

CHAPTER 3

RESEARCH METHODOLOGY



3.1 Research design

This study is a cross-sectional descriptive study, which includes four major parts. The first section is to calculate the unit costs of two CHs. The second is to analyze cost-recovery of universal coverage scheme. The third section is to calculate the appropriate (actual) reimbursement rates for two CHs. The last section is to find out the appropriate number of population who are registered for UC at 1,052 Baht Universal Coverage Reimbursement Rate.

3.2 Sample selection

This study uses the non-probability (selective) sampling technique for sample selection. For provincial selection, this study selected Buri Ram province because of feasibility of information accessibility and data availability. Additionally, Buri Ram province was enthusiastic to develop their financial and management system under UC scheme.

For CH selection, this study employs five criteria as follows,

1. Two CHs have similar physical characteristics, such as the population size, major occupation in the districts and geographical features.
2. Turn over rate of Hospital Director must be low
3. Hospital has in operation at least five years
4. Actual capacity of hospital correlates with the size of hospital
5. Feasibility of information accessibility

Table 3.1: General Information of two CHs in this study.

	Krasung CH	Lampraimach CH
<i>Physical environment of district</i>		
Characteristic of district	Big Train Port	Big Train Port
Number of population in district (FS 2001)	104,457.00	132,148.00
Major Occupation	Farmer	Farmer
<i>Number of Health Facility</i>		
Community (District) hospital	1	1
Health center	17	18
Community primary health care center	166	213
<i>Age of CH</i>	More than 20	More than 20
<i>Size of CH</i>	30 beds	90 beds
<i>Five Highest diseases of CH</i>	<ol style="list-style-type: none"> 1. Diabetic Mellitus 2. Upper Respiratory Tract Infection 3. Cardiovascular Diseases 4. Senility 5. Gastrointestinal Disease 	<ol style="list-style-type: none"> 1. Upper Respiratory Tract Infection 2. Gastrointestinal Disease 3. Skeletomascular Disease 4. Cardiovascular Diseases 5. Parasite Infection
<i>Health Personal: Population Ratio (FS2002)</i>		
Doctor: Population	1:34,819	1:18,878
Dentist: Population	1:52,228	1:66,074
Pharmacist: Population	1:52,228	1:44,049
Nurse: Population	1:3,264	1:2,003
<i>Number of Medical Doctor</i>	3	7
General Practice	3	3
Specialist	0	4

Table 3.1: General Information of two CHs (continue).

	Krasung CH	Lampraimach CH
Number of Dentist	2	2
Number of Pharmacist	2	3
Number of Nurse	32	66
<i>Administration Structure of CH</i>	<p>Six departments and one section</p> <ol style="list-style-type: none"> 1. Administration Department 2. Nursing Department 3. Pharmacy Department 4. Dental Department 5. Promotive and control disease Department 6. Sanitary and environmental Department 7. Technical Service Section 	<p>Six departments and one section</p> <ol style="list-style-type: none"> 1. Administration Department 2. Nursing Department 3. Pharmacy Department 4. Dental Department 5. Promotive and control disease Department 6. Sanitary and environmental Department 7. Technical Service Section
<i>Number of Ward for IP</i>	<p>1</p> <p>Ward I: General ward</p>	<p>5</p> <p>Ward I: Medico chirurgic Ward</p> <p>Ward II: Pediatric Ward</p> <p>Ward III: Surgeon and After delivery Ward</p> <p>Ward IV: Monk Ward</p> <p>ICU: Incentive Care Unit</p>

Source: Database in two CH.

3.3 Data analysis

This study is based on two assumptions. Firstly, the unit cost of any patient is the same. From the patient's point of view, every patient has the right to receive the same quality of health care services. If health care facilities

provide the same quality of services for every patient, the average unit cost in the same health care facility should be the same.

Secondly, TR can be divided into two parts, non-budgetary revenue and budgetary revenue. The non-budgetary revenue is revenue from sources other than government budget such as patients (out of pocket), private insurance. In FS 2001, the combination of budgetary revenue and non-budgetary revenue of Krasung district (include health centers) is 89.29% and 10.71%, Lampraimach district is 80.73% and 19.27%. However, this study will calculate only budgetary revenue and some non-budgetary revenue, which are co-payment of patient (30 Baht/episode) and revenue of high cost care reimbursement or received refer cases.

3.3.1 Unit cost calculation:

1. *Cost center identification and grouping:* This study divided cost center into three categories: NRPCC, RPCC and PS.

- NRPCC is Administration, Nursing department, Supply, Canteen and Medical Record.
- RPCC is Pharmacy department, Laboratory, X-ray, Labor room, Operating room, Thai's traditional medicine department (TMD) and Discharge center (only for Lampraimach CH).
- PS is OPD (including ER), IPD, Dental department, Promotive/Control disease department (PCD) and Sanitary /Environment department (SED).

2. *Total direct cost determination:* TDC consists of three components: LC, MC and CC

$$\text{TDC} = \text{LC} + \text{MC} + \text{CC} \quad (3.1)$$

LC = Salaries (S) (including promotion wages, professional wages and value of % time allocation of salaries) + Overtime wages (OT) + Fringe benefits (in this study, total fringe benefit (TFB) will be included into administration cost center)

MC = Material costs of each cost center. In this study, utility costs will be included into administration cost center.

CC (depreciation rate already taken into account using straight line method) = Building costs of each cost center + equipment costs of each cost center. In this study, the CC of accommodation will be included into administration cost center.

The present value of CC in the first quarter of FS 2002 will equal to the present value of CC in FS 2002 divided by 12 and multiply with 3

Table 3.2: Value of LC, MC and CC for each cost center (Baht of three months)

DEPARTMENT	LC	MC	CC
NRPCC			
Administration	S+OT+TFB	Household material +Office material+ Utility+ other	CC of Admin and Accommodations
Nursing Department	S+OT	Medical material	CC
Canteen	S+OT	Food material	CC
Supply	S+OT	Laundry material	CC
Medical Records	S+OT	-	CC
RPCC			CC
Pharmacy Department	S+OT	Drug consumption	CC
Laboratory	S+OT	Lab. material	CC
X-ray	S+OT	X-ray material	CC
LR	S+OT	-	CC
OR	S+OT	-	CC
TMD	S+OT	Herbal material	CC
Discharge center (for Lampraimach)	S+OT	-	CC
PS			CC
OPD (include ER)	S+OT	-	CC
IPD (In Lampraimach divided this part into 5 Wards)	S+OT	-	CC
Dental Department	S+OT	-	CC
PCD	S+OT	-	CC
SED	S+OT	-	CC

Source: Adjust from Viroj (2000).

3. Indirect cost allocation:

This study will use the step-down method to allocate cost from indirect cost centers to direct cost centers because this method is easy to calculate and to understand, and also the result is considered to be acceptable for representing the actual cost (Horngren et al, 2000). Allocation criteria in this study are shown in Table 3.3

Table 3.3: Allocation criteria in this study (based on data in the first quarter of FS 2002).

Code	DEPARTMENT	Allocation criteria
A01	Administration	Number of personal
A02	Nursing Department	Number of nurse
A03	Medical Records	Utilization rate
A04	Canteen	Day meal
A05	Supply	Number of cloth
B01	Pharmacy Department	Utilization rate
B02	Laboratory	Number of visit of Lab
B03	X-ray	Number of visit of X-ray
B04	LR-OR	Number of day stav of IP
B05	Thai's Traditional medicine	Number of visit
B06	Discharge center (for Lampraimach)	Number of day stav of IP

4. *Unit cost calculation*: to calculate unit cost in the first quarter of fiscal year 2002

$$\text{Unit cost of OPD} = \frac{\text{Full cost of OPD (FO)}}{\text{Number of visits of OPD}} \quad (3.2)$$

$$\text{Unit cost of Dental} = \frac{\text{Full cost of Dental department (FD)}}{\text{Number of visits of Dental department}} \quad (3.3)$$

$$\text{Unit cost of PCD} = \frac{\text{Full cost of PCD (FP)}}{\text{Number of visits of PCD}} \quad (3.4)$$

Hence,

Average cost or unit cost of OP services (ACO),

$$\text{ACO} = \frac{\text{FO} + \text{FD} + \text{FP} + \text{Full cost of SED}}{\text{Number of visits of OPD} + \text{Dental} + \text{PCD}} \quad (3.5)$$

$$\text{Unit cost of IPD} = \frac{\text{Full cost of IPD}}{\text{Number of IP Days}} \quad (3.6)$$

The average cost or unit cost of IP services (ACI) of Lampraimach CH will be averaged from the unit cost of all wards (Ward I, II, III and IV) including ICU.

$$\text{ACI} = \frac{\text{Summation of Full cost of each ward}}{\text{Total IP day}} \quad (3.7)$$

3.3.2 Cost – recovery analysis:

Total Cost (TC):

Total cost of patients under UC Scheme in the first quarter of fiscal year 2002 = (ACO * number of OPD visits from UC) + (ACI * number of IPD days from UC) + costs of refer UC cases + Salaries of Health Center personnel + other expenditure of Health Center.

Total Revenue (TR):

Total revenue of UC Scheme = (Capitation of Universal Coverage rate (1,052) * Number of people registered with UC in the catchments area) / 4 + Co-payment from patients + High cost care reimbursement + revenue from refer-cases of UC patients who are registered in other catchments areas

$$\text{Cost-Recovery of UC} = \text{TR of UC} / \text{TC of UC} \quad (3.8)$$

3.3.3 Appropriate reimbursement rate (ARR)

Different value between TR and TC (DV) = TR – TC

$$\frac{\text{DV}}{\text{Number of people registered with UC}} = \text{DV per person} \quad (3.9)$$

Therefore, **ARR = UC reimbursement Rate (UCR) +/-DV per person** (3.10)

If DV has a positive sign (TR>TC), ARR = UCR – DV per person. Otherwise, DV has a negative sign (TR<TC), and ARR = UCR + DV per person.

3.3.4 Appropriate number of people registered (ANP) with UC at 1,052 Baht UCR

From TR – TC = DV and DV= 0, then TR = TC

Cost of patients under UC Scheme in the first quarter of fiscal year 2002 =
Revenue from UC Scheme in the first quarter of fiscal year 2002

Therefore,

(ACO * number of OPD visits from UC) + (ACI * number of IPD days from UC) + cost of refer UC cases + Salaries of Health Center personnel + other expenditure of Health Center = [Current UCR (1,052) * **Number of people registered with UC in the catchments area (x)**] / 4 + Co-payment from patients + High cost care reimbursement + revenue from refer cases of UC patients who are registered in other catchments areas.

Hence,

ANP (x) = [(ACO * number of OPD visits from UC) + (ACI * number of IPD days from UC) + costs of refer UC cases + Salaries of Health Center personnel + other expenditure of Health Center] – [Co-payment from patients + High cost care reimbursement + revenue from refer cases of UC patients who are registered in other catchments area] * $\frac{4}{1,052}$

3.3.5 Graphic description of ARR and ANP

From Equation (3.9), (3.10) and ANP = Number of people registered with UC

$$ARR = \frac{3UCR + [ACO_i - (PO_i) * (30)] * OP \text{ Utilization }_i + [ACI_i - (PO_i) * (30)] * IP \text{ Utilization }_i + OF_i}{ANP} \quad (3.11)$$

Where; i = Size of CH

UCR = Current UC reimbursement rate (1,052 Baht/person/year)

PO = Probability of co-payment of OP

PI = Probability of co-payment of IP

OF = Other figures (=costs of refer UC cases + other costs of Health Center - High cost care reimbursement - revenue from refer cases of UC patients who are registered in other catchments area)

3.4 Data collection

Data can be divided into two categories as follows:

3.3.1 Primary data: This type of data comes from interview (e.g., hospital director, head of each sector, medical doctors) such as % time allocation of each staff (see % time allocation interview form in Appendix II, Record Sheet II.1)

3.3.2 Secondary data: This type of data comes from reports. To calculate the unit cost and revenue, this study uses the reports of the first quarter of fiscal year 2002 (see record form of LC, MC and CC in Appendix II, Record Sheet II.2, II.3 and II.4)

Table 3.3: Type of data collection in this study

Type of Data	Source of Data	Unit of Measurement
Structure of Hospital	Primary and secondary Data	Department
<i>Cost data</i>		
LC	Secondary data	Baht per three months
MC	Secondary data	Baht per three months
CC	Secondary data	Baht per three months
<i>Number of population</i>		
Population in catchments area	Secondary data	Number of population
Population who are registered for UC	Secondary data	Number of population in FS 2002
<i>Number of patient</i>		
Number of OP and UC's OP	Secondary data	Number of visit in three months
		Number of patient in three months
Number of IP and UC's IP	Secondary data	Number of day in three months
		Number of patient in three month
<i>Allocation criteria</i>		
Number of health personal in hospital	Secondary data	Number of personal of each department
Number of cloth used	Secondary data	A piece of cloth used per month of each department
Number of patient who use laboratory, X-ray service and Thai traditional medicine	Secondary data	Number of patient per month per department
Number of nurse in each department	Secondary data	Number of nurse of each department
% Time allocation of personnel	Primary data	Hours per week per person
<i>Other</i>		
Revenue from co-payment of patient	Secondary data	Baht in three months
Revenue and cost from referral system	Secondary data	Baht in three months
Revenue from high cost care reimbursement	Secondary data	Baht in three months

3.5 Conceptual Framework

In conclusion, this study employs four main analysis methods: Unit cost calculation, Cost-recovery analysis of UC scheme, ARR calculation and ANP calculation. Figure 3.1 shows main conceptual framework of this study. For the full cost analysis, this study will use step down allocation method to calculate the unit cost as shown in Figure 3.2.

Figure 3.1: Main Conceptual Framework

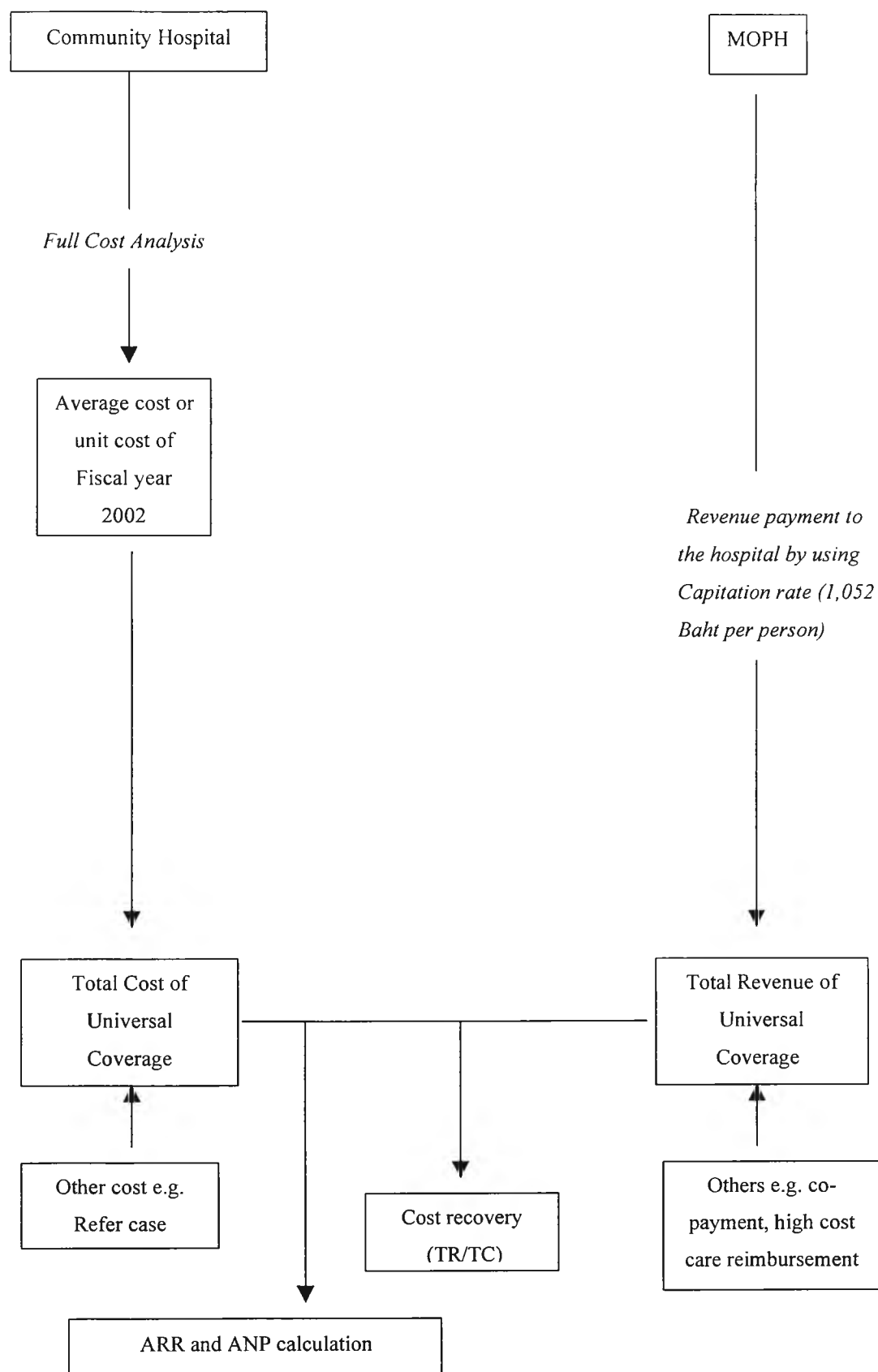


Figure 3.2: Conceptual Framework of Full Cost Analysis

