

## CHAPTER 3

### METHODOLOGY

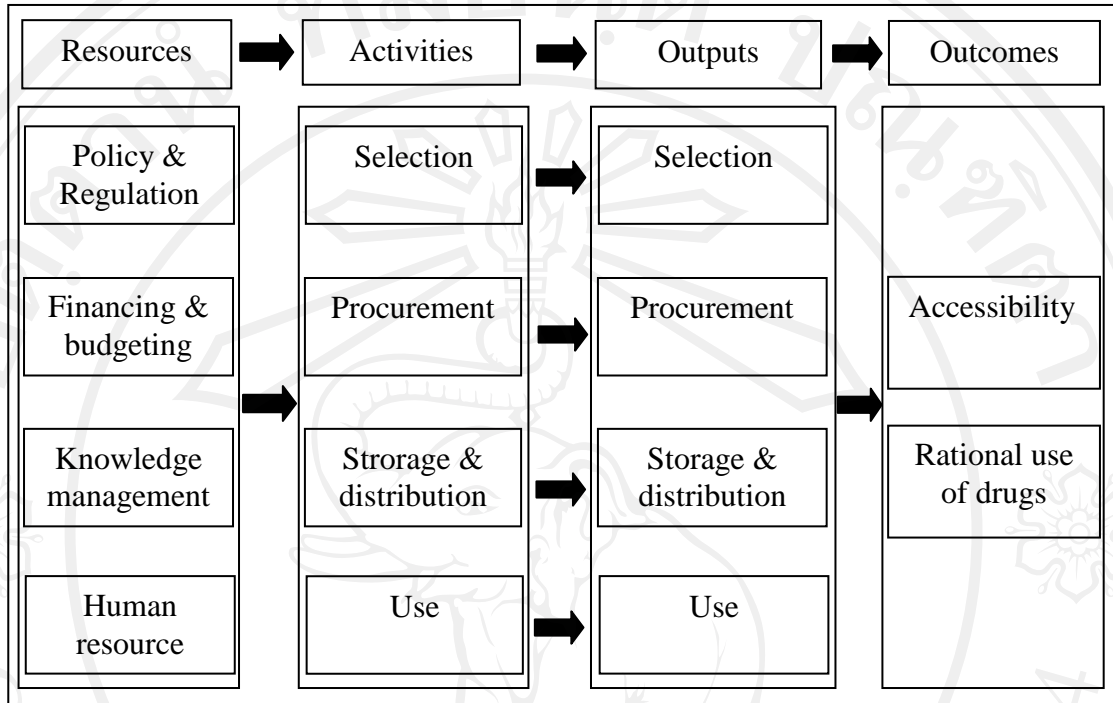
#### **Research design**

A drug system research was designed to develop the potential QIs based on provider perspective for assessing DSM of community hospitals in Thailand under MOPH.

#### **Scope of the research**

Logic model is a beneficial assessment tool that facilitates the analysis of effective system which presents relationships among the resource, activity, output, outcome, and impact components (W.K. Kellogg Foundation, 2004). The components of the Logic model was used to represent that, in this study, DSM was investigated covering all of components of the theoretical - effective system. Since the impact component of the model is the ultimate results which will be seen 3-5 years after the potential assessment tool is implemented (Fyfe, 2005). In this study, only four components were considered resources, activities, outputs, and outcomes. The study was focused on development of a set of potential QIs for assessment of DSM performance at the community hospitals following 10 key issues of DSM.

### Research framework



**Figure 3.1** Research framework of DSM at community hospitals

### Research Methodology

This study was conducted into 3 parts as follows.

Part 1: gathering of QIs related to DSM. A systematic literature review was used. The selected QIs was grouped following Logic model for analysis of effective system among the resources, activities, output, and outcome components.

Part 2: selecting the potential QIs for assessing DSM performance at the community hospitals. Delphi technique, a technique of getting a consensus of the expert opinions collected by systematic and iterative processes that involve Delphi repeated rounds, was used to verify the potential QIs. Two Delphi rounds were used in this study (Bloder and Ammenwerth, 2009).

Part 3: testing a set of potential QIs in 30 community hospitals to find out the correlation and reliability.

**Part 1: Gathering of QIs related to 10 key issues of DSM**

**Study design**

A systematic review was performed.

**Data collection period**

Between January 2010 to August 2011

**Data collection tool**

The tool was a spreadsheet. It was created from the data of the literature reviews searched from several databases. Ten key issues were used as searched terms in the reviews as presented in Table 3.1.

**Table 3.1** List of searched terms for QIs of DSM

No.	Search terms (Key issues)
1	Policy and regulation
2	Financing and budgeting
3	Knowledge management
4	Human resource
5	Drug selection
6	Drug procurement
7	Drug storage and distribution
8	Drug use
9	Accessibility
10	Rational use of drugs

**Study procedure**

A systematic review was used for gathering of QIs related to DSM. Literature reviews were conducted by direct searching from international organizations and organizations in Thailand. The data were collected in January 2010 to August 2011. The reviewing process was shown in Figure 3.2.

(1) The the purpose of each key issue relevant to DSM were stipulated base on WHO concept and DSM of MOPH.

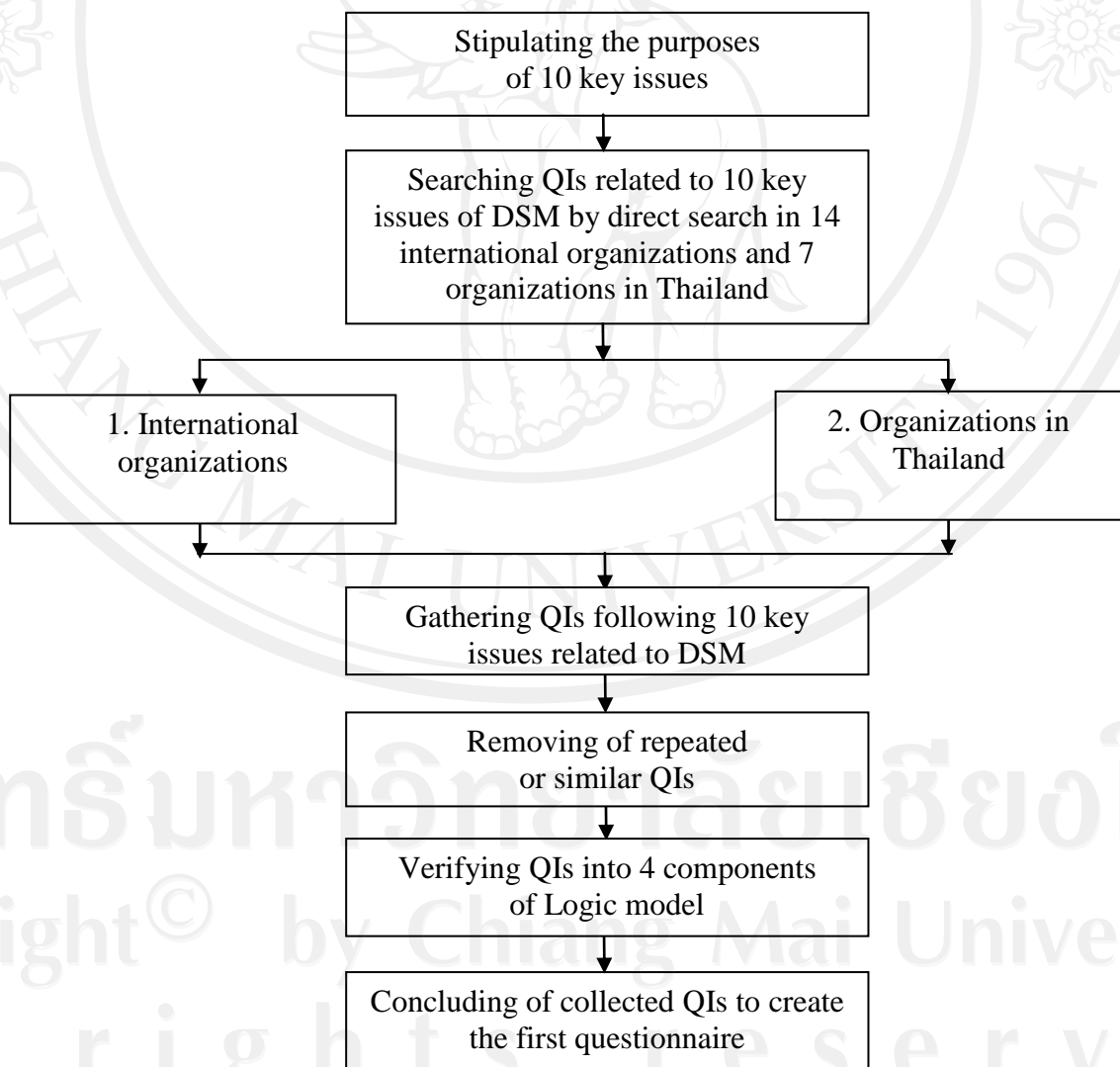
(2) QIs were searched from fourteen international databases. In Thailand, QIs were searched from databases and website of seven organizations related to DSM.

(3) The gathered QIs were verified following 10 key issues of DSM.

- (4) The repeated or similar QIs were removed.
- (5) The QIs were examined for their appropriateness and correctness of each QI following the purposes of 10 key issues of DSM by the researcher.
- (6) The QIs were analyzed to present in resource, activity, output, and outcome components of the Logic model.
- (7) The QIs were concluded to create the first questionnaire.

### Data analysis

The data was analyzed for the QIs that represented the purposes of ten key issues of DSM. For the presentation of the results in the systematic point of view, ten key issues of DSM was classified and presented following 4 components of the Logic model, i.e resources, activities, outputs, and outcomes.



**Figure 3.2** A systematic review process in part 1

## **Part 2: Selecting the potential QIs**

### **Study design**

A prospective study was performed. The QIs and criteria in the first questionnaire will be considered by expert group using Delphi technique for their potential to represent the success of DSM performance. Consensus of the expert opinions from the technique was used as an end-point for each QI to be selected as a potential QI.

### **Data collection period**

1 March – 15 June 2012

### **Study experts**

Experts who had experience in DSM and assessment of DSM performance at the community hospitals were involved in this study. The experts were selected by purposive sampling. Twenty experts were classified in three levels and were participated for testing QIs in two Delphi rounds as follows;

#### National level (6 pharmacists)

(1) Three pharmacists from organizations under MOPH are inspectors who monitor and assess the DSM process at the hospitals affiliated with MOPH. These organizations developed QIs for assessing the DSM performance of the hospitals based on strategies of the organizations.

Three pharmacists composed of one pharmacist of NHSO, one pharmacist of Bureau of Health Administration, and one pharmacist of regional inspector.

(2) Three pharmacists from university involved in DSM education. They have experience in drug system more than 10 years and have knowledge about QIs of DSM.

Three pharmacists composed of three university lecturers from Chiang Mai university, Khon Kaen university, and Naresuan university.

#### Provincial level (4 pharmacists)

Four pharmacists selected from provincial public health office in Chiang Rai, Lamphun, Lampang, and Mae Hongson. The pharmacists were responsible to monitor and evaluate the DSM performance at the community hospitals, and they have experience in field of DSM more than 10 years.

### Community level (10 pharmacists)

(1) one (physician) director of community hospital who is the chief of drug committee at the hospitals and experienced in the hospital more than 10 years.

(2) nine pharmacists of the community hospitals who are the head of pharmacy department at the community hospitals or who have experienced in field of DSM more than 10 years. They were also responsible to the data of QIs of DSM in the community hospitals.

### **Study procedure**

The Delphi technique was used to measure the quality indicators that have potential to represent the covering of all ten key issues of DSM performance of community hospitals. This technique was classified into two rounds as follows.

#### **2.1 The first Delphi round**

(1) Questionnaire was created from 201 collected QIs (Part 1). The details of each QI composed of name of the QI, description of QI, objective of QI, description of scoring criteria, rating scale of importance, validity, appropriateness, congruence and feasibility, data source, and suggestion of the expert.

(2) The first questionnaire was sent to twenty experts. The experts could express their opinions and suggestions of each QI and rated for the importance, validity, appropriateness, congruence and feasibility of each QI.

(3) The results of Likert scale opinions and suggestions were used to improve the questionnaire. The language used in the questionnaire was also corrected. The QIs which passing the importance and validity criteria were selected for evaluation of appropriateness, congruence and feasibility.

(4) Data was analyzed and the questionnaire was improved, as a second questionnaire, to be used in the second Delphi round

#### **Data collection tool**

A questionnaire of a five-point Likert scale together with open-ended questions was used. The experts were requested to rate the importance of each QI. The five - point Likert scale was classified to not important, rather not important, rather important, important, and very important (Bortz and Doring, 2002).

The content validity was evaluated using a rating scale classified in 3 levels, i.e. -1, 0, and +1. The scoring system is as follows:

- +1 for relatively valid questionnaire statements
- 0 for not sure
- 1 for irrelevant questionnaire statements

The obtained scores from each section of the evaluation form will be calculated to demonstrate the validity of each section (item), using the formula below. The desired content validity index of item objective correctness (IOC) will be calculated to be equal or more than 0.7 (Clark and Watson, 1995).

$$IOC = \sum \frac{R}{N}$$

When            IOC = Item Objective Correctness  
                      R = total score of that item  
                      N = number of experts

The open – ended questions were used to collect their opinions and suggestions. Moreover, the questionnaire was evaluated by twenty experts using the evaluation form for its appropriateness, congruence, and feasibility.

The appropriateness, congruence, and feasibility were evaluated by using a Likert scale (Flower et al, 2007). The median will be used as the appropriateness of each QI. A Likert scale composed of five scales (1 – 5), i.e. rather inappropriateness, rather appropriateness, appropriateness, very appropriateness, and excellent appropriateness. The Inter-quartile Range (I.R.) will be analyzed for congruence. Interpretation of I.R. was: 0.01 – 0.99 = very high congruent, 1.00 – 1.99 = high congruent, 2.00 – 2.99 = low congruent, and upper 3.00 = not congruent. Each of QI was selected following the cutoff score: median above 3 and I.R. not more than 1.99.

### **Data Analysis**

The qualitative data were used to improve the QIs following the purposes of ten key issues and the quantitative data; the mean for importance and IOC for validity, were used for potential selection of each QI. For the appropriateness, congruence, and feasibility was measured by median and I.R and these values were reconsidered by the experts in the second Delphi round.

## **2.2 Second Delphi round**

(1) The second questionnaire was re-tested for appropriateness, congruence, and feasibility by the same twenty experts to perform for consensus. Inter-rater reliability (IRR) was used to confirm the consensus of the experts in appropriateness, congruence, and feasibility for selecting the potential QIs.

(2) Data was analyzed and the potential QIs were selected.

(3) The questionnaire was improved, as a third questionnaire, to be used in part 3 study.

#### **Data collection tool**

The second questionnaire and evaluation form were used in the study. The appropriateness, congruence, and feasibility were evaluated again with the same criteria in the first round for decision to select the consensus QIs. The consensus between the first and second expert opinions from the results of appropriateness, congruence, and feasibility were evaluated for inter-rater reliability (IRR) by using kappa statistic (Lambert, 1996). Criteria for interpretation of the kappa statistic are  $\kappa < 0.2 = \text{poor}$ ,  $0.2 < \kappa \leq 0.4 = \text{fair}$ ,  $0.4 < \kappa \leq 0.6 = \text{moderate}$ ,  $0.6 < \kappa \leq 0.8 = \text{good}$ ,  $\kappa > 0.8 = \text{excellent agreement}$  (Nygaard and Jarland, 2006). Kappa coefficient  $< 0.6$  is used as exclusion criteria.

#### **Data Analysis**

The data of appropriateness, congruence, and feasibility were measured by median and I.R. The consensus of QIs was analyzed by Cohen's kappa statistic.

### **Part 3: Testing a set of potential QIs of DSM**

#### **Study design**

Data of the retrospective study were collected to examine the set of potential QIs on DSM to confirm the efficiency of the QI that can represent the DSM performance in the community hospitals.

#### **Data collection period**

20 June to 31 July 2012

#### **Study samples**

Pharmacists who are responsible for DSM in thirty community hospitals are involved in field study. The community hospitals in four provinces were classified in four categories following number of hospital beds by proportion method as shown in



Table 3.2. The selection of 30 community hospitals was done by simple random sampling from 47 community hospitals which can represent the DSM operation in the hospitals under MOPH. These hospitals have the same characteristics of rules and regulation related the DSM operation, structure and function in the hospitals, and other resources of the hospital namely human, budget, etc.

**Table 3.2** Number of community hospitals classified by number of hospital beds in four provinces under MOPH, region 15.

Hospital Province	More than 120 beds	90 beds	60 beds	10-30 beds	Total
Chiang Mai	2	1	1	19	24
Lamphun	-	1	1	4	7
Lampang	-	-	3	9	13
Mae Hongson	-	1	1	4	7
Total population	2	3	6	36	47
Proportion	0.04	0.06	0.13	0.77	1
<b>Total sample</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>26</b>	<b>30</b>

#### Data collection tool

The questionnaire and data collection form were developed and sent to 30 community hospitals and data were collected in June - July 2012 for the 2011 budget year. The correlation between potential QI with the scoring of drug safety standard of 2011 budget year from the Bureau of Health Administration under MOPH was analyzed. The value of coefficient correlation ( $r$ ) ranges from +1.0 to -1.0 (Choudhury, 2009). The reliability was also be calculated (Maclure and Willett, 1987).

#### Study procedure

(1) The questionnaire and data collection form were developed and sent to 30 pharmacists of the community hospitals classified in Table 3.2. Permission to perform the research was asked for by sending official letters to the Director of

Provincial Public Health Offices and the Director of community hospitals under MOPH in region 15.

(2) The collected data was used to evaluate Pearson correlation (potential QIs of resource and activity components) and Spearman correlation (potential QIs of output and outcome components) between each of potential QI with drug safety standard scoring and reliability was, then, calculated.

(3) The final set of potential QIs was developed.

#### **Data analysis**

SPSS for window, a statistic program, will be used for performing of Pearson correlation (ordinal data) and Spearman correlation (continuous data) (Levein, 1977; George et al, 2000). The potential QIs of resource and activity components were analyzed for reliability.