CHAPTER II

PROJECT DESCRIPTION

2.1 Rationale

Accuracy of stock record is one of the most important indicators for evaluating the effectiveness of inventory management. It is also a preliminary assumption foundation of inventory management because existing data in stock records will be used by stock personnel to make stock management decisions and to derive other indicators for measuring inventory management performance.

Several inventory management performance indicators can be used. An organization may select an indicator depending on its nature and data availability. The indicators that are commonly used in public-sector drug supply system are as follows:

- average percentage of inventory variation in the stock record-keeping system
- percentage of stock records that correspond with physical counts
- percentage of a specified set of indicator drugs that are in stock
- average percentage of out-of-stock occasions for a set of indicator drugs
- average lead time from supplier and from warehouses to facilities

And the set of indicators that are frequently used by commercial firms are

- Net sales to inventory/ Inventory turnover, which is the total value of drugs distributed, minus write-offs, divided by the value of the inventory.
- Inventory shrinkage: The sum of beginning inventory value plus purchases, minus the sum of the cost of goods sold, plus ending inventory value.
- Expense ratio: Total operating divided by net sales (or value of drugs distributed).

- Service level: The percentage of items ordered or requested that is filled from stock by the supplier or warehouse.
- Average inventory holding cost: The average cost of holding inventory as a percentage of average inventory value.
- Incremental ordering cost: The average incremental cost of placing each order.

A team consisting of 2 pharmacists, 3 pharmacist assistants and 3 employees has selected a list of inventory management performance indicators with an influence from the key performance indicators of the pharmaceutical department, Sena Hospital (HA evaluated), Ayutthaya, as follows:

1. To measure the accuracy and inaccuracy
    1.1 Accuracy of stock records
    1.2 Loss due to damage and theft
2. To measure effectiveness
    2.1 Stock turnover rate
    2.2 Loss due to expired items in stock
    2.3 Service level

Due to the current trend of acquiring Hospital Accreditation, quality improvement program has been widely carried out. CQI is one of the tools being commonly adopted.

The Canadian Council defines CQI as "the philosophy and management system in which policy makers, managers, practitioners and other personnel can participate to improve the working process and results to continuous treatments for the patients. It is also the applied statistical method and the tool for group work to reduce the waste and redundancy with aims to respond to or exceed needs and expectations of patients, practitioners, vendors and community". CQI is normally implemented to train personnel to think, understand and know how to improve quality systematically, resulting in continuous improvement of the environment in the organization.

CQI are normally executed in 9 steps as follows:

1. Seek opportunities for improvement
2. Define the system
3. Access current situation
4. Analyze causes
5. Analyze alternatives
6. Try out the alternatives
7. Study the result
8. Standardize improvement
9. Plan continuous improvement

From literature review on applying CQI to solve problems, several health service development program employs CQI. For instance, the study by Seeves S et al, Parkland Memorial Hospital, Dallas, Texas USA mentions about creating a CQI plan and process to develop a comprehensive plan for a rapidly evolving organization. The study concludes that CQI is an important part of successful change management in health care. The study by Cox S et al, Talbot Medical Centre, Bournemouth under the title "Improving the repeat prescribing process in a busy general practice using continuous quality improvement (CQI) methodology (including the Plan-Do-Check-Act cycle)" suggests that a combination of audit and improvement methodology offers a powerful way to learn about, and improve, practice. More research studies utilizing CQI are listed below.

- Development of a continuous quality improvement/total quality management program for medication use monitoring by Ryan ML and Chaffee BW, University of Michigan hospitals

- Quality improvement in the use of medications through a drug use evaluation service by Atevenson JG et al, Detroit Receiving Hospital and University Health Center, MI.

- A continuous quality improvement team approach to adverse drug reaction reporting by Flowers P et al, Northwest Texas Hospitals, Amarillo.

The application of CQI to inventory management problems has not been considered before. The problems are typically dealt with using generic management tools that are not quite systematic. The strategy for solving inventory management problem in a pharmacy section is usually top-down. The head of the section handles the problem without considering its root causes. The staffs often do not join the problem-solving effort due to its impracticality. With the lack of indicator and a monitoring process, the attempts at solving the problems will likely be fruitless, wasting time and resources, and causing delay in everyday operation. The staff could be fed up; thereby, affecting the quality of patient care.

Our team has opted to use CQI as a tool for solving this problem because the philosophy behind CQI is teamwork-oriented. CQI clearly defines steps for applying tools to attack the root causes of the problem. CQI stimulates personnel to think, understand and know how to improve quality systematically, resulting in continuous improvement of environment in the organization. Specific to our problem, our team has modified the original CQI by omitting the first step of seeking opportunities for improvement because the team has already identified the problem.

2.2 Objective

2.2.1 General Objective

To improve the quality of stock data in Somdejprasungkaraj hospital.

2.2.2 Specific Objective

1. To investigate factors which contribute to inaccuracy of stock records.
2. To correct inaccuracy of stock records by using CQI process.
3. To use corrected data to evaluate stock performance indicators.

2.3 Study Design, Approaches, Methods and/or Techniques

This study aims to apply CQI process to correct inaccuracy of stock records. It is agreed to skip the CQI first step which is "seeking opportunities for improvement" because the team has already selected the topic of this study for improvement. Four major steps for implementation are identified: Plan-Do-Check-Act, each of which has sub-activities as follows:

1. Plan

The first step to find out appropriate ways to correct problems through system assessment is to search for actual causes of the problems and to explore suitable solutions.

1.1 Define the system

: study the whole process of all performances and write a flow chart so that people will have the same understanding.

1.2 Assess current situation

: study and analyze the occurring problem using both quantitative and qualitative approaches.

1.3 Analyze causes

: by observation, in-depth interviews and brainstorming, using "why" questions to investigate the root of the problems and then draw the cause and effect diagram.

1.4 Analyze alternatives

: focus at ways to fix the problem at its root by selecting a method which can benefit the analysis of other causes, then start to adapt it to the user, so s/he can practice it. This step uses brainstorming method.

2. Do

Try to implement by using the alternative from point number 1.4 to develop an action plan and then start an implementation process.

3. Check

Clearly identify an indicator which, in this study, is the percentage of incorrect records/errors obtained from stock counting. The stock count refers to a comparison between the actual physical stock present and the stock records which are data in stock cards and the figures in computer. The results were classified into 2 groups as follow:

"Correct records" refer to the records that correspond with physical counts

"Incorrect records" refer to the records that do not correspond with physical counts

In this project, two types of stock count were conducted.

3.1 Total stock count

: Checking the system. The total stock count was conducted in October 2001, two months after the beginning of the project. It gave an immediate result after the implementation of the chosen alternative solution to inform us whether the system works or not.

3.2 Continuous stock count

: Checking maintenance system. These checks took place twice a month during the 10-month period. One hundred and fifty drug items, which account for 95% of the value of the hospital drug consumption during the fiscal year 2001 were selected and each item was counted 1.3 times on average. The procedure for selecting the items is as follows:

- **Systematic random sampling to get 10 items of drug.**

    1. Select 150 items of drug with the highest consumption during the fiscal year 2001.

    2. Sort the selected 150 items and randomly select one item from the top 15 items to be the first one to count.

    3. Take 10 items by counting every 15 items.

    4. Compare the actual stock count with the quantity shown in the computer and in the Stock Card. Report the result as 'Correct Record' if they match; otherwise, report 'Incorrect Record.'

- **Systematic random sampling to get 5 items of medical supplies**

    1. Select 75 items of medical supply with the highest consumption during the fiscal year 2001.

    2. Sort the selected 75 items and randomly select one item from the top 15 items to be the first one to count.

    3. Take 5 items by counting every 15 items.

    4. Compare the actual stock count with the quantity shown in the computer and in the Stock Card. Report the result as 'Correct Record' if they match; otherwise, report as 'Incorrect Record.'

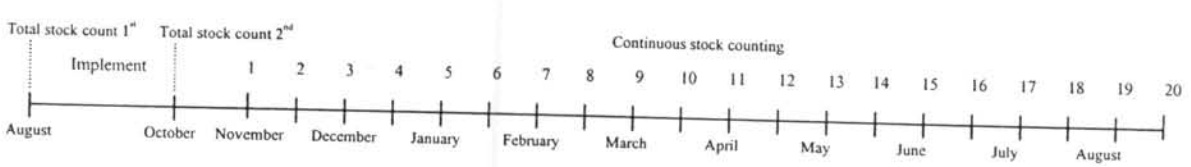

Figure 2.1 : Time frame of stock counting

4. Act:

4.1 Improve standardization

: once the system is satisfactorily adapted, the standardized performance process must be clearly set.

4.1.1 Work instruction of stock recording system

4.1.2 Stock recording monitoring system

4.2 Use corrected data to evaluate inventory management performance indicators

1. To measure the accuracy and inaccuracy
   1.1 Loss due to damage and theft
2. To measure effectiveness
   2.1 Stock turnover rate
   2.2 Loss due to expired drugs in stock
   2.3 Service level

4.3 Planning for improvement in other areas using information from 4.2

Inventory Management Performance Indicators

1. Loss due to damage and theft

How to calculate:

A = Percentage of loss due to damage and theft

a = Value of loss items at cost

b = Value of total stock dispense at cost

$$A\ (\%) = \frac{a}{b} \times 100$$

Goal is 0%

2. Stock turnover rate (TOR)

: Number of time inventory was turned around

How to calculate:

a = Value of drug/medical supply consumption during the fiscal year (= usage in each quarter x 4)

b = Value of inventory on hand at the end of quarter

$$TOR\ (months) = \frac{a}{b} \times 100$$

Goal : Not more than 3 per year for drugs

: Not more than 4 per year for medical supplies

3. Loss due to expired drugs in stock

(Data supported by software program)

Goal is 0 item and 0%

4. Service level

: The percentage of items ordered or requested that are supplied, in the quantity requested, by a warehouse in one delivery.

How to calculate:

a = No. of requested items that are available in stock

b = No. of total requested items per month

$$\text{Service level (\%)} = \frac{a}{b} \times 100$$

Goal : Not less than 95%

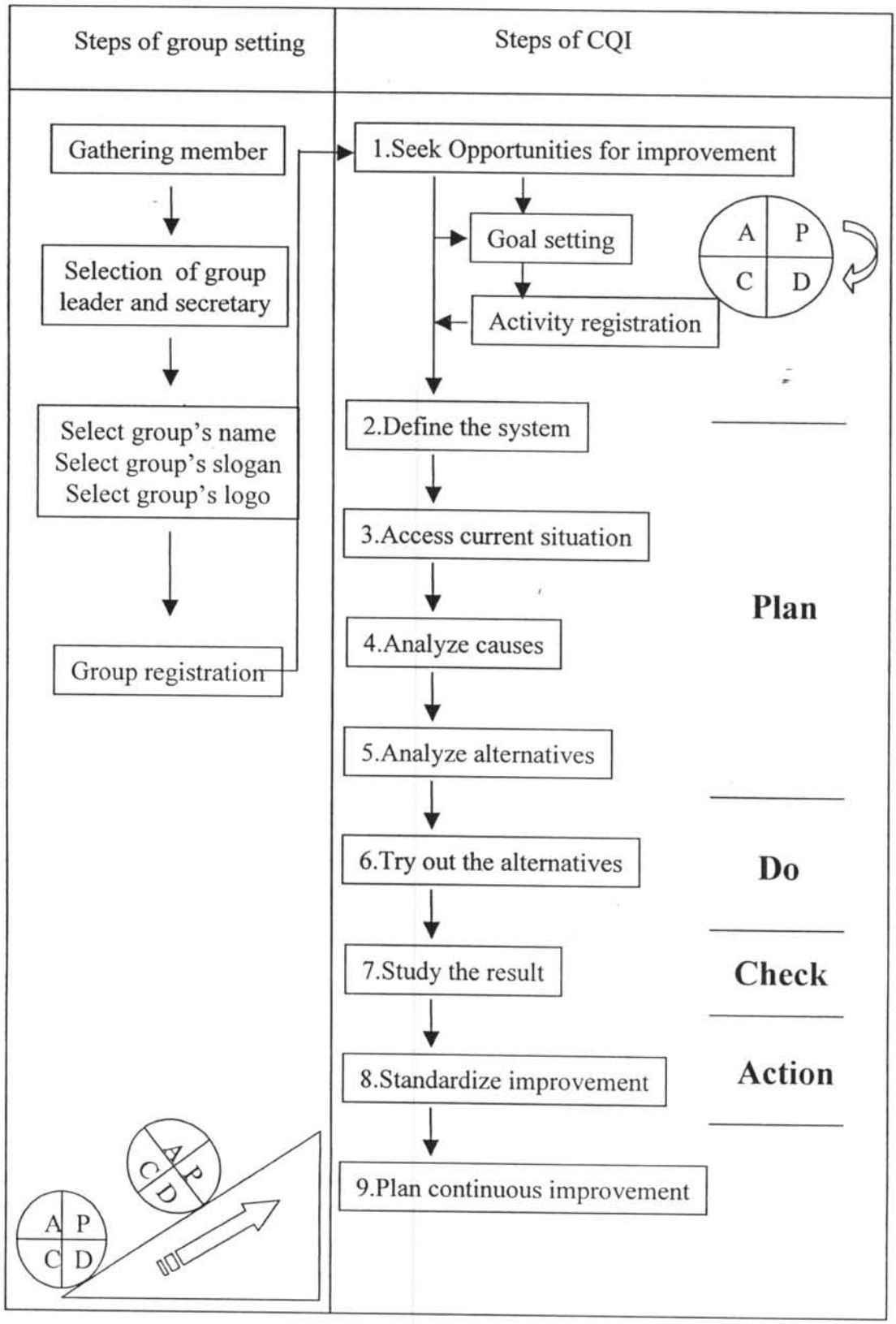

Figure 2.2 : Steps of CQI

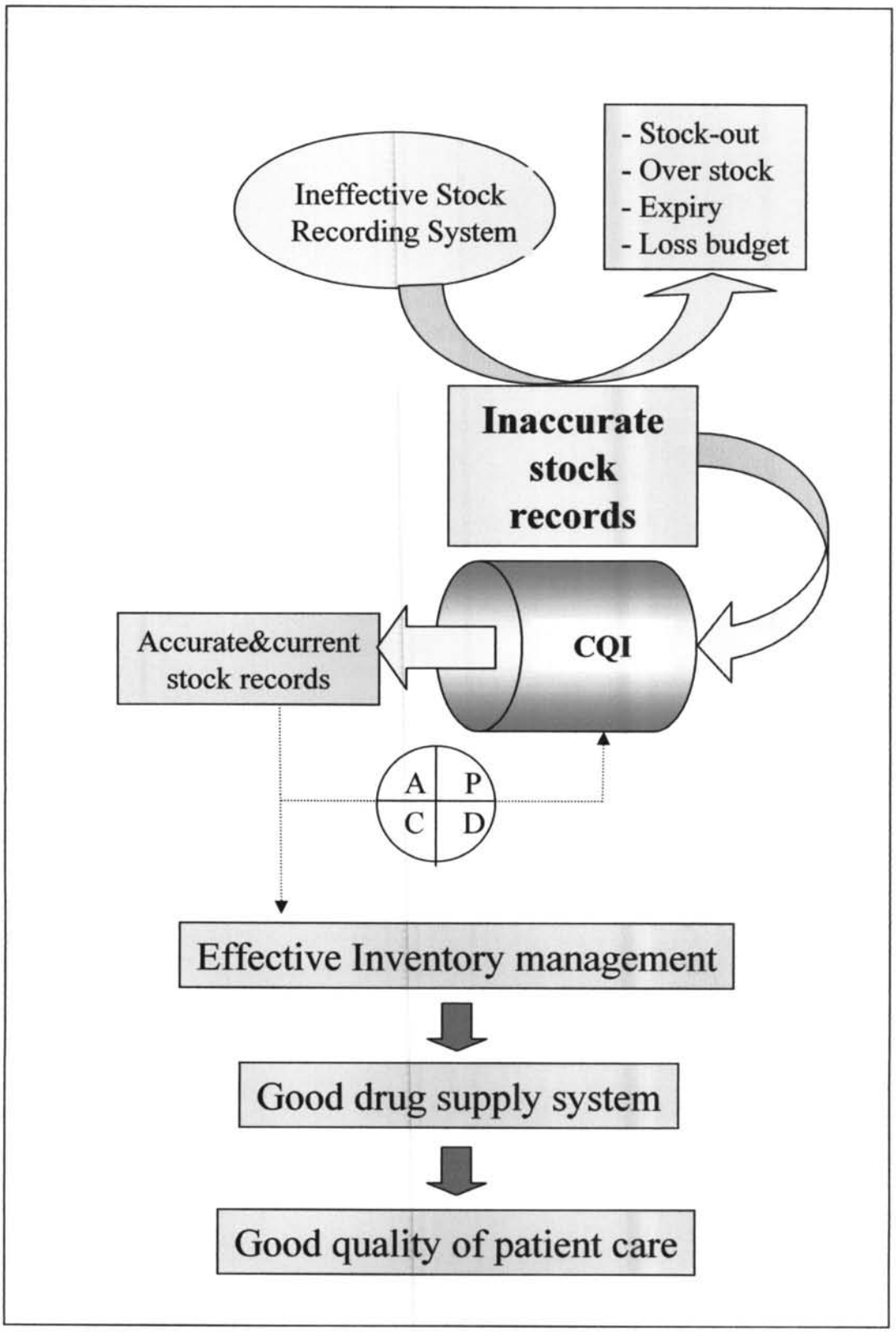

Figure 2.3 : Conceptual framework