

## CHAPTER 3

### PROJECT EVALUATION



#### 3.1 Introduction

The evaluation of this study aimed to assess the quality improvement in physical environments and infrastructure of health centers in Phachi district six months after the implementation. This is to evaluate the outcome if it meets objectives of quality improvement in physical environments and infrastructure of health centers. The data were collected by observations inside and outside the health center, asking questions based on standardized Five S checklist from 18 primary care staff, observations of the tidiness and neatness of the units, interviewing officers at the units concerning problems, obstacles and recommendations of the Five S implementation. The satisfaction questionnaire was used to assess patients' satisfaction with working environment. A total of 180 patients answered this question.

#### 3.2 Purposes

The purpose of this study was to evaluate the efficiency of health centers in Phachi district concerning quality improvement in physical environment through an adoption of Five S program.

#### 3.3 Evaluation Questions

1. Do all health centers in Phachi district comply with at least 80% of the Five S standard by the year 2002?

2. Are all health centers in Phachi district tidy, neat and pleasant to work by the year 2002?
3. What is the customers' satisfaction with the improvement of physical environment and infrastructure?
4. What are problems and obstacles in implementing the Five S in Phachi district?

### **3.4 Evaluation Method**

#### **3.4.1 Design**

This study applied a descriptive method to explore the implementation of Five S which serves as a model for quality improvement of health centers concerning clean, tidy, pleasant and standardized physical environment and infrastructure. Seven health centers in Phachi district were investigated six months after implementation except the one in Nong Nam Sai which was under construction.

#### **3.4.2 Sample**

The sample consisted of two groups;

- (1) Eighteen staff of six health centers, and
- (2) Thirty customers in each of six health centers; 180 in total

#### **3.4.3 Instrument**

To evaluate the improvement in physical environment and infrastructure of health centers in Phachi district by adopting the Five S program, the following measures were assessed;

Compliance : Compliance was assessed by evaluation checklist which consisted of three domains; 1) Office conditions and environment ( 16 items ) 2)

Facilities, equipment and medical supplies for services ( 11 items ) and 3) Service system management for convenience and safety ( 15 items ).

One point will be added if any of these items is practiced and zero for non-practice. The health center must have 34 points or more than 80 percent to pass the evaluation.

Working environment : Evaluation checklist was used to assess the tidiness, cleaning, pleasantness of the health centers. The criteria of the evaluation are measured by visual observation, by touching, by listening and by smelling. Twenty evaluation questions assess the appropriateness of infrastructure organization and check the cleanliness, noisiness and smell, and check whether systems and facilities to be used to provide services can be utilized conveniently and safe for customers. Each item is measured on a 3 - point scale has three levels; 3 = good, 2 = fair, and 1 = need for improvement. The row score is calculated by summing the item score ; this score may range from 20 to 60. Total score were converted into 3 groups according to the following : good = 50 – 60, fair = 40 – 49 , and need for improvement = 20 –39.

Customer Satisfaction : To assessed customer satisfaction questionnaire which consisted of two sections was used as follows :

Section 1: Demographic information: gender, age, educational background, occupation, income, rights to access to the services, and data in the service used at the health centers concerning the reason to come to the health centers and frequency of receiving the service at the health center .

Section 2: Ten questions to check the satisfaction of customers with the infrastructure and facilities of health center . Each item is measured on a 3 - point scale from; 3 = good, 2 = fair, and 1 = need for improvement. A score is calculated by summing the item score ; this score may range from 10 to 30. Total score were converted into 3 groups according to the following : good = 27 – 30, fair = 21 – 26 , and need for improvement = 10 –20.

Evaluation of the Five S implementation : Implementation questionnaire, this questionnaire was used to assess implementation after the training, problems, obstacles, benefits, supporting and recommendations in implementation of Five S program. This consisted of two parts as follows :

Part 1: General information of the primary care staff; gender, age, educational background, work experience.

Part 2: Seven questions regarding the implementation of Five S program, problems and obstacles. All are open-ended questions to allow the staff to freely express their opinions.

#### **3.4.4 Procedure**

Data were collected as follow :

1. Primary care staff distributed self in about problems and obstacles of Five S implementation by the researcher in April 2002.
2. Monitoring the implementation of Five S program by the researcher in each health center in April 2002.
3. Self-administered questionnaire customers about their satisfactions by primary care staff in April 2002.
4. Evaluate the tidiness, cleaning and pleasantness of the health centers by the core team consisting of six persons in May 2002. Each person has one copy of the evaluation form for each health center.

#### **3.4.5 Data Analysis**

Data were analyzed in SPSS. Descriptive statistics were calculated for background characteristics of participants and outcome variables.

### **3.4.6 Limitation**

The data about the customers' satisfaction with the services at the health center may be invalid because the respondents may feel afraid to express their opinion to the staff.

## **3.5 Results**

This study uses alias to refer to each of the six health centers. The health centers were represented as A, B, C, D, E and F.

### **Evaluation of the Five S Program in the Health Centers**

The researcher aimed to conduct an evaluation of the Five S program implementation after being carried out for six months and each unit has to achieve at least 80% of the standard. The result found showed that only two health centers scored higher than 80% which were health center A (92.8%) and health center B (80.9%) while the other four could not accomplish such level (Table 4).

BY considering each standard, it was found that there were 13 criteria which all primary care units could implement which were; availability of water which is sufficient for the cleaning, clear labeling on medicines, well-prepared dressing wound sets and suture wound set which are ready for use, systems for keeping used clothes in place, etc. All of these were standards in medical supplies and facilities to serve the customers and operation management in the health service provider. This is partly because staff had just attended courses in treatments and sterilization systems one month before the evaluation, so they had knowledge and were well prepared in organizing facilities and equipment in order and handy for use.

The criteria which the health centers barely achieved were; beds are covered with clean plastic or bed sheet, waste is separated between infected and uninfected, only needed items are put on desk and are labeled, items are safely assigned in place. Two criteria were reported not being implemented at all which are (1) the availability of stock cards to check the quantity of medicines and expiry date and (2) labels are put on dangerous or fragile items which can cause danger if they are broken. They overlooked these probably because all the health centers usually conduct an annual survey on needs for the medicines so as to make orders to the medicine storage room of Phachi hospital and they can order at any time. (Table 4).

**Table 4 : Compliance with the Five S Program Sorted by Health Centers**

The Five S standard	Health Centers					
	A	B	C	D	E	F
<b>Infrastructure and Environment</b>						
<b>Location</b>						
Surrounding areas are clean, tidy and pleasant.	√	√	x	√	√	√
Signs are displayed at each allocated working area.	√	√	√	x	√	√
Working hour signs are displayed and can be seen clearly.	√	√	√	x	√	√
Area arrangement in the building (inside) is tidy and pleasant.	√	√	√	√	√	x
The floor is spotless and not blocked and not slippery.	√	√	x	√	√	√
<b>Beds, tables, chairs and shelves</b>						
They are well-organized, clean and spotless.	√	√	x	√	x	x
There are only needed items which are labeled for placement	√	x	x	x	x	x

Table 4 : ( Continued )

Standard Criterion	Health Centers					
	A	B	C	D	E	F
They are ready for use, in good shape and put in a proper place.	√	x	√	x	x	√
Beds are covered with clean bed sheet or plastic sheet.	√	x	√	x	x	x
<b>Toilet</b>						
There are signs showing directions.	√	x	√	√	x	√
Floor is clean; doesn't have any dirt or marks and not slippery.	√	√	√	√	√	x
Bad smell is deodorized and there is good ventilation and the air circulates freely.	√	√	√	√	√	x
<sup>a</sup> There is enough water for cleaning.	√	√	√	√	√	√
<sup>a</sup> There is enough light.	√	√	√	√	√	√
Only necessary items are put in the toilet.	√	√	√	√	√	x
<sup>a</sup> There is good water system, not clogged up and no leakage in the water pump.	√	√	√	√	√	√
<b>Facilities, equipment and medical supplies</b>						
Medical supplies are categorized by types.	√	√	√	x	x	√
<sup>a</sup> Labels indicating names of medicines are attached clearly.	√	√	√	√	√	√
There is a temperature control within the refrigerator.	√	√	√	√	x	√
<sup>b</sup> The availability of stock cards to check the quantity of medicines and expiry date	x	x	x	x	x	x
<sup>a</sup> The number of medicines is sufficient for services	√	√	√	√	√	√

Table 4 : ( Continued )

Standard Criterion	Health Centers					
	A	B	C	D	E	F
<sup>a</sup> The number of thermometers is sufficient for use.	√	√	√	√	√	√
<sup>a</sup> Spatulas are available and enough for use.	√	√	√	√	√	√
<sup>a</sup> Sphygmomanometer (to check blood pressure) are ready for use.	√	√	√	√	√	√
<sup>a</sup> Stethoscopes are ready for use.	√	√	√	√	√	√
<sup>a</sup> Flashlights are ready for use	√	√	√	√	√	√
<sup>a</sup> Dressing wound set and suture wound are sufficient and ready for use.	√	√	√	√	√	√
<b>Service Management for Convenience and Safety</b>						
<b>Fire Protection System</b>						
Fire extinguishers are placed in appropriate areas.	√	√	√	√	x	√
Fire extinguishers are regularly examined and ready for use.	√	√	√	√	x	√
Inflammable items are kept safely.	√	√	√	√	x	x
Electric facilities						
<sup>a</sup> Electric facilities are ready for use safely	√	√	√	√	√	√
Electricity wires are kept tidily.	√	√	x	√	x	x
Electric facilities are checked regularly.	x	x	x	√	√	x
<b>Infection prevention</b>						
Waste is disposed by incinerator.	√	√	x	x	x	x
Waste is separated between infected and uninfected.	√	√	x	x	x	x
Hand-wash basins are available and sufficient, separated from general purpose basins (for cleaning tools and equipment).	√	√	x	x	√	√



**Table 4 : ( Continued )**

Standard Criterion	Health Centers					
	A	B	C	D	E	F
Liquid, soap and clean towels are available at the hand-washing basins.	√	√	x	x	√	√
Medical carts are equipped with solution and first aid kits.	√	√	√	x	√	√
<sup>a</sup> Used and contaminated clothes are completely kept.	√	√	√	√	√	√
Items are sterilized and not infected.	√	√	√	x	x	x
<b>Safety</b>						
Items are labeled and placed with safety.	√	x	x	x	x	x
<sup>b</sup> Fragile items or those, which can be broken easily, must be labeled with a cautious sign.	x	x	x	x	x	x
<b>Percentage for the compliance with the Five S standard</b>	<b>92.8*</b>	<b>80.9*</b>	<b>69</b>	<b>64.3</b>	<b>59.5</b>	<b>59.5</b>

**Remarks**

- \* means passing the standard level (  $\geq 80\%$  )
- <sup>a</sup> refers to the criteria which all health centers can achieve.
- <sup>b</sup> refers to the criteria which none of the health centers can achieve.
- √ means compliance to the Five S philosophy
- X means non-compliance to the Five S philosophy

**Evaluation of the Pleasantness of the Health Centers**

Table 5 presents mean of the pleasantness, cleanliness and tidiness of health centers . Two units; health center A (mean = 54.2) and health center B (mean = 52.3) were scored in 'good' level and both were compliance to the Five S philosophy scoring

higher than 80%. Three units were ranked in 'fair' level and one was assessed in need for improvement (mean =38.7). This result reflected that those succeeded and passed the Five S program were perceived neat, clean and has a pleasant work environment.

When considering each criterion, it was found that all the health centers scored satisfactorily ranging over 1.5 except health center 'F' which was rated only 1.17 for the cleanliness of areas under desks and chairs; no dust, cobweb, and clutters and health center 'C' earned just 1.33 and 1 for the following statements; 1) surrounding areas of the primary care unit are clean, tidy and 2) it has good functioning incinerators which are well-lid; do not smell and do not have wastes cluttering around (Table 5).

**Table 5 : Mean of the Pleasantness, Cleanliness and Tidiness of Each Health Center in Phachi District**

Standardized criteria	Health Centers					
	A	B	C	D	E	F
1. Surrounding areas are clean and tidy.	2.17	2.50	1.33	2.17	2.17	2.83
2. The outlook of buildings is clean and pleasant.	2.33	2.67	1.50	2.33	2.17	2.67
3. Work environments, such as, floor, walls, mirrors, windows, doors, ceilings are clean and tidy.	2.83	2.67	2.33	2.50	2.33	2.17
4. The building has enough light.	3	3	3	2.67	2.83	2.50
5. Good ventilation systems are in place to avoid bad odor and stuffiness.	3	3	2.67	2.67	2.83	2.67
6. Areas allocation is appropriate, well organized and convenient for work.	3	2.83	2.67	2.50	2.83	2.00
7. Items on the desk are organized and clean, convenient for use.	2.67	2.33	2.33	2.00	2.00	1.50
8. Items in the drawers are well organized, clean and tidy.	2.50	2.33	2.33	2.00	1.83	1.50

**Table 5 : ( Continued )**

Standardized criteria	Health Centers					
	A	B	C	D	E	F
9. Areas under the desk and chairs are clean and well organized.	2.83	2.67	2.83	2.33	2.00	1.17
10. Stationery and items on the desk (pens, pencils, erasers, rulers) are well organized and assigned in a proper place convenient for use.	2.33	2.33	2.17	2.00	1.83	1.50
11. Office equipment (computers, printers, telephones) is clean and arranged in order.	2.33	2.17	2.17	2.17	1.83	1.50
12. Cupboards or shelves are well organized and clean both internal and external.	2.50	2.50	2.67	1.83	1.50	1.67
13. Documents are arranged and sorted out by categories which is convenient to use.	2.50	2.33	2.83	2.67	1.83	1.67
14. Medical carts are clean and equipped with solutions and first aid kits sufficient for use.	2.83	2.33	2.83	2.67	2.00	2.00
15. Patient and hospital beds are clean and tidy; no bloodstain nor dirt.	2.67	2.33	2.50	2.00	1.50	1.50
16. Garbage bins are separated between infected and non-infected waste. Waste is kept carefully with no dirt and bad odor.	2.67	2.33	2.50	2.00	1.50	1.50
17. Incinerators function properly and are well lid, so wastes don't spill out and do not cause bad odors.	3	3	1.00	2.50	2.17	2.33
18. Medicines are well arranged in order by types.	3	3	3	2.00	2.17	1.50
19. Refrigerators are well organized; no other than drug is placed in.	3	3	3	1.63	2.17	2.83
20. Toilets are odorless.	3	3	2.67	2.67	2.17	1.83
<b>Total of means</b>	<b>54.2</b>	<b>52.3</b>	<b>48.3</b>	<b>44.5</b>	<b>42.8</b>	<b>38.7</b>
<b>Level</b>	<b>Good</b>	<b>Good</b>	<b>Fair</b>	<b>Fair</b>	<b>Fair</b>	<b>Need for improvement</b>

## Evaluation of the Five S Implementation

### General information of health staff

Eighteen staff members of six health centers were interviewed. Ten were female and eight were male. Most of them were around 21-30 years (9 cases). The oldest was aged 56 and the youngest was 23 years of age. The educational background of these staff was lower than the undergraduate (11 cases) and most of them had 5-9 years of work experience (9 cases).

### Evaluation of the Five S implementation after the training

After the evaluation of the six health centers which had implemented the Five S program, it revealed that all of them conducted these following activities; (Table 6)

- Meetings among team members which were set as a monthly activity and written as a rule of the health center to hold at least once a month.
- Areas are allocated and delegated for responsibility. Each health center developed diagrams of their area responsibility in the health center in a month.
- Standards of the area were set by each health center based on the agreement made by its own staff and the staff have to comply with the standards within two months.
- Big cleaning day was set. All health centers had already conducted the big cleaning day and three months after the training, four health centers A, D, E and F continued organizing the big cleaning day. B asked for cooperation from volunteers and C seek cooperation from students and communities in its neighborhood.
- Areas were explored and photos were taken before and after the Five S implementation for comparison in all six health center. Photos were

taken two weeks after the training and films were developed within one month. Photos after the Five S implementation were shot and still were not developed for six months. So, there was no photo before and after to display on the board.

**Table 6 : Start of the Five S implementation after the training**

Activities	Time of start implementing Five S (week)						
	Health centers	A	B	C	D	E	F
1. Meetings among team members		1	2	2	2	2	3
2. Areas are allocated and delegated for responsibility		1	2	2	2	2	3
3. Standards of the area were set		3	3	4	3	6	7
4. Big cleaning day was set		4	4	8	8	12	12
5. Areas were explored and photos							
Photos before the Five S implementation		2	2	2	2	2	2
Photos after the Five S implementation		24	24	24	24	24	24

When asking the staff about implement the Five S activities in their health center, 17 staff from all health centers said that they were started with sorting, separation needed and unneeded items by categories. 15 staff from all health centers said they were started with cleaning areas, equipment and facilities. 11 staff from all health centers said that they were started with allocating and arranging areas, chairs and set up categories for documents and 3 staff from health center A said that they were started with Five S planning, staff and volunteer meeting, design.

### **Problems and obstacles**

According to interviews with 17 staff from six health centers about problems and obstacles during the implementation of the Five S program, it revealed the following issues :

- **Equipment:** Sixteen staff from all health centers replied that existing equipment and facilities were not in good conditions, some were broken while some were in need for more.
- **Human resources:** Twelve staff from six health centers mentioned insufficient number of staff. Three staff from two health centers pointed out that the staff did not pay much attention to their jobs. Two staff from two primary care units said that the management team didn't prioritize the Five S implementation.
- **Budget:** Seven staff from four health centers referred to financial constraint to support the Five S implementation.
- **Infrastructure:** Seven staff from four health centers said that the building was old, looked sloppy, too small and didn't have space for storage.

### **Benefits from the Five S implementation**

According to interviews with staff of health centers about benefits of the Five S program, it revealed that 16 staff from all health centers said the health centers were clean and tidy. Fourteen staff from 4 health centers thought that the health centers could attract more customers and seven staff from three primary care units said the Five S program prepared the health centers to provide quality services. (Table 7)

When asking the staff about benefits they received from conducting the Five S program, 17 staff from all health centers said it was easier and more convenient for

them to perform their work and four staff from 2 health centers said they felt more responsible and received unity, became accustomed to this habit and the office looked pleasant. One staff did not answer this question. (Table 7)

They were also asked what the customers would benefit from the Five S program, 16 staff from all health centers said that the customers would receive higher quality, more convenient and faster and safer services and eight staff from three units replied that the customers were pleased with the services provided. (Table 7)

### **Support for Five S Program Activities**

The staff were asked what support the health centers need for continual implementation of the Five S program. Sixteen from all units said financial support was necessary and seven staff from three units said they needed facilities, equipment and materials to implement the Five S program. Four staff from three health centers preferred going on field studies and two from two units would like to have monitoring systems. (Table 7)

### **Recommendation for the Five S Program Implementation**

In answering the question on how the health centers in Phachi district implement the Five S program to achieve success, staff proposed that staff must be responsible and cooperative (15 persons from 6 units), the management team must prioritize and continually monitor this program (8 from four units), financial support is needed to support the implementation (5 from three units) and there should be contests and good management (3 from 2 units) ( table 7).

**Table 7 : Results of Five S Program Implementation, Problems and Obstacles**

Content	Number (case)						Total
	A (n=5)	B (n=2)	C (n=2)	D (n=3)	E (n=3)	F (n=3)	
<b>After the Five S training, do you implement the Five S activities in your health center?( n = 18 )</b>							
Sorting, separating needed and unneeded items by categories.	5	2	2	2	3	3	17
Cleaning areas, equipment and facilities.	5	2	1	2	3	2	15
Allocating and arranging areas, chairs and set up categories for documents.	5	2	1	1	1	1	11
Others, such as, Five S planning, staff and volunteer meetings, design.	3	-	-	-	-	-	3
<b>What are problems and obstacles in implementing the Five S program?( N = 17 )</b>							
<b>Equipment and facilities</b>							
Some equipment and facilities are not in good or appropriate conditions for use; some are defected and outdated; some are stored more than needed while some has less.	5	2	2	2	2	3	16
<b>Human resources</b>							
Limited number of staff	1	2	2	2	2	3	12
Staff do not pay attention to and neglect the Five S program.	2	-	-	-	-	1	3
Management team does not prioritize the Five S program.	-	-	-	-	1	1	2
<b>Budgeting</b>							
Lack of financial support	1	-	-	2	2	2	7
<b>Infrastructure</b>							
Buildings are old, deteriorated, unattractive, small and do not have storage area.	-	2	-	1	2	2	7
<b>What does your health center benefit from the Five S program? ( N = 18 )</b>							
The health center is clean tidy, and organized.	5	2	2	3	2	2	16



Table 7 : ( Continued )

Content	Number (case)						Total
	A	B	C	D	E	F	
	(n=5)	(n=2)	(n=2)	(n=3)	(n=3)	(n=3)	
The health center can attract customers to come for treatments.	5	2	-	-	3	3	14
The health center is ready to provide quality services	4	2	-	-	1	-	7
<b>What do the staff gain and benefit from the Five S program? ( N = 17 )</b>							
They can work more conveniently.	5	2	2	3	2	3	17
Others (they are more responsible, they have more unity, they get used to being so self-disciplined that they apply this habit at home, the work areas are more visibly pleasant)	2	-	2	-	-	-	4
<b>What do the customers of the health centers benefit from the Five S program?( N = 18 )</b>							
They have high quality, faster, safer and more convenient services.	5	2	1	3	2	3	16
They are satisfied with the services provided.	4	2	-	-	-	2	8
<b>What kind of support do your health Center need to continue the Five S implementation? ( N = 18 )</b>							
Budget, financial support.	4	2	2	3	2	3	16
Equipment, materials to be used for the implementation	4	-	2	-	1	-	7
Field study, trips	1	-	-	2	-	1	4
Monitoring and supervisory	1	-	1	-	-	-	2
<b>How do we implement the Five S program in Phachi district to be successful? ( N = 15 )</b>							
Staff have to be responsible and cooperative.	5	2	1	2	2	2	15

**Table 7 : ( Continued )**

Content	Number (case)						Total
	A (n=5)	B (n=2)	C (n=2)	D (n=3)	E (n=3)	F (n=3)	
The management team has to put it in priority and continually monitor and supervise the program.	4	1	-	2	1	-	8
The Five S program should be financially supported exclusively.	1	-	-	-	2	2	5
Others (contests should be conducted and good management)	1	-	-	-	-	2	3

### **Satisfaction of Customers toward Environment in the Health Centers**

#### **Demographic Information of Customers**

The average age of 180 customers was 45.6 years and most of them were female (68.3%) who graduated Prathom 4 (45%) and were farmers and employees (53.4%). They earned 1,000 baht per month (40%). For the right to access the health services, 55.3% had a gold card issued from the 30 baht campaign and 55% came to the health center more than five times in the last twelve months. Seventy eight point three percent came to the health center for treatments and 71.7 said the health centers were close to their houses.

#### **Satisfaction of Customers**

Table 8 shows the satisfaction level of the customers with physical improvements and infrastructure of the health centers. It was found that the customers rated it in 'good' level toward all health centers except health center 'E' in which the customers felt was in 'fair' level.



Regarding the relation of compliance with the Five S standard, tidiness, cleanliness and pleasantness of work environment in each primary care unit and satisfaction of the customers toward the improvement of physical environment, it was found that A and B which scored more than 80% and complied with the Five S program were perceived clean, organized, and had pleasant work environment in 'good' level and so was the customers' satisfaction. However, it was interesting to note that health center 'F', which failed to pass 80% level and was assessed in need for improvement for the neat. cleanliness and pleasantness of work environment, was rated by the customers in 'good' level. This can be implied of bias because this researcher conducted interviews with the customers, so there were possibilities to gain biased answers (Table 9).

**Table 9 : Comparisons of the Relations of the Five S Implementation, Neatness, Cleanliness and Work Environment Pleasantness and Satisfaction of the Customers**

Topics for evaluation	Health Centers					
	A	B	C	D	E	F
Percentage of the compliance with the Five S standard	92.8	80.9	69	64.3	59.5	59.5
Organization, cleanliness and pleasantness of work environment	Good	Good	Fair	Fair	Fair	Need for improvement
Satisfaction	Good	Good	Good	Good	Fair	Good