers. The direct allocation method is the least accurate for all methods.

3.1.3.2 The Step-down Method

This method compensates for one weakness in the direct apportionment method that non-revenue cost centers does provide services to other non-revenue cost

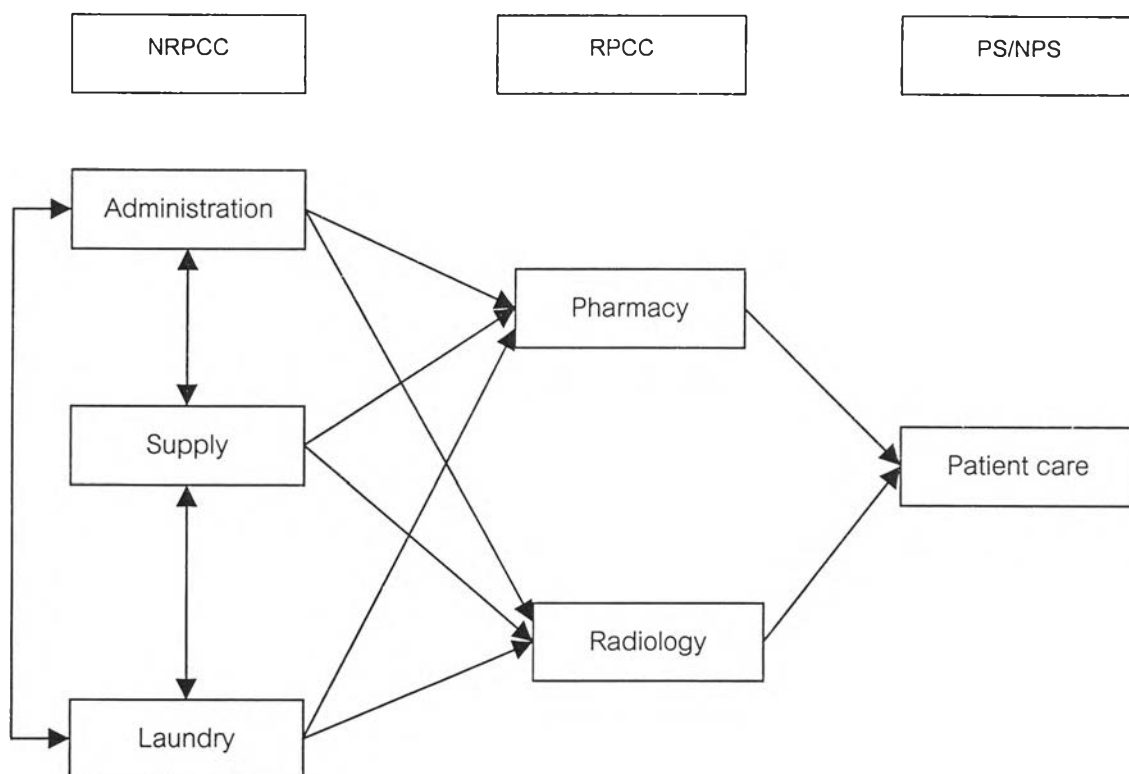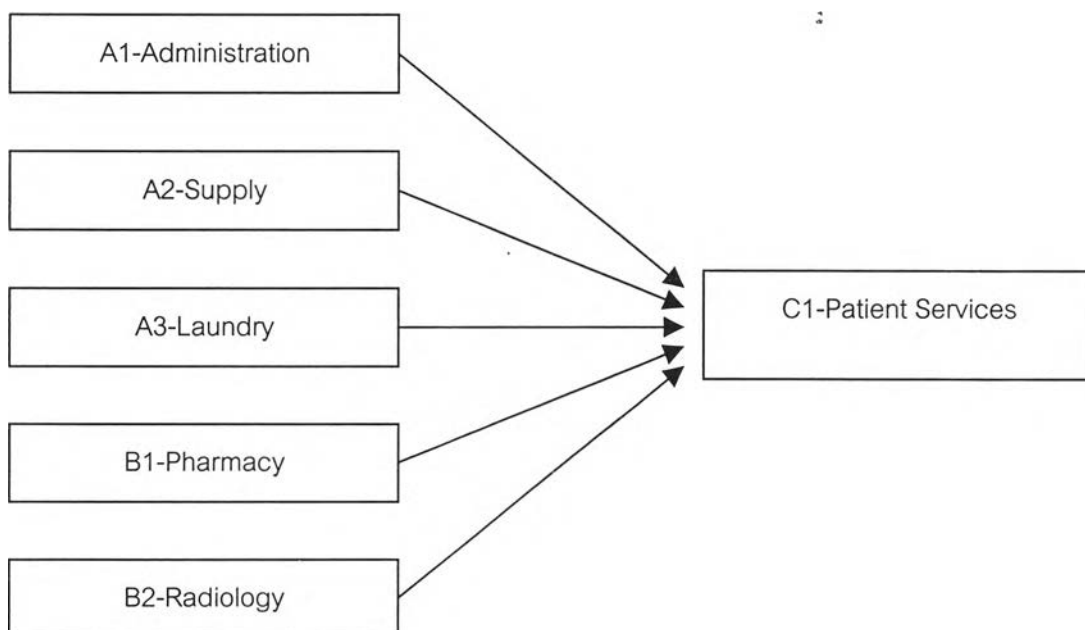FIGURE 3.1   Conceptual Model of Costing on Health Care Services

FIGURE 3.2   Steps of the Direct Apportionment Method

centers. This method is complex to use. The step-down allocation method is illustrated in Figure 3.3.

The first steps in this process that allocate the administration costs (Non-revenue cost centers) to all other centers that have received the administration services. After this has been done, the administration center was considered to be closed and no further costs allocated to it.

The second steps, the process is to allocate the finance costs that now include a portion of administration costs as well to all the remaining centers such as laundry, pharmacy, radiology and patient services. After this allocation has been performed, the finance center is considered closed.

The third steps, this step down is to allocate from the last remaining non-revenue cost center to the revenue centers (pharmacy and patient services). At this point, all non-revenue cost centers are considered closed since all costs have been now allocated to the revenue cost centers.

3.1.3.3 The Double Distribution Method

The double distribution method was planned to remedy one of major weakness of the step down method, which is the failure to consider all interrelationships between non-revenue cost centers. Centers are successively "closed" under the step down method, but in the double distribution method, each cost center remains "open" and costs can be reallocated to non-revenue cost centers.

This method uses two allocations at which time all non-revenue cost centers are "closed". The final allocation is made only to the revenue cost centers.

The first distribution, all direct and indirect costs of all centers are distribution to the receiving cost centers. Unlike the step-down method, the double distribution method allows a backward flow of allocation among the non-revenue cost centers.

In the second distribution, the costs have been allocated to the non-revenue cost centers are redistributed to the revenue cost centers

The method for double distribution allocation methods are illustrates in Figure 3.4 and Figure 3.5.

Figure 3.3   Steps of the Step-down Method
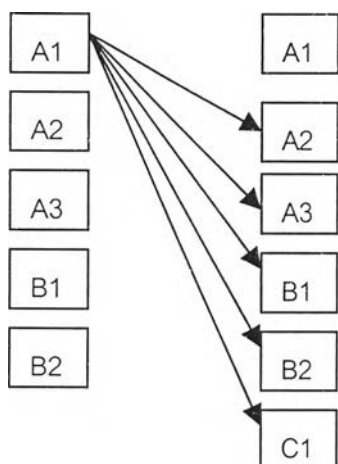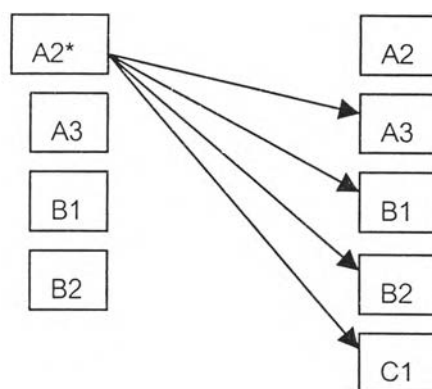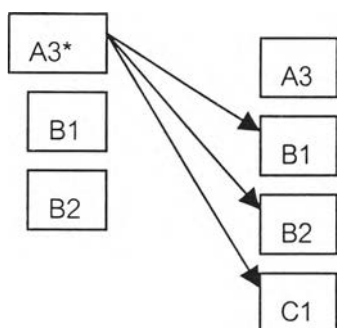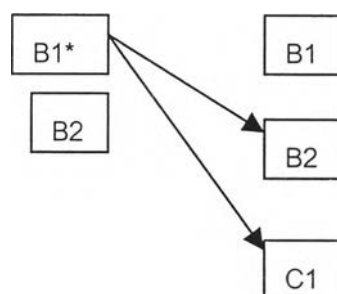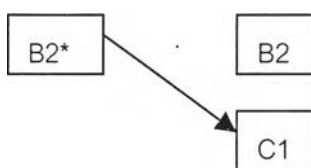

Step 1   Step 2.1 (A2*=A2+A2A1)

Step 2.2 (A3*=A3+A3A1+A3A2)   Step 3.1 (B1*=B1+B1A1+B1A2+B1A3)

Step 3.2 (B2*=B2+B2A1+B2A2+B2A3+B2B1)

FIGURE 3.4   Steps 1 of the Double Distribution Method
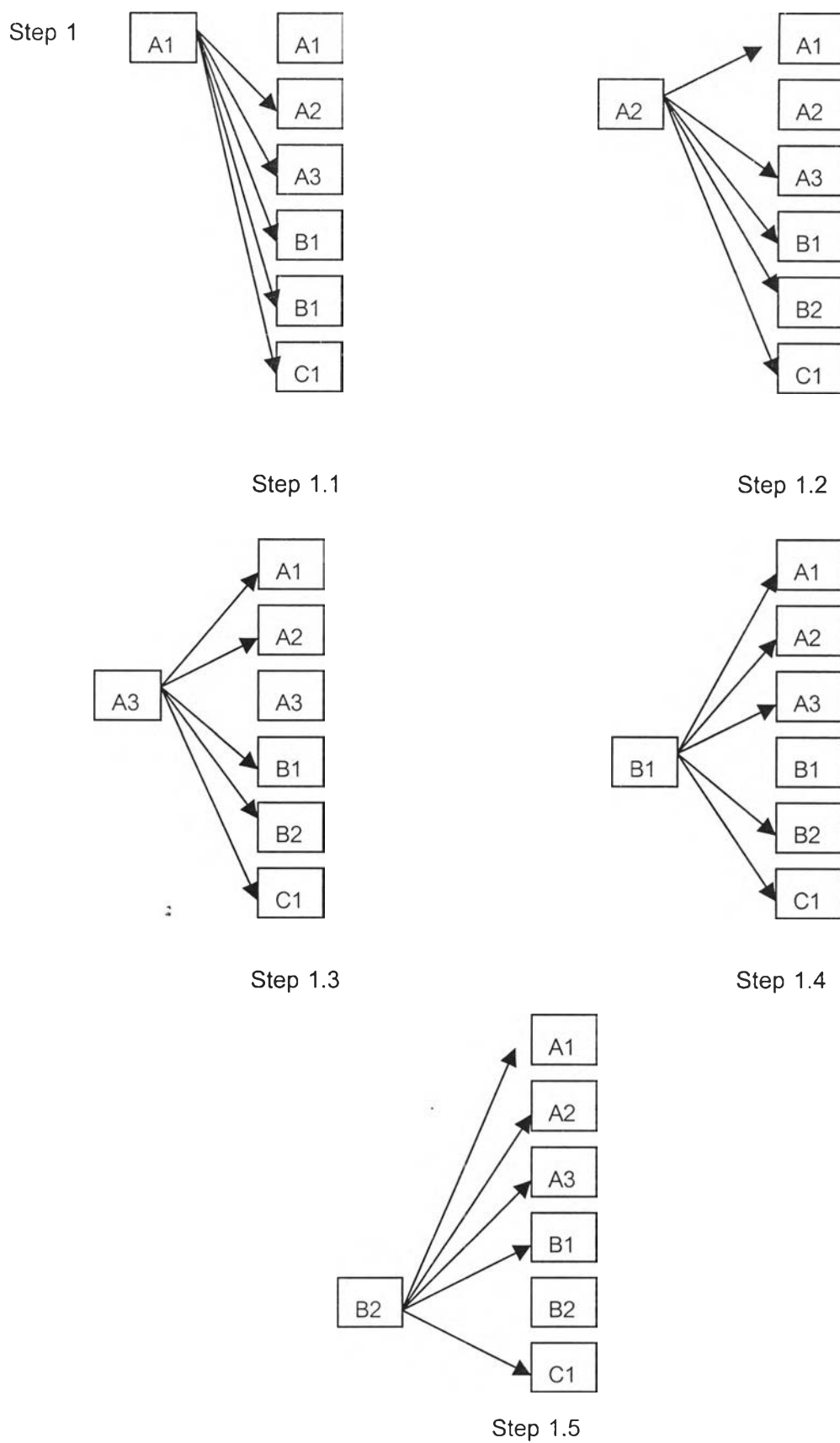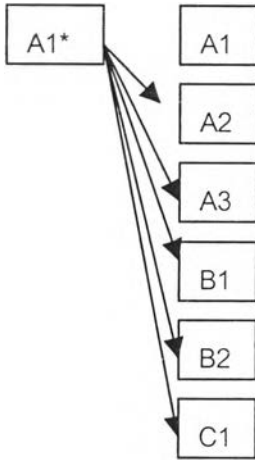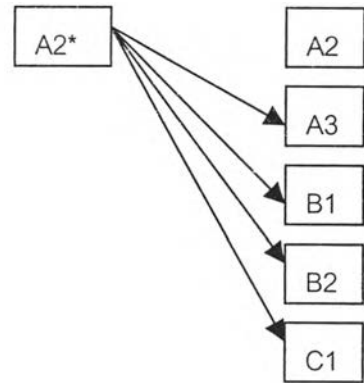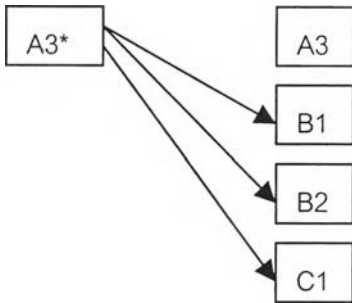

Step 1

Step 1.1

Step 1.2

Step 1.3

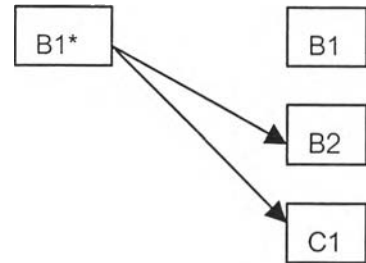Step 1.4

Step 1.5

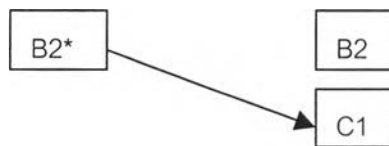FIGURE 3.5   Step 2 of the Double Distribution Method

Step 2.1 (A1*=A2A1+A3A1+B1A1+B2A1)

Step 2.2 (A2*=A1A2+A3A2+B1A2+B2A2)

Step 2.3 (A3*=A1A3+A2A3+B1A3+B2A3)

Step 2.4 (B1*=A1B1+A2B1+A3B1+B2B1)

Step 2.5 (B2*=A1B2+A2B2+A3B2+B1B2)

3.1.3.4 Algebraic or Reciprocal Method

The reciprocal method or simultaneous equation method involves the simultaneous solution of series of equations. These equations are the mathematical representations of the interrelationships between all non-revenue cost centers. These results are in the most complete allocation of all costs. It is the most defensible method and it is also the most complex and requires the aid of a computer program. The manual use of simultaneous equation method is limited to six cost centers. In addition, most of hospitals are having more than six departments (cost centers) that should use computer program assist for calculation by this method.

The simultaneous allocation method recognizes all the services that are provided for other centers and because of this recognition should result in a more accurate cost estimation than any of the other three methods.

In Figure 3.6 illustrate details in the relationship of the cost flows under reciprocal method allocation technique. Ultimately, all non-revenue and revenue cost centers are allocated to the patient and non-patient service cost centers. Consequently, under the simultaneous allocation method, the total amount of a particular non-revenue and revenue cost centers are allocated to each patient and non-patient service cost centers. These costs are effected by the reciprocity of services which each non-revenue and revenue cost centers provides to the other patient service cost centers.

In the simultaneous method, it is necessary to state the relationships among the non-revenue cost centers with a matrix formula. Linear algebra used for solves the total costs of non-revenue cost centers to the revenue cost centers.

For comparison of allocation method, the direct apportionment method and the step-down method are simple for using while the simultaneous method is difficulty. In addition, for accuracy, the simultaneous method is the highest while accept for the direct apportionment method and the step-down method. For computer program requires, the simultaneous method must used computer program for cost estimation (see Table 3.1).

FIGURE 3.6   Interrelationships between Cost Centers in Simultaneous Equation Method
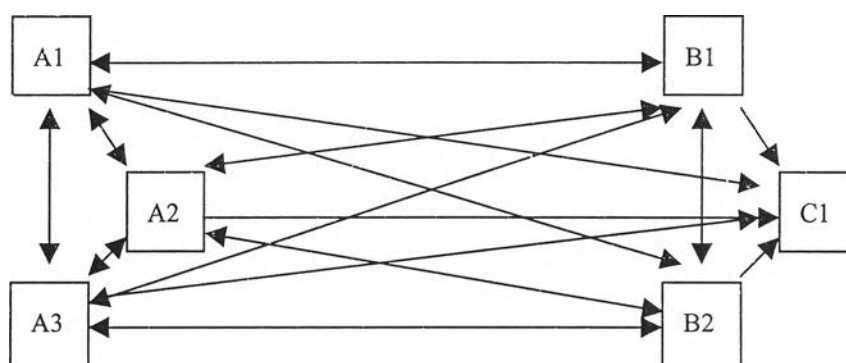
TABLE 3.1   Comparison of Allocation Method

	The Cost Allocation Method			
	Direct	Step-down	Double	Simultaneous
Absorbing costs and allocate costs to other cost centers			*	*
Allocated to transient cost centers group		*	*	*
Equity in transient cost centers group	*		*	*
Number of allocation	1	1	2	infinity
Feasibility	simple	simple	moderate	difficult
Require computer program				necessary
Accuracy	accept	accept	high	highest

Source: Pachranaleamol, Tityathikom and Tangcharoensathein (1999)

Note: * = Applicable

3.1.4 Total Cost Estimation

Total cost come from direct cost of patient service (PS) including with indirect cost that allocated from RPCC (Revenue Producing Cost Center) and NRPCC (Non-Revenue Producing Cost Center). The equation of total cost is:

Total Cost of Service = Direct Cost + Indirect cost

= Direct Cost of Patient Service + Indirect cost of NRPCC and

RPCC

3.1.5 Unit Cost Estimation

A unit cost is the cost of one unit of measure of a good or service. The unit cost should identify the output of goods or services of the organization which can be calculated by using an average cost, which establishes a relationship between the costs and the activity level or volume. It is calculated by dividing some total cost by some total measure of activity. The activity level is expressed in a unit of measure that is meaningful to the users.

Average costs are useful to measure productivity or detect significant cost trends. However, for decision-making purposes, they should be interpreted with caution. Average costs include both fixed and variable cost components. Variable costs are affected by changes in activity levels, but fixed costs are not.

Unit cost will be calculated by:

$$\text{Unit cost} = \frac{\text{Total Cost of Service}}{\text{Number of Visits}}$$

The steps of cost calculation are shown in Figure 3.7.

FIGURE 3.7   Steps of Cost Calculation
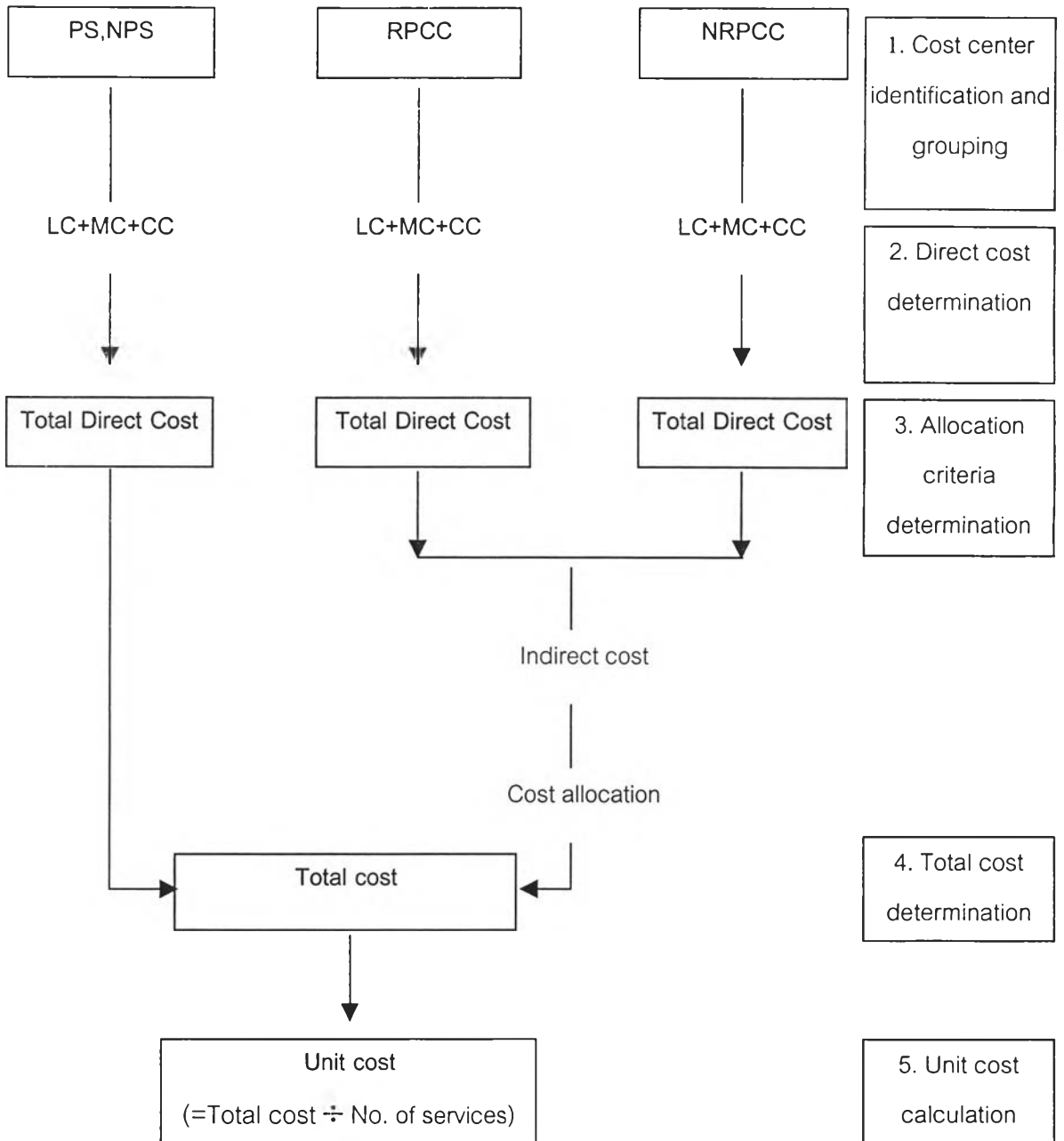
Note: 1. PS   = Patient services

2. NPS   = Non patient services

3. RPCC = Revenue producing cost center

4. NRPCC = None revenue producing cost center

5. LC   = Labor cost

6. CC   = Capital cost

7. MC   = Material cost

In Thailand there are several studies on cost analysis of health facilities. The studied of cost calculation in community hospital shown that the average cost of in-patient case expense per outpatient case expense is about 14:1 (Kongsawat and Srithamrongsawat, cited in Committee of health facilities resource management, 2001). From this study result, International Health Policy Program (IHPP) uses this proportion for quick method in cost calculation of community hospital which the hospital size less than 120-beded hospital. Relatively, 18:1 is the co-efficient proportion for general hospital or the hospital size which more than 120-beded.

As for health centers, Pithayarungsarit (1999) studied the unit cost of health centers in Samutprakan province in fiscal year 1999 by using the information of total operating expense method and found that the medical treatment expensed is about 44% of the total cost in health center. Recently, IHPP uses this proportion as co-efficient of the quick method of cost estimation for health center.

Considering from the studies of cost estimation, the organization can be implement and applying by these following respects:

1) Consideration the whole picture of production cost, which the organization should allocated resources by following the organization's vision and mission. The managers of organization should consider whether labor cost, material cost and capital costs are having appropriate proportions to their organization. Second point to wage, which wages that the organization can or cannot control such as overtime wage or fringe benefit. For material cost, which material that they consume more than they have plan in the organization material plan. In addition, whether the organization has lower depreciated capital cost. If the organization has lower capital cost proportions the organization have nearly expire durable equipment and older building.

2) For production cost at each cost center (department in facilities), Whether or not the labor cost and material cost allocated are relevant to outcome of each cost center. This information is beneficial to organization budget planning which employed Performance Based Budgeting System method, This method is based on realistic, clear and audible information.

3) For unit cost of patient services, its consists of routine service cost and medical care cost. These 2 parts of production cost are appropriate for cost control planning and budget planning. The routine service cost is the cost which occur in production cost whether or not the organization provide service for patient. These means that lower routine service cost are the management efficiency in each cost center. For medical cost, its occurs while patient visit health facilities which can be used to assess efficiency of management by compare the cost to number of patients visits.

4) For total cost of Transient Cost Centers (TCCs), the consideration should be taken if each cost center manages efficiently. For example, in the laundry department the manager should evaluate the efficiency which doing by their staff or ordering private company doing.

Considering to the cost management, Maureen (1996) suggests that the hospital and the health care sectors should be concerns regarding fairness, resource allocation, access and quality with lack of information. Even with adequate information on costs and output and management information systems to oversee the hospital approaches to capture outcome or performance limits their usefulness as hospital management tools or guides to health policy as well. However, the unit cost of health facilities is the basic information of health economics on financial and outcome of health facilities which represent the efficiency of resource management in their organization. In addition, this information can not represent the quality of their health facilities services. Hence, the organization should beware for applying these information whether these information bases on complete, correct and valid data.

In view of the present condition of the public hospitals sector, the government is well aware that hospital requires a great deal of financial resources. A system of cost recovery that is to be fair and effective as well as capable of nationwide implementation requires adequate knowledge of the characteristics of the supply and demand for health services.

As for cost recovery, Joseph (1997) described that the cost recovery is an essential component of health care reform- one that requires a major overhaul of health

care financing system. It is obvious that every country or community will have a different conception of the system to be adopted for the recovery of costs. One country or community may favor a system of itemized charges on account of its cost-effectiveness and not be so much concerned with access to care by the different strata of the population

GUY and Kodjo (1995) describe that in another option of cost recovery it would be a flat rate system if some importance were attached to the distribution of financial risks among the different patients, thus offering better chances of access to care to the poor. In most country cost recovery efforts are intended to; (1) raise revenue for health care by imposing user charges for public health service that used to be provide free of charge; (2) improve the coverage and quality of care by increasing resources for the health sector; (3) enhance equity in the provision of health care by targeting spending toward services for the poor and other vulnerable groups; and (4) improve service utilization patterns and control frivolous demand.

Waddington and Enyimayew (1989) described that cost recovery for public health care services was initially viewed as a panacea for the inadequate revenue generation in the health sector. However, it has become apparent that although they can increase revenue in absolute terms, direct fees have little proportionate impact on the public health system's financial requirements in many countries, especially developing countries, the public sector collects private revenues through fees charged at the point of services.

In choosing an appropriate system for cost recovery (user fees) in hospital, it seems to us that the adoption of a system of flat rates for each category of care fits with the stated objectives of the government. It is often claimed that user fees increase efficiency in the delivery of health care, for several reasons. Firstly, user fees cause service providers and users to behave more efficiently. Secondly, providers have an incentive to allocate revenues to produce appropriate services at the appropriate levels, and to choose appropriate production techniques. Finally, user fees send price signals to which clients respond by using only the services that they need.

Criteria for the evaluations of cost recovery systems propose three main criteria: economic efficiency, administrative efficiency and equity. As for first criteria, In economic

efficiency – cost-effectiveness analysis is able to show the extent to which a given system of financing is economically efficient. The aim is obviously too economically on the use of resources in attaining the set objective.

Second criteria, the administrative funds accruing from payment by patients, international aid, etc. and the use of these funds must also be governed by the rule of economic efficiency. This means that resource for administration (personnel, equipment, etc.) must be used judiciously. Following the rules of cost-effectiveness, the cost of administration must therefore be minimized while the objective of producing adequate health services must be still been achieved.

Considering to the third criteria, a system of cost recovery are said to be equitable when patients with similar needs for medical care are effectively able to obtain the same treatment. The advantage of this definition of equity is that it is not too difficult to monitor its application in practice. It is obvious that the charge patients must pay influence the extent to which they seek care. In direct charges, such as the cost of transport may also affect the use of services. It is essential to have a good knowledge of these effects if the objective of equity is to be pursued.

Ultimately, in context of cost recovery implemented are the administrative and management framework which important for the policy successfully as the ability to pay of users (customer) for the services or the quality of those services. Moreover, implementation of cost recovery efforts must ensure that quality, equity, and efficiency is maintained.

3.2 Previous Research on Health Care Provision at the Border Province

There are several researches in health at the border. In Britain, Chan (1999) studied about immigration in Britain and described that in Britain immigration has been an emotive issue in for more than 30 years. Some of them, faced racism in housing and in daily life. The community health services in the National Health System (NHS) provide health service for immigration and facing that new immigrants and refugees in community health care includes: language barrier, information about the NHS, knowledge of social welfare benefits, specific health needs and support in the community. Most refugees are

economically poor and need to access the health service and they spread communicable disease and burden in health care financial of NHS. But it can be support by community fund, local NGOs and local government officials.

Considering to the migration in Thailand, the typologies of the unusual mobility in Asia indicated three distinctive categories: undocumented migration, overstays and migrant workers. With an increasing trend, among June 1996 to December 1999 Thai government established policy in register for foreign migrant workers its have 99,974 migrants for working in Thailand, but it was estimated that at present, Thailand accommodated about a million irregular migrants.

There are differences on economic status effected accessibility to public services. In that connection, they were invariably facing social disruption, social and cultural differences and inaccessibility. The health complications were further aggravated by a lack of information, education and services leading to inequity and discrimination in health care system. Significantly, communicable diseases and sexually transmitted diseases are the most affected them.

Pratipchaikur, Inthanon, Wongcharoenyong and Sae-lim (1999) studied about the health status of foreign migrant workers in Ranong province and found that 59.8% of children have good health, 45.7% have dental problem and 46.8% are malnutrition in grade 2 and 3. For the EPI (Expanded Program on Immunization) there is less coverage of immunization with 43.3% and don't receive vaccination with 22.5%. Ranong province also face health problem from the migrant in maternal and child health and immunization that the central and local government especially Ranong Provincial Public Health should beware for health at the border such as maternal and child health project and promotion in complete immunize scheme.

In part of cooperation on health between the country along the border, Mahabhol, Pattarakulwanich and Rugpao (1999) studied about the national strategy for cooperation on health at the border and found that most of the foreigners seeking services from public health facilities were migrant workers. These health facilities suffer less from providing health care for them. In addition, It reported that causes of illness of the migrant worker are epidemic diseases which have been eradicated in Thailand, for example, diphtheria and polio disease.

For national policy on health at the border, this study suggests that national strategy for sustainable health development should strongly advocate cooperation along the border. This policy should based upon a proactive approach rather than a passive one such as promotion program in maternal and child health care, EPI (Expanded Program on Immunization), management and health manpower development especially training on medical treatment. In addition, the national health policy of Thailand should depict a good balance between humanity and cost-benefit of programs to be implemented.

This study suggests that the national cooperation should be seeking an international support on research and development, technology transfer and referral systems. The policy and planning should be flexibility and decentralize in the local cooperation.

For the local cooperation on health at the border, Wongcharoenyong (1999) studied about the health management along the border within Ranong province and found that mostly non-native group was affected with communicable diseases such as malaria, diarrhea, filariasis and AIDS. A total of 2 million baht subsidy would be required annually in health care provision for foreign migrants about 5,000 outpatient visits and 750 in-patients visits. It's suggests that the roles of the Thai-Myanmese Border Committee, NGOs and private sectors on health issues should be intensified, focusing on the prevention and control of communicable diseases. Taking into account the social and cultural differences, primary health care should be promoted through the urban health centers, mobile facilities, training of Myanmese health volunteers and health educational programs.

The analysis of secondary data between year 1996 to 1999 in Chiangrai province which report by Chiangrai Provincial Public Health Office revealed that the migrants had problems related to economic status, social, laws and health. In terms of health status, the major concerns related to the communicable diseases, an increase of prevalence rate of local diseases (HIV/AIDS and accidents), and low accessibility to health care services. There were implementations of various health programs by many non-government organizations. It's recommended that the principles of border health

management were to advocate human rights, promotion in health accessibility, communicable disease control and bilateral cooperation.

In addition, there were three major health activities at the border in Thailand. The first activity was to provide health care services that usually put a financial burden on the health services. The second activity was to screen for work permits and the third activity was outreach programs that need the cooperation among employers, migrant workers and hospitals. There were also implementations of various health programs by many NGOs. Relatively, the local initiatives for bilateral border health cooperation have made some progress with Vietnam and Lao PDR.

As for the situation on Thai-Laos cooperation in Nan province, the cooperation on prevention and control of communicable diseases began in Nan province in year 1994 and expanded to other health development programs later. Between year 1995 to 2000, the average of 3,329 Laos's patients sought services in Nan health facilities annually. However, they were able to cover 20-30% of the medical cost and left the financial burden of 2.5 million Baht, at the maximum, to the Nan health facilities in year 1997.

Since 1996, there have been three Thai-Laos consultative meetings at the local level and other interactions included various health manpower development programs in Nan province. For example, medical treatment, obstetrics and maternal and child health care. Relatively, Laos and Thai health officials have carried out other activities, particularly, in proactive new case finding and development of a reliable referral system. In addition, supply of medical equipment has been granted from Nan Provincial Public Health Office and Nan general hospital to Chaiyaburi Hospital (Lao PDR) for supportive their health care provision.