

## CHAPTER 4



### RESEARCH METHODOLOGY

This is a retrospective study of cost recovery in order to compare outcomes between costs and revenues of health care provision for foreign patients in Nan health facilities in fiscal year 2001. The methodologies consist of five parts as follows: (1) conceptual framework; (2) cost estimation from providers' viewpoint; (3) revenue estimation; (4) cost-recovery estimation; and (5) source of data.

This study aspires to estimate the total cost of health care provision for foreign patients and compare these total costs to revenues, but there were inadequate information for calculating the production cost of foreign patients. Hence it's difficult to calculate the total cost of their services.

This study will estimate total cost of health care provision for foreign patients by calculating total cost and unit cost of hospitals and health centers. Respectively, this study assumed that the pattern and quality of health care services and the utilization of resources between Thai and foreign patients were not significantly different. Then, the total costs of health care service for foreign patients was derived from multiplying the number of foreign patients by the unit cost of health care services which was assumed to be the same as Thai patients.

According to cost estimation, allocation criteria method in hospital and health center is different technique because the organization function of hospitals and health centers are different. The simultaneous method will be used in hospital while direct distribution method will be used in health center. Hence, these studies divide into two parts of cost calculation which is hospital and health center.

In addition, user fee of foreign patients in each visit will calculate for the total revenue of health care provision for foreign patients.

For source of data, data of cost and revenue collected from Nan general hospital, three community hospitals and five health centers which provide services for foreign patients.

## 4.1 Conceptual Framework

The descriptive study aims to estimate the total cost, total revenue and compute the cost recovery ratio of health care facilities for foreign patients in the provider's viewpoint. It is difficult to calculate the total cost of health care services for foreign patients directly because of inadequate and incompleteness of the data in health facilities. The data cannot be distinguished which resources Thai or foreign patients use. Total cost of foreign patients will be calculated base on the available data of health facilities. It is assumed that characteristic of illness among Thai and foreign patients are similar. Hence, costs per unit of Thai patient and foreign patients should not be significantly different.

According to the above assumption, the unit cost will be calculated only in the departments which provide services for both Thai and foreign patients. For the hospital, these are outpatient department (OPD), emergency room (ER), dental health department and in-patient (IPD) department. For health centers, these departments are the medical treatment services, maternal and child health services and family planning clinics. The total cost of foreign patients can be derived from unit cost of foreign patient (which is the same as Thai patient) multiplies by number of foreign patient visits.

The total revenue is calculated from the user fee rate for foreign patients which is preset by the health facility in each service. Other sources of revenue such as budget subsidy from Ministry of Public Health, Non Government Organization and other donator are not included in calculation. Ultimately, the cost and revenue of foreign patients are compared with each other to get the cost recovery ratio. The study method will be used based on the conceptual framework as showed in Figure 4.1.

## 4.2 Cost Estimation from Providers' viewpoint.

Steps of cost analysis are cost center identification and grouping, direct cost determination, indirect cost allocation, total cost determination and unit cost calculation. Then, total cost of health care provision for foreign patients are unit cost of each services multiply by number of foreign patients visits in that services. (see Figure 4.2).

FIGURE 4.1 Conceptual Framework of the Study

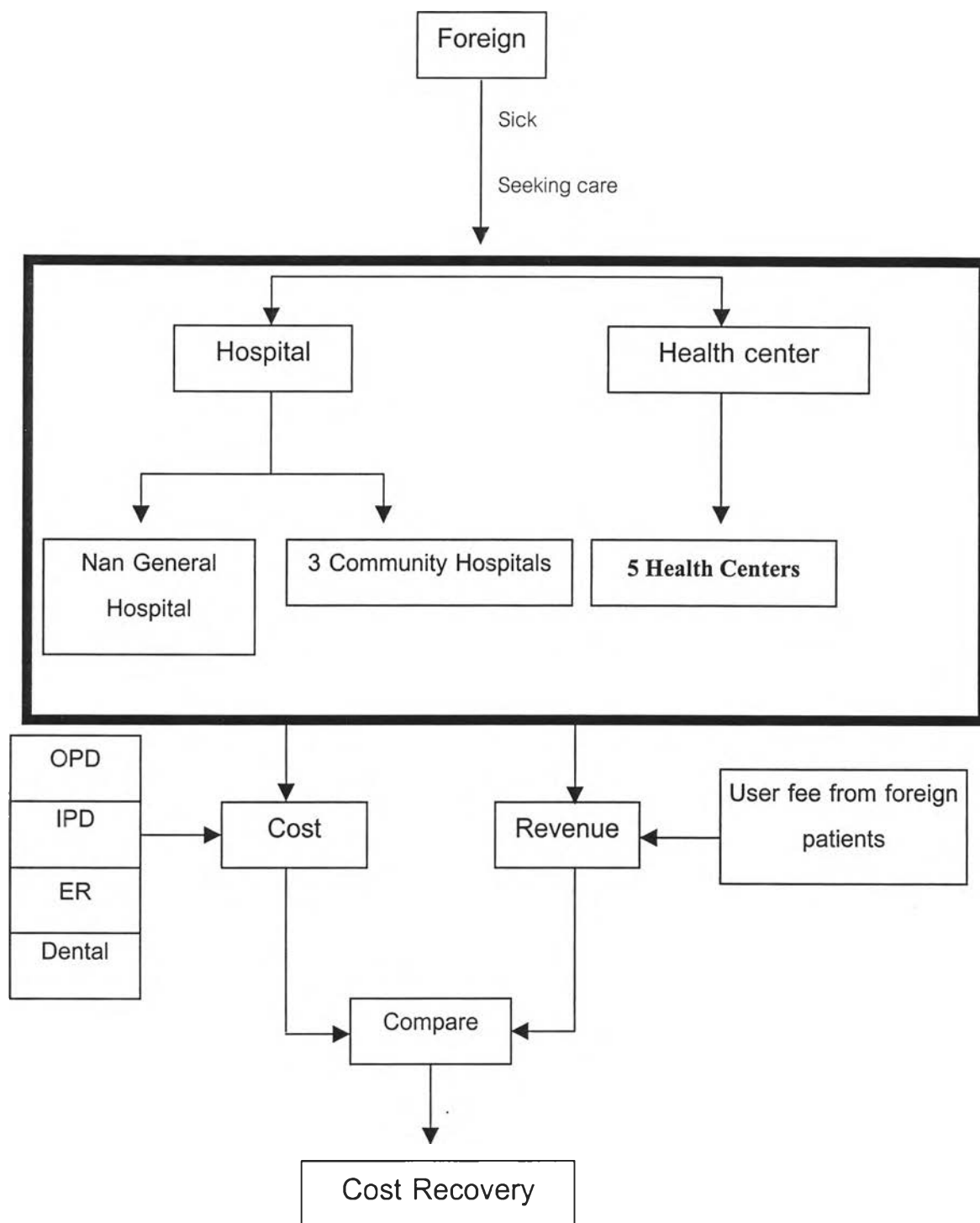
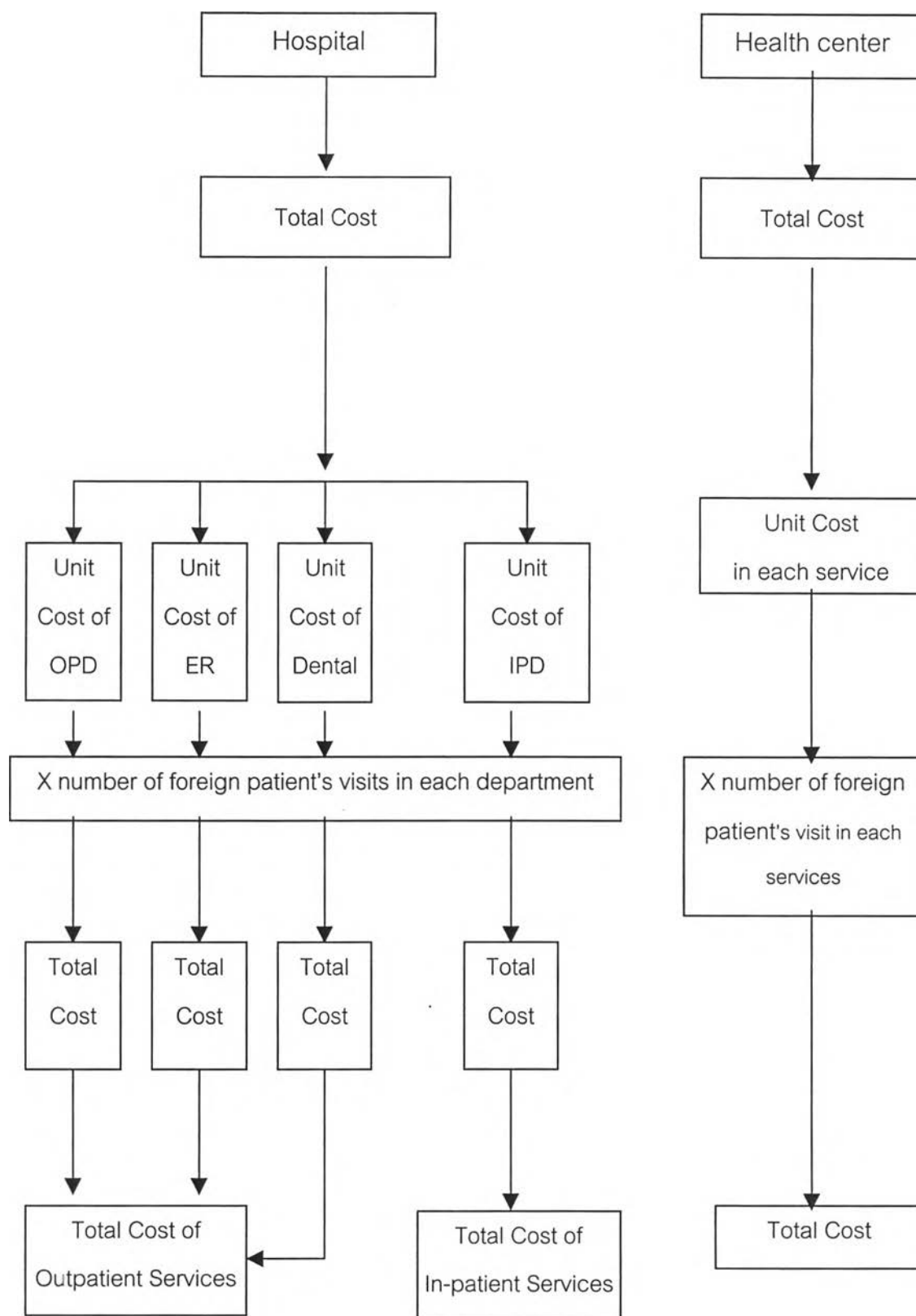


FIGURE 4.2 Total Cost Calculation of Health Care Provision for Foreign Patients



#### 4.2.1 Cost Estimation for Hospitals

Cost estimation in hospital, it is necessary to understand the basic information of hospital. This includes the structure of hospital, function of all departments and the organization's culture of the hospital.

There are six steps used in calculating total cost of the service departments.

##### 4.2.1.1 Cost Center Identification and Grouping

In this study cost centers should be identified and grouped into four groups according to their function as follow respects:

###### 1) Non Revenue Producing Cost Center (NRPCC)

These cost centers are responsible for the management or support operation to the other departments and do not originate the revenue for the hospital (do not charge the patient). Departments in this group are represented by code Axx (Where A is NRPCC and xx are Arabic numerals of cost center list). In this example, administration department, supply department, laundry department, academic and quality control department and nurse administration department.

###### 2) Revenue Producing Cost Center (RPCC)

These cost centers are responsible for giving medical service to patients and creating revenue for the hospital by charging the patients. Departments in this group are represented by code Bxx (Where B is RPCC and xx are Arabic numerals of cost center list). In this example, radiology department, operating room, pharmacy department, clinical laboratory department and labor room.

###### 3) Patient Service Area (PS)

These cost centers are responsible for giving directly services to patients. Departments in this group are represented by code Cxx (Where C is outpatient services and xx are Arabic numerals of cost center list). In this

example, For outpatient services, they are outpatient department (OPD), emergency room (ER), and dental health department. For in-patient department (IPD), wards in hospital will be coded in Dxx (Where D is in-patient services and xx are Arabic numerals of cost center list) for example, male surgery ward, female surgery ward, male orthopedic ward, female orthopedic ward, pediatric ward and intensive care unit ward (ICU).

#### 4) Non Patient Service Area (NPS)

These cost centers are not providing service for patients directly. This cost centers responsible for giving health care service or educating people. They are community health services department and health education department. Departments in this group are represented by code Exx (Where E is NPS and xx are Arabic numerals of cost center list).

The Transient Cost Centers (TCCs) are the group of cost centers which support the other cost centers such as general administration department, maintenance and supply department, and radiology department.

The Absorbing Cost Centers (ACCs) which are patient and non-patient services such as outpatient department and in-patient department are supported by TCCs for provide services. Hence, the total cost of TCCs must be allocated to the ACCs.

In this study, the TCCs are composed of both non-revenue producing cost centers (NRPCC) and revenue producing cost centers (RPCC), which are represented by, code Axx and Bxx. These cost centers allocate their cost to ACCs, which are represented by code Cxx, Dxx and Exx. The lists of cost centers of hospital are shown in Table 4.1.

#### 4.2.1.2 Direct Cost Determination

The direct costs are defined into capital cost and recurrent cost (or operating cost). Capital costs are costs of buildings, and equipment. Recurrent costs are labor cost, material cost, maintenance and facilities.

TABLE 4.1 Code and Cost Centers of Hospital in Nan Province

Code	Cost Centers	Hospitals			
		Nan General	Pua Crown Prince	Tungchang	Songkwae
A01	General administration	*	*	*	*
A02	Medical records and statistics	*	*	*	*
A03	Food and nutrition department		*	*	*
A04	Supply and laundry department		*	*	*
A05	Nurse administration department	*	*	*	*
A06	Maintenance and Supply	*			
A07	Laundry department	*			
A08	Academic and research and QC	*			
A09	Central supply department	*			
B01	Pharmacy department	*	*	*	*
B02	Clinical laboratory department	*	*	*	*
B03	Radiology department	*	*	*	*
B04	Operating room and Anesthesiology	*	*	*	*
B05	Labor room (Delivery room)	*	*	*	*
B06	Rehabilitation department	*			
C01	Outpatient department (OPD)	*	*	*	*
C02	Emergency room (ER)	*	*	*	*
C03	Dental health department	*	*	*	*
D01	In-patient department (IPD)			*	*
D02	IPD-Female ward		*		
D03	IPD-Male ward		*		
D04	IPD-ICU ward (Intensive care)		*		
D05	IPD-Pediatric and monk ward		*		
D06	IPD-male surgical ward	*			
D07	IPD-female surgical ward	*			
D08	IPD-male orthopedic ward	*			

TABLE 4.1 Code and Cost Centers of Hospital in Nan Province (Continued)

Code	Cost Centers	Hospitals			
		Nan General	Pua Crown Prince	Tungchang	Songkwa
D09	IPD-female and pediatric orthopedic ward	*			
D10	IPD-nursery ward	*			
D11	IPD-Post partum ward (PP ward)	*			
D12	IPD-gynecological ward	*			
D13	IPD-ratanurak (2 <sup>nd</sup> floor)	*			
D14	IPD-ratanurak (1 <sup>st</sup> floor)	*			
D15	IPD-pitakthai (2 <sup>nd</sup> floor)	*			
D16	IPD-pitakthai (1 <sup>st</sup> floor)	*			
D17	IPD-ICUmed(chayanun1 <sup>st</sup> floor)	*			
D18	IPD-chayanun (2 <sup>nd</sup> floor)	*			
D19	IPD-special room ward	*			
D20	IPD-pediatric ward	*			
D21	IPD-ICU (pediatric and surgical)	*			
D22	IPD-EENT (eyes, ears nose and throat)	*			
D23	IPD-rutrungsun ward (2 <sup>nd</sup> floor)	*			
E01	Health promotion department		*	*	*
E02	Sanitary, prevention and disease control department		*	*	*
E03	Community health services	*			
E04	Health education	*			

Note: Tungchang hospital is the 30-bedded hospital.

Songkwa hospital is the 10-bedded hospital.

Pua Crown Prince hospital is the 90-bedded hospital.

Nan General hospital is the 430-bedded hospital

\* = Applicable



1) **Capital Cost:** The capital cost is the cost of inputs which purchased or procured for useful life more than one year or in the year before this study, and associated with the establishment or productive capacity and physical infrastructure. The capital cost will be calculated for depreciable life value. Depreciation cost is due to the fact that equipment, building and assets gradually lower their value comparing to their original cost. Useful life is the number of years of equipment, building, or other kinds of assets are expected to last. Any equipment, building and assets that have a usage life longer than they are useful life is assumed to have a zero value for their cost.

- (1) The building and concrete structure, cost calculation of building is done by calculating the depreciation cost of the space used in each cost center.
- (2) The durable equipment and apparatus includes categories that had been used in hospital for at least one year.

In this study capital cost is calculated for depreciation by straight-line method or fixed installments method. The straight-line method divides the cost of the asset (less any estimated salvage value) by the number of years of its expected life, to arrive at the annual depreciation.

$$\text{Annual Depreciation} = \frac{\text{Cost Less Estimated Salvage Value}}{\text{Expected useful life}}$$

In calculating the annual depreciation of capital cost, it is assumed that salvage value is equal to zero. The expected lifetime of equipment is 5 years and for building is 20 years (American Hospital Association, 1988). Then, annual depreciation of building will be allocate to each cost centers due to proportion of space area. The total equipment cost is calculated from annual depreciation and summed up together for each cost centers.

2) **Recurrent Cost:** Recurrent cost consist of labor cost and material cost.

(1) **Labor cost** is the expenses that are paid to physicians, nurses and other hospital staffs for their services rendered. These also include monetary fringe benefit, overtime and other allowances. The labor costs are calculated in term of time spent for work or labor hour in that cost center. For staffs that work for several cost centers such as physicians, dentist, nurses, pharmacist, their salary will be allocated by percentage of work for each cost center. The labor cost in this study covers only the staffs that actually work in that cost center.

(2) **Material cost** is cost of all materials that used during the fiscal year. The material cost is divided into three types such as medical cost, non-medical cost, and facility cost.

*Medical cost* is the cost of medicine and medical supplies which used for medical treatment directly.

*Non-medical cost* is the overhead cost, not associated with medical treatment.

*Facility cost* or *Office utility* is the cost of water supply, phone, mail and electricity.

Total direct cost will be calculated by this equation. :

$$\text{Total Direct Cost} = \text{Labor Cost} + \text{Material Cost} + \text{Capital Cost}$$

#### 4.2.1.3 Allocation Criteria Determination

The indirect costs are more difficult to identify than direct cost. These are the costs of goods and services used jointly for several activities or by several departments of the hospital and cannot attributed in their totality to one department, service or activity. In this study, indirect cost is allocated from TCCs, which are NRPCC and RPCC to ACCs (patient services and non-patient services), by cost allocation method. The Algebraic or reciprocal method (simultaneous method) is used here for allocating the indirect cost.

This method involves the simultaneous solution of series of equations. These equations are the mathematical representations of the interrelationships between all revenue and non-revenue cost centers.

The criteria of allocation must reflect the resources use that support from other cost centers (NRPCC and RPCC). Allocation criteria, which used in this study are shown in Table 4.2.

In this study the simultaneous equation method is used to determine the indirect costs of ACCs that are transferred from TCCs. The procedures of data analysis are shown below.

- 1) All TCCs will allocate costs to ACCs by the simultaneous equation method.

The matrix equation in Microsoft Excel program will be used to determine the total cost of TCCs.

$$\text{Matrix: } AX = B$$

$$\text{Where } A = \text{Matrix of co-efficient of each TCCs}$$

$$B = \text{Total direct cost of TCCs}$$

$$X = \text{Full cost of TCCs}$$

- 2) Determine the inverse matrix of A by using computer with Microsoft Excel program.

$$\text{Matrix: } X = A^{-1} B$$

- 3) The total cost of TCCs is calculated by multiply the inverse matrix with the matrix B.
- 4) Indirect cost of PS and NPS can be determined by multiply the total cost of the TCCs with co-efficient (proportion of allocation criteria)

#### 4.2.1.4 Total Cost Determination

The Total cost of activities in hospital is the sum of the costs incurred by all the departments of the hospital.

Total cost calculation: Total cost of PS and NPS will be calculated by the sum of direct cost and indirect cost or the sum of direct cost of patients services and indirect cost of NRPCC and RPCC (see Equation 4.1).

TABLE 4.2 Criteria for Allocated of each Cost Centers

Code	Department	Criteria
A01	General Administration department	<i>Number of personnel in each cost center</i>
A02	Medical records and statistics	<i>Number of OPD visits And IPD visits multiply by 2</i>
A03	Food and nutrition department	<i>Total in-patient days in Each cost center</i>
A04	Supply and laundry department	<i>Quantity of withdraw and Weight of cloth</i>
A05	Nurse administration department	<i>Number of nurse personnel in nurse department</i>
A06	Maintenance and Supply	<i>Quantity of withdraw from supply and Material Cost</i>
A07	Laundry department	<i>Weight of cloth</i>
A08	Academic and research and QC	<i>Number of personnel</i>
A09	Central supply department	<i>Quantity of withdraw from Central supply department</i>
B01	Pharmacy department	<i>Value of services for each cost center</i>
B02	Clinical laboratory department	<i>Value of services for each cost center</i>
B03	Radiology department	<i>Value of services for each cost center</i>
B04	Operating room and Anesthesiology	<i>Value of services for each cost center</i>
B05	Labor room (Delivery room)	<i>Value of services for each cost center</i>
B06	Rehabilitation department	<i>Value of services for each cost center</i>

$$\begin{aligned}
 TC &= DC + IDC \\
 &= DC_{PS} + [IDC_{NRPCC} + IDC_{RPCC}]
 \end{aligned}
 \tag{4.1}$$

Where

- TC = Total Cost
- DC = Direct Cost
- IDC = Indirect Cost
- DC<sub>PS</sub> = Direct cost of patients services
- IDC<sub>NRPCC</sub> = Indirect cost of NRPCC
- IDC<sub>RPCC</sub> = Indirect Cost of RPCC

#### 4.2.1.5 Unit Cost Calculation

Unit cost: Unit cost of PS and NPS will be calculated from total cost of services divide by number of visit (see Equation 4.2).

$$UC = TC/Vs \tag{4.2}$$

Where

- UC = Unit cost
- TC = Total cost
- Vs = Number of patients visits

#### 4.2.1.6 Total Cost Estimation of Foreign Patients

The total costs of foreign patients in each department are the number of foreign patients visit in OPD, emergency room (ER), dental health department and IPD department and multiply by unit cost of that department for total cost.

$$T_{FOPD} = N_{FOPD} \times C_{OPD} \tag{4.3}$$

Where

- T<sub>FOPD</sub> = Total cost of foreign patients in OPD
- N<sub>FOPD</sub> = Number of foreign patients in OPD
- C<sub>OPD</sub> = Unit cost of OPD

$$T_{FER} = N_{FER} \times C_{ER} \quad (4.4)$$

Where  $T_{FER}$  = Total cost of foreign patients in ER  
 $N_{FER}$  = Number of foreign patients in ER  
 $C_{ER}$  = Unit cost of ER

$$T_{FDENTAL} = N_{FDENTAL} \times C_{DENTAL} \quad (4.5)$$

Where  $T_{FDENTAL}$  = Total cost of foreign patients in dental health department  
 $N_{FDENTAL}$  = Number of foreign patients in Dental  
 $C_{DENTAL}$  = Unit cost of dental health department

$$T_{FIPD} = N_{FIPD} \times C_{IPD} \quad (4.6)$$

Where  $T_{FIPD}$  = Total cost of foreign patients in IPD  
 $N_{FIPD}$  = Number of foreign patients visits in IPD  
 $C_{IPD}$  = Unit cost of IPD

Then, the total costs of each department will be sum up for total cost of each hospital in health care services for foreign patients in fiscal year 2001.

$$T_{HFP} = T_{FOPD} + T_{FER} + T_{FDENTAL} + T_{FIPD} \quad (4.7)$$

Where  $T_{HFP}$  = Total cost of foreign patients in hospital  
 $T_{FOPD}$  = Total cost of foreign patients in OPD  
 $T_{FER}$  = Total cost of foreign patients in ER  
 $T_{FDENTAL}$  = Total cost of foreign patients in dental health department  
 $T_{FIPD}$  = Total cost of foreign patients in IPD

#### 4.2.2 Cost Estimation for Health Centers

Health center is the basic health provider of the Ministry of Public Health and usually located in the rural areas (villages and sub districts). The functions of health center are integration of medical treatments, health promotion and prevention and diseases control. The health officers in the center are chief of health center, 2-3 health personnel and other staff not exceeding more than 5 personnel per one health center.

The method for cost calculation in health center is direct apportionment (or direct allocation) which is different from cost analysis in hospital. Eventhough direct allocation method is the least accurate of all methods but in health center, the departments are not completely separated as in the hospital. Activity approaches are uses in identifying cost centers. The cost centers are medical treatment services, maternal and child health services and family planning clinics which providing services for both Thai and foreign patients equally.

Results of unit cost will be multiplied by number of foreign patients visits to obtain total cost of foreign patients for that cost center. Then, the summation of each total cost centers is the total cost of foreign patients in that health centers. The six steps of total cost calculation on health centers are as follows:

##### 4.2.1.1 Cost Center Identification and Grouping

The various cost centers in the health center can be identified from their activities into two groups. First is Transient Cost Centers (TCCs) which supports other cost centers. This cost center will be code as Axx (Where A is NRPCC and xx are Arabic numerals of cost center list).In this study, there are A01 for administration and A02 for information report).

Second is Absorbing Cost Centers (ACCs- patient services and non-patient services) which provide services to patients. These cost centers will be code as Bxx for patient service (Where B is patient services and xx are Arabic numerals of cost center list). In this study, there is B01 for medical treatment services.

In addition, Cxx for non-patient service (Where C is non-patient services and xx are Arabic numerals of cost center list). For example, there are C01 for maternal and child health services (MCH), C02 for family planning clinic, C03 for EPI (Expanded Program on Immunization) and C04 for health education. The lists of cost centers in health center are shown in Table 4.3.

TABLE 4.3 Cost Centers in Health Centers

Code	Cost Centers
A01	Administration
A02	Information report
B01	Medical treatment services
C01	Maternal and child health services (MCH)
C02	Family planning clinic (FP)
C03	Expanded Program on Immunization (EPI)
C04	Health education
C05	School health promotion services
C06	Primary health care services
C07	Sanitary and prevention and diseases control services

#### 4.2.2.2 Direct Cost Determination

Total direct costs of each cost center are classified into three parts which are labor cost, material cost and capital cost. These costs are determined by the same criteria as hospitals also.

#### 4.2.2.3 Allocation Criteria Determination

The indirect costs are the costs of goods and services used jointly for several activities that are more difficult to identify than direct cost. The indirect costs are allocated from TCCs to ACCs by cost allocation method.



The allocation criteria must reflect the resource uses that support from other cost centers (NRPCC and RPCC). For health centers, the proportion of total direct cost is uses as the co-efficient in allocation criteria calculation.

#### 4.2.2.4 Total Cost Determination

The total costs of health centers are the sum of direct cost and indirect cost. The indirect costs are allocated from direct cost by the proportion of total direct cost in each cost centers.

$$TC = DC_{PS} + [IDC_{NRPCC} + IDC_{RPCC}] \quad (4.8)$$

Where

- TC = Total Cost
- DC<sub>PS</sub> = Direct cost of patients services
- IDC<sub>NRPCC</sub> = Indirect cost of NRPCC
- IDC<sub>RPCC</sub> = Indirect Cost of RPCC

The total cost of PS and NPS will be calculated for unit cost by:

#### 4.2.2.5 Unit Cost Calculation

$$UC = TC/Vs \quad (4.9)$$

Where

- UC = Unit cost
- TC = Total cost
- Vs = Number of patients visits

#### 4.2.2.6 Total Cost Estimation of Foreign Patients

The total costs of services for foreign patients are numbers of foreign patient visits multiply by unit cost of each service.

$$T_{FMD} = N_{FMD} \times C_{FMD} \quad (4.10)$$

Where  $T_{FMD}$  = Total cost of foreign patients in Medical treatment  
 $N_{FMD}$  = Number of foreign patients visits in Medical treatment  
 $C_{FMD}$  = Unit cost of Medical treatment

$$T_{FMCH} = N_{FMCH} \times C_{FMCH} \quad (4.11)$$

Where  $T_{FMCH}$  = Total cost of foreign patients in MCH  
 $N_{FMCH}$  = Number of foreign patients visits in MCH  
 $C_{FMCH}$  = Unit cost of MCH

$$T_{FFP} = N_{FFP} \times C_{FFP} \quad (4.12)$$

Where  $T_{FFP}$  = Total cost of foreign patients in Family Planning Clinics  
 $N_{FFP}$  = Number of foreign patients visits in Family Planning  
Clinic  
 $C_{FFP}$  = Unit cost of Family Planning Clinics

The total cost of health care services for foreign patients in each health center are the sum of the total costs of each service which foreign patients visits.

$$T_{HCFFP} = T_{FMD} + T_{FMCH} + T_{FFP} \quad (4.13)$$

Where  $T_{HCFFP}$  = Total cost of foreign patients in health center  
 $T_{FMD}$  = Total cost of foreign patients in Medical treatment  
 $T_{FMCH}$  = Total cost of foreign patients in MCH  
 $T_{FFP}$  = Total cost of foreign patients in Family Planning Clinics

### 4.3 Revenue Estimation

The revenue on health care provider will be analyzed from financial data of the health care sector which provides services for foreign patients. The revenues are calculated from the user fee of foreign patients (foreign patients payment).

$$T_{FR} = \sum F_{FP} \quad (4.14)$$

Where  $T_{FR}$  = Total revenue of foreign patients  
 $F_{FP}$  = User fee of foreign patients

### 4.4 Cost Recovery Estimation

Cost recovery is the ratio of revenue to cost. In this study, the total cost and total revenue will be compared and estimated to get the magnitude of financial loss and proportion of cost recovery. The health facilities suffers a loss when total revenue is less than total cost and the magnitude of loss is the volume of the difference in total revenue and total cost. If the cost recovery ratio higher than one it means that health facility receives more revenues than production costs. Thus, the health facility with higher cost recovery ratio has high capability to generate revenues and operate efficiently.

Magnitude of financial loss

$$M_{FL} = T_{FR} - T_{FC} \quad (4.15)$$

Where  $M_{FL}$  = Magnitude of financial loss  
 $T_{FR}$  = Total revenue from user fee of foreign patients  
 $T_{FC}$  = Total cost of foreign patients services

Cost Recovery Calculation

$$CR_{FP} = T_{FR} / T_{FC} \quad (4.16)$$

Where	$CR_{FP}$	=	Cost recovery of foreign patients services
	$T_{FR}$	=	Total revenue from user fee of foreign patients
	$T_{FC}$	=	Total cost of foreign patients services

The result of cost recovery ratio and magnitude of loss will be compared with those of private health facilities (perfect competitive market). Firstly, it is assumed that all of health facilities operate as public health facilities in which cost of production is less than the real cost of production in perfect competitive market. Hence, there should be comparison between the cost recovery of private health facilities and that of public health facilities which are assumed that the cost recovery of private health facilities represents the real market price. The result of this analysis will be discussed for strategies and policy planning according to cost recovery

#### 4.5 Sources of Data

##### 1) Population and Sample

The population samples in this study are all foreign patients that receive health services from health facilities in Nan province fiscal year 2001. These health facilities compose of nine health facilities as follows: provincial hospital (Nan general hospital); three community hospitals (Pua Crown Prince hospital, Tungchang hospital and Songkwae hospital); and five health centers (Chondan health center, Numripattana health center, Pon health center, Ngob health center and Hauysatang health center), which are located along or near the border area and provide services for foreign patients.

##### 2) Data Collection

This study collects secondary data from several related organizations as follow respects:

- (1) The data of patient's characteristics are obtained from Nan Provincial Public Health Office.
- (2) The data of revenues from health care provision for foreign patients are obtained from hospitals, health centers and Nan Provincial Public Health Office.
- (3) The data for cost calculation is obtained from health centers and hospitals. As for data of cost calculation, there are consist of capital cost and recurrent cost. In this study, for capital cost, data of building and durable equipment are collected from administration department of each facility. For recurrent cost, there are consist of labor cost and material cost. Labor cost is collected from administration department. For material cost, the data of non-medical cost is collected from central supply while medical cost is obtained from pharmaceutical department. In addition, the facilities costs are obtained from administration department.