ANALYSIS OF HOSPITAL OPERATIONS: CASE STUDY OF BANGMUNNAK HOSPITAL

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ABSTRACT

The objective of the Bangmunnak Hospital Case study has been to *demonstrate hospital workflows including outpatient flows and outpatient pharmaceutical flows, as well as, identify operational problems existing in the big public community hospital*. This case study also included the ideas, comments, and suggestions which were pronounced from various caregivers in Bangmunnak Hospital. It is hoped that these findings will illustrate the strengths and weaknesses of each workflow which in-turn will lead to improvements in future research and healthcare operation. It is also hoped that any audience who read though this research will at least change the attitude toward public hospital in Thailand.

The datasets utilized in this case study was obtained by an observation from the researcher while he was visiting Bangmunnak Hospital in October, 2012. The datasets were gathered by a presentation from Bangmunnak's caregivers themselves and, as well as questioning which was asked by the researcher. The data obtained was mainly extracted into hospital operational workflows and operational problems. The workflows were demonstrated and edited by the researchers in order to be more logically, somehow the insight operations and processes have remained original.

The results of this research will be used as a case study for any further study in order to improve the operation and workflows in the hospital by both qualitative and quantitative. It is also that this case study could be used to ignite any researcher to think about improving the healthcare systems which, at the end, means higher quality of life of the overall population.

Key Words

Outpatient, Workflows, Expectation, Operational Problems

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Chapter 1

INTRODUCTION

1.1 Background

Hospitals are health organizations that hold certain responsibilities or obligations in regards to providing health-related services to the people, including disease protection, health promotion, nursing care and rehabilitative care. Therefore, World Health Organization (WHO) defines a hospital as "Hospital is an integral part of a social and medical organization, the function of which is to provide for the population complete healthcare, both curative and preventive, and whose out- patient services reach out to the family in its home environment, the hospital is also a center for the training of health workers and biosocial research". Furthermore, the Infirmary Act 1998 defines a medical center as a place, along with motor vehicle, that has been prepared for, practicing medicine, in accordance to the law concerning with the practices of medicines, medical professional practices, in accordance to the law concerning with the medical profession practices, nursing professional practices, in accordance to the Nursing and Midwifery Practice Standard law, or dentistry professional practices, in accordance to the law concerning with the dentistry practices, on a normal basis, either by receiving benefits or not. Nonetheless, this definition does not include a place the sells medication which is subjected to a law established specifically for governing pharmacy businesses.

Consequently, it may be said that a hospital is an institution set up for treating patients, where there are resting and operating rooms available for curing serious illnesses. Otherwise, it may be concluded that a hospital is an organization that administer medical works, both in a hospital itself or in a community, with responsibilities to provide public health services to the people including health promotion, disease protection, helping the community avoid health risks or factors that may be harmful to their health, medical treatment, rehabilitative services both within

the organization and outside premises that cover the patients' homes. Additionally, a hospital is also a training site for medical and public health personnel, along with being a place for receiving education and conducting researches on medicines, public health and other related subjects, in order to solve problems and further develop the quality of the people. Hospitals generally hold values that emphasize on providing moral and quality services and to consider patients' best interests. Hospital works can be divided as services, service-supported tasks, developmental works and hospital managerial works.

According to the statistics on Thailand's health services and medical center levels in 2008, it is founded that the highest ratios for inpatients and outpatients, in accordance to affiliations, belong to Ministry of Public Health hospitals, followed by private and university hospitals (Health Resources Research, Bureau of Policy and Strategy). Thus, hospitals under subjections of the Ministry of Public Health must be prepared for handling the number of patients coming in for treatments in their hospitals.

Hospital management is similar to managing other service businesses with the exceptions that hospital work is always more urgent than other services since it relates to human lives. If services are delayed, patients may be in danger and can cause deaths. In addition, hospital service works must be performed on swift and accurate information. Inaccurate information or accurate information that is acted upon in, even if the slightest, tardiness, can create problems. Therefore, information system is brought in to facilitate hospital operations in order to make them run more efficiently. One other crucial factor is to build a set of personnel that share the same objectives and visions, is understanding and compassionate for each others, so that the overall goals of the hospital can be achieved. The more personnel of the hospital share the vision, the more impact there will be to the success of that particular organization. In terms of human resources, Thailand experiences a shortage of public health personnel. In 2009, it is estimated that the ratio of physician to take care of citizens in Thailand is 1 to 2,500, almost the highest when compared to other countries with similar economy. In order to

solve human resources shortages, the government has issued some policies to increase the development of skilled personnel. In terms of medical technology, Thailand has made some purchases and imported 15,799 million Baht worth of technology in order to help prevent disease and being able to make diagnoses early on. Nonetheless, access to medical technology is still centralized in the capital city and areas that are more developed. Since each technology is still very expensive, the evaluation of returns on investment is highly important. Furthermore, there have been some continuous public health developments to make necessary services vastly available and cover more areas in the country.

Presently, Thailand has expanded the coverage of public health services with unit structures in both primary and secondary levels to cover every province and later to set up the National Health Security program that is available in order to relieve financial burden and make health care services more accessible for all Thai citizens. Three types of health insurance systems are established, including health care for civil servants, social security and health insurance from the government. In terms of preventing social and financial problems to the system, the Universal Health Care Policy significantly helps to reduce medical expenses for households. Although health care and welfare system in Thailand is expanded to cover all areas of the country, continuous development is still necessary for sustaining an efficient system which will be beneficial to users in all aspects.

The welfare agenda in Thailand mandates that hospitals treat patients without charge from 2001.This universal coverage has encouraged Thai people to visit hospitals. Increasing demand for services has forced hospitals to grow rapidly without commensurate increase in funding. For many services, hospitals are enticed to trim the length of stay through a public policy that only reimburses costs for outpatient treatment. Consequently, while upholding or improving the flow time for treating patients, Outpatient department have to identify how to cope with drastically increased demands. A universal characteristic of OPDs is waiting rooms full of patients. Toleration

of long waiting times challenges enfeebled patients. Indeed, for some sick people, knowing to long waiting discourages them from going to outpatient and they seek for alternative help. A universal characteristic of OPDs is waiting rooms full of patients. Hall (2006) discovers that some of people decide on leaving the service system because of the lengthy queue.

Outpatient service is the most important service provided by all the hospitals as it is the point of contact between a hospital and the community. It is an ambulatory care center (also called polyclinic) which provides to all members of a community the whole scope of services that are needed to keep them in good state of health directly or by referral to more qualified institutions. Many patients gain their first impression of the hospital from the OPD. In other words, the first impression will have lasting effects. A neat and clean hospital with necessary information boards and proper directions generally provide good image.

Out-patient services are the most important service provided by all the hospitals as it provides services to a large number of patients at a low cost. Successful and efficient management of OPD can lighten the burden on the patient wards. Nowadays OPD services of the majority of hospitals are having queuing and waiting time problem. Patient's waiting time refers to the time from the registration of the patient for appointment with doctor till they enter the doctor's chamber (Bharali, 2010).

Various functions affecting the services of an OPD are:

- Arrival pattern or input rate of patients at the central waiting room.
- Service time at various clinics of OPD.
- Queue lengths at waiting rooms of clinics of OPD.

OPD in a hospital serves the facility for diagnosis and treatment of non-resident patient. It provides health care to infant, child, adolescent, adult, and geriatric patients in need of non-emergency physician care. Since the numbers of consumer kinds are

large and the treatment should be given within a day the bottlenecks occurred with respect to these constraints can be solved by an effective appointment system design (Bharali, 2010).

Common problems to be encountered in OPD system are as follows:

1. Long patients wait time will occur at the front desk of the hospital.
2. Patient might be conveyed to wrong services.
3. Large number of patients waiting to be served at the OPD will result in uncomfortable conditions such as congestion, noise, and poor ventilation.
4. A sound scheduling will not be performed due to incorrect examination times
5. Patient appointments will overlap
6. Number of patient admitted within a working day will cause overtime for doctors.
7. Long work-shifts will cause cleaning crew to wait idle and related cost will increase
8. Doctor's and patient's dissatisfaction will create a tense environment at the OPD.
9. Patients could prefer another health clinic due to improper management.

Thus, the main objectives of the Out-patient department of a hospital should include the reduction of patient's time in the system, improvement on customer service, better resource utilization, and reduction of operating costs.

Waiting time in outpatient departments is a problem throughout the word. One consistent feature of patient dissatisfaction has been expressed with the length of waiting time in the outpatient department. The waiting time is particularly important for a hospital, since the "customers' are 'patients". Long waits create customer dissatisfaction on one hand and resource inefficiencies on the other hand. In Japan, with a progressively aging society, this has become a central issue in the healthcare industry.

As a result, the researchers are interested in studying the workflows and operational problems in a big public community hospital. The objectives are to collect nursing department data of a big public community hospital in order to make a case study regarding hospital internal management in order to make patient services more efficient in the future.

1.2 Organization History

Figure 1.1: Bangmunnak Hospital

Bangmunnak Hospital is located at 2, Moo 9, Bangmunnak–Potalae Road, Bangmunnak District, Pichit, Thailand 66120 and has been grouped as a big public community hospitals with 90 patient's beds under the control of Ministry of Public Health. Bangmunnak Hospital was established in June 1984 and originally located in Bangmunnak District Office, which has 300 square meters area and got construction budget from the Ministry of Health and faithful donators.

In 1985, the Ministry of Health has approved funds to construct a 10 bed-facility to Bangmunnak hospital. But at that time they could not provide the land for

construction, while the land in Bangmunnak is readily available but they lack of budget for construction then Ministry of Public Health has approved and changed to construct a 30 inpatient beds in Bangmunnak district, which became Bangmunnak hospital today.

In 1989, Bangmunnak Hospital has faced a huge numbers of patients everyday caused problems with the narrow place and inconvenient to services. Bangmunnak Hospital cannot expand to a larger space to serve the patient because of the limited in area. At the same time, Bangmunnak district has providing public land for the project to various government agencies to take advantage of it then the Commission allocation approved the allocation of the land away from Road, Bangmunnak–Potalae to Bangmunnak Hospital.

Since the day started until today, number of patient in Bangmunnak Hospital has increases every year and has the average numbers of outpatients are 300 people per day. Because of the enlarged from the past, Bangmunnak Hospital consists of 12 departments now, namely Outpatient Department(OPD), Specific Clinical Diseases, Pharmacy Department, Emergency and Trauma Center, Dental Department, X- Ray Department, Laboratory Equipment Department, Rehabilitation Department, Childbirth Department, Inpatient Department(IPD), Intensive Care Unit (ICU), Surgery Department, Department of Family Clinical Practice and Community. Bangmunnak Hospital has totally 268 employees (154 Government Officials, 15 Government Employees, 47 Permanent Employees, and 52 Temporary Employees).

Bangmunnak Hospitals function much like other non-profit hospitals; they have a strong commitment to contributing to the health of the community and providing charity care to people with inadequate or no health insurance. By followed the intent of the founder under the development of Dr. Direk Khampaen and Hospital Management Committee, Bangmunnak Hospital is going to be a pace of improvement based on patients and received many awards and will continue to provide quality ongoing to maintain the quality of the hospital.

1.2.1 Vision

To provide the healthcare service with quality and efficiency .Give the patients to impresses, be nonstop develop for the quality of life and the environment.

1.2.2 Mission

1. Bangmunnak Hospital provides holistic health in terms of preventive health care and rehabilitation under professional standards and modern technology.

2. Provide high-quality medical services.

3. To develop personnel to be knowledgeable in all academic disciplines and expertise in the use of medical devices.

4. Management team with a great vision.

5. Good management system and can be checked.

6. Operate in an environmentally responsible manner.

7. People in the community can participate in health development.

1.3 Problem statement

Hospital is similar to other service businesses with the exceptions that hospital work is always more urgent than other services since it relates to human lives. If services are delayed, patients may be in danger and can cause the deaths. Therefore, this study will identify hospital workflows and also determine the bottleneck existing in an area of outpatient department flows and outpatient pharmaceutical flows in the big public community hospital. Then, offer the suggest solutions so they can adjust and improve their services in order to provide better services to the patients and more efficiency to the hospital.

1.4 Research Objective

The purposes of the study are to identify the hospital workflows and bottleneck existing in an area of outpatient flows and outpatient pharmaceutical flows which obstruct the hospital's efficiency and this study aims at identifying overall problems of the workflows in Thai big public community hospital and obstacles in Thai big public community hospital. Then, offer the suggest solutions for hospital improvement in Thai big public community hospital so they can provide better services to the patient and the more efficiency to the hospital.

1.5 Scope of the study

1. To identify hospital workflows in area of outpatient department flows and outpatient pharmaceutical flows at Bangmunnak Hospital, Phichit, Thailand.
2. To identify the bottleneck existing in area of Outpatient department workflows and Outpatient pharmaceutical workflows at Bangmunnak Hospital, Phichit, Thailand.
3. To suggest solutions for hospital improvement in Thai big public community hospital.

The next section of this independent study is Literature review, which discuss factors, and related theories and research. In chapter 3 Research methodology, this section describes research methods used in this study. The findings are revealed in Chapter 4. Lastly, some relevant conclusions and recommendations are drawn.

Chapter 2

LITERATURE REVIEW

Healthcare and public health services areas much important as other main industries which have been growing significantly, they were ranked as top businesses around the world and they have been shown from public health expenditures which were approximately worth over 3 percent Thailand's GDP in each year. Public health industry have businesses that involved in equipment and medical tools, medical services, medicines, biological technologies and alternative medicines for instance. These businesses have fixed conditions to operate and provide their medical products to more complex supply chains of public health organizations.

2.1 Healthcare Operation Management

Healthcare operation management can be seen as a discipline that combines scientific principles of management to examine the most optimal and efficient methods of care delivery. Many positions in hospitals today actually are roles involved in operation coordination and execution. This chapter provides the reasons for operation management and describes it as evolving role in helping hospitals since it became more competitive.

Most hospitals are usually non-profit organizations. Almost 84% of hospitals are defined as not-for-profit and existing solely to serve the community where they are operating. As non-profit organizations, they are exempt from most federal and state taxation but they are not expected to perform at positive growth rates or gain huge profits as much as most publicly traded firms do. However, if a hospital cannot operate and gain extra return on its capital or invested money, there surely will be a several guaranteed negative circumstances. For example, a failure to perform reasonable profits will likely cause the public bond market (which finances most of healthcare businesses

today) to assign sub-par credit ratings which will make hospitals less than stellar investments for bondholders.

More importantly, the term of limited profit margins also implies that there will be less money to reinvest in the business or ensure that buildings are repaired, that equipment are replaced, that technology is modern and that clinical programs continue to expand and be enhanced. Without these investments or budgets, hospitals will probably be unable to attract qualified physicians and administrators which will lead the business to the downward spiral. While some hospitals and healthcare system are waiting for changes in public health policy to save them, the more competitive and successful hospitals are acting now to protect their profit margins.

In this time of how pricing gives a pressure on business continually and affects the top line of the income statement, with more than half of all hospital businesses reporting negative profit margins, it is essential that hospitals start to find out more profitable business strategies to operate. "Differentiated marketing programs and strategies, broader use of advertising and more careful and precise long-term planning about service lines are all strategies that must be utilized"(Nachtmann, 2009).

Equally as important as what researcher had mentioned, there should be a broader adoption of logistical and operational management techniques in the hospital business affairs. By monitoring and maximizing labor productivity for all medical supports and allied health professionals are crucial to stabilize their salary expenses. Incorporating queuing theory and scheduling optimization methods can help driving an effective cycle time out of hospitals. Incorporating logistical and supply chain management techniques help cutting operational expense down, eliminating excessive safety stocks and improve working capital management in overall (Bharali, 2010). But most importantly, by using technology can further automate and streamline all processes in hospital operations which can help reducing costs a lot and maximizing their efficiencies.

Healthcare organizations or hospitals are not able to depend on the extrinsic factors (such as health federal payer regulation changes, policy or shifts in managed care market structures) to change their potentials anymore. These are important and distinguish issues, however they are covered in other texts and will evolve regardless of the managerial behavior that hospitals employ. These macro-level issues are important, but equally significant are also the micro-economic and organization factors that can be affected by operations and logistics management which operations management can help organizations today.

Healthcare profit margins can be represented as a balloon where various extrinsic or external factors cause deflationary pressure from the outside which inside is the set of decision and management system put in place to confront these pressures and essentially inflate the balloon or expand the margin. In effect, operations management is the set of intrinsic or internal, process and decision that help address costs, process, technology, and productivity which is not a focus on this text.

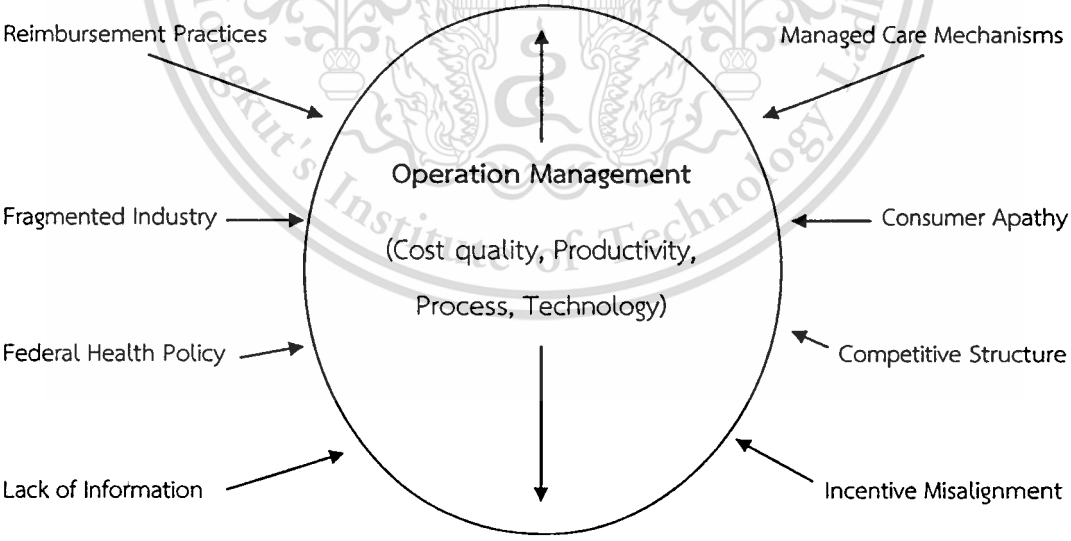

Figure 2.1: shows conceptually the margin-expansion role operation management plays.

Source: Easterby-Smith, M., Thorpe, R., Jackson, P. and Lowe, A. (2008) Management Research (3rd edn). London: Sage. Chapter 1 provides a very clear and readable introduction to management research.

Heath care is a part of service sector that provides intangible or non-physical "goods" which is opposed to physical object since it can be seen or touched. Hospital services basically deliver care through provider to patient who does not contain manufacturing or assembling process. These services are specific, unique and differentiated from other usual service providers; they are knowledge-based and also have a high level of customer interaction. There are physical goods to accompany with these services which supply chain management focuses on in hospitals in which replenishes, procures and stores pharmaceuticals or medical supplies as well. In this regard, hospitals can be presented as a mix of both tangible and intangible characteristics. All of this attributes make operations management in health care different from other businesses in industries that has to be strictly produce market physical goods or widgets.

Therefore healthcare operations management can be defined as the quantitative management of the supporting business systems and processes that change resources (inputs) into healthcare services (outputs). Inputs are defined as the resources and assets for example capital and labor including cash, personnel, space, technology, equipment and information. Outputs include the delivery of healthcare services and actual production. Quantitative management implies uses of analytical and optimization tools as well as extensive uses of process and quality improvement techniques to improve performances (Mohr, 2008). This field is relatively new to healthcare but it has been existing in other industries for almost a hundred years.

The overview of healthcare operations management explains all functions which are related to the management systems and business processes regards clinical care. It also includes extensive attentions on the followings: workflow, staffing levels, capacity

design, physical layout, physical network optimization, productivity management, supply chain and logistics management, quality management and process engineering.

OM Function	Objective or Issue to Consider
Workflow process	Are there too many departments or people performing the same task?
	Do we have and end-to-end map of our major business processes?
	How many manual processes exist?
	Are there ways to reduce cycle time, steps, and choke points for key processes?
	Can we improve speed and patient satisfaction?
Physical Layout	Are our facilities designed with the consideration of speed, capacity, traffic flow, and operational efficiency?
	Are unit or floor layout designed to eliminate redundancy (e.g. safety stock on all resources)?
Capacity design and Planning	How can we reduce bottlenecks to improve patient through-put for each area?
	In which cases should we increase the use of technology to improve labor productivity?
Physical network optimization	Where should we position appropriate par locations, pharmacy satellites, warehouses, and supplies to minimize resources and costs?
	Do we strategically utilize vendors and their facilities?
	How can we design and position optimal locations for clinics or resources to ensure lowest total costs?
Staffing levels and	How much output can we expect from our staff?

productivity management	Have we maximized the use of automation and electronic commerce to increase productivity?
	Have we implemented sophisticated analytical models to optimize labor and resource scheduling?
Supply chain and logistics management	Have we built collaborative planning and forecasting processes to standardize items and reduce total costs?
	Should we operate "just in time "?
	Do we use automated, optimized replenishment of medical surgical supplies to increase turns and asset utilization?
	How much inventory of each item do we need?
	Do we use perpetual inventory systems to ensure stringent internal controls and accurate financial reports?
Quality, planning, and process improvement	Do we use advanced tools for tracking projects?
	Are we measuring the right performance indicators to bring visibility to trends and exceptions?
	Do we know how we compare to our key competitors?
	Have we identified the quality issues that affect goals of customer satisfaction and efficacy, in addition to efficiency, costs, and speed?

Table 2.1: Key functions and some of critical issues in healthcare enterprise.

Source: Mohr, D.C., Burgess, J.F. & Young, G.J. (2008). The influence of teamwork culture on physician and nurse resignation rates in hospitals. Health Services Management Research, 2 (1), 23-31.

Healthcare logistics and operations management include all of these business functions and open job opportunities for unemployed with titles such as operations supervisor, administrator, scheduling manager, quality manager, vice president of support services, director of patient transportation, operations analyst, procurement manager, facilities manager, management engineer, inventory analyst, supply chain consultant etc. Technicians, nurse and other health providers also play important roles in service operations management. The advance of operational management positions in hospitals will go on as the need of increased cost efficiency and accountability rises.

2.1.1 Hospital Business Operations

The management of hospital business operations can be broken down into a few major roles and responsibilities; including finance and accounting, business logistics and supply chain management, physical plant or facilities, human resources, information technology, and business planning and performance improvement, there are a number of job opportunities in each of these areas for typical hospital.

2.1.2 Finance and Accounting

Finance and accounting represents a large growing portion of healthcare. Finance professionals are responsible for managing a wide variety of functions, including accounting, billing, collections, financial reporting, payroll, treasury and cash management, investment management, records management, budgeting, and account payable, While some of these focus on transaction processing, such as investments and budgeting. Financial analysts, accountants, and other professionals can find many challenges in this area of health care.

2.1.3 Logistics and Supply chain Management

Supply chain management is one of the fastest growing sectors in healthcare. The search for cost savings of key resources and supplies and for better management of goods and services in the physical supply chain is responsible for creating job opportunities for analysts and professionals interested in a wide number of fields,

including purchasing, receiving, inventory, transportation, distribution, logistics, and laundry and linen.

2.1.4 **Physical Plant or Facilities**

As hospitals continue to expand beyond just single, multi-floor buildings, the need for additional resources and different types of facilities expertise keep growing. Many hospitals are part of systems or networks with several facilities, each of which has a need for design, planning, construction, maintenance, housekeeping, and security operations. Roles for architects, engineers, and general business managers to help manage these business support services keep increasing.

2.1.5 **Human Resources**

The average hospital employs about 250 employees, although that number can range from 50 to more than 250. As large employers, there is continued need for business skills focused on providing general personnel management, as well as specialized services such as recruitment, compensation, and benefits. Organizational development and training are also common in larger hospitals.

2.1.6 **Information Technology**

Information needs require management of telecommunications, data services, information reporting, system project management, and infrastructure support. Significant improvements in labor productivity can be gained by investing appropriately and wisely in technology to automate manual processes, as well as other technologies to improve access to information and work flow.

2.2 The Regional Health System

While the macro system represents the state of individual health, the regional system portrays the organizational and functional relationships among health care processes. The is invariably a hierarchy, beginning whit primary care providers, through private practices and local clinics; moving to secondary care providers, through

community hospitals; and then moving to tertiary providers, through regional medical centers (some highly specialized quaternary care is only available at a few national centers). As the geographical scale becomes larger, increasingly specialized care becomes available, a consequence of scale economies and a consequence of aggregated patient demand. On the other end of the spectrum, more routine care is conveniently obtained from primary care providers, the primary, secondary and tertiary providers are augmented by ancillary services such as MRI centers, laboratories or dialysis facilities, which may support multiple providers (again influenced by scale economies); continuing care facilities, such as nursing homes; or on a more basic scale, pharmacies (Health Insurance System Research Office, (2009).

Many variations exist within this general framework, which has evolved over time as more specialized treatments have become available. Healthcare plans have changed, costs have changed and people have changed, costs have changed and people have become more mobile. On one hand, by creating multiple layer of care some delays are inevitably created due to increasing difficulty of access. On the other hand without multiple layers, some types of specialty care would not be available at all due to insufficiently trained care-givers or simply cost. Yet it is clear that the regional /national system should be designed with three (somewhat conflicting) goals in mind:

- Minimizing the cost of providing desired services.
- Maximizing convenience and access to services that individuals need.
- Maximizing the likelihood of a positive health outcome from service

Reducing healthcare delay contributes to all three goals by: 1 removing inefficiencies in the provision in the provision of services, thus reducing cost, 2. Providing timely access to the services people need, and 3 reducing waits for needed services.

It should be recognized that the regional health system is in part the result of deliberate planning (e.g., design of the emergency medical system and designation of trauma centers), in part due to happenstance (e.g., where hospitals happened to develop many years ago). In part to market pressures (e.g., competition for patients among facilities and health plans), and in part due to factors that originate from outside the region (e.g., regulations, medical discoveries, and medical training). Thus, it would be impossible to fully optimize such a system, though it might be steered in a desirable direction.

2.3 Healthcare Center

The center is a grouping of geographically proximate facilities under the management of one organization. At a minimum, this entails two or more interacting departments, each with a distinct function (e.g., a laboratory and an outpatient clinic). At a maximum, this could encompass a larger tertiary care medical center with dozens of departments.

A healthcare center operates as a system of interacting departments, which must be coordination, materials and pharmaceuticals, the center leadership, facility design, organizational design, employee training and recruitment are all important factors (Health Insurance System Research Office, (2009). Centers can sometime represent enormous multi- billion dollar investments, and are and medical outcomes. Patient flow is particularly important for centers, as flow from department to department needs coordination; otherwise delays at the interfaces can be significant. During a typical center visit, the patient may separately encounter waits for their services (Hall and Randolph W., 2006):

- Information collection as part of admission
- Diagnostics and examinations
- Procedures, surgeries and therapist
- Rehabilitation and recuperation
- Transportation between departments
- Discharge process

In the background, patients may be delayed waiting for ancillary services, many of which are invisible to patients:

- Transfer of medical records
- Transfer and analysis of laboratory specimens
- Filling prescriptions
- Housekeeping to prepare rooms for new patients
- Communication among departments, scheduling and decision-making in preparation for patient arrivals
- Movement and availability of wheel chairs, gurneys, and other portable equipment
- Completion of required paperwork for internal or governmental use.

Thus, patient delays depend in part how he or she physically flows through the center, and in part on how information, equipment and other objects flow through the center.

In summary, the system for managing patient flows in a center should be designed and operated to achieve these goals:

- Minimizing wait as patients transition from department to department.

- Achieving a high level of synchronization among patients, employee and resources, so that services begin promptly on patient arrival and are provided with high efficiency.
- Identifying and resolving system level bottlenecks that impede the flow of patients.

These goals can only be achieved through effective coordination and communication, combined with constant attention to patient service.

2.4 Department

The department is the most microscopic of the systems researcher consider. It represents a unit within a larger center oriented toward performing a single function, or a group of closely related functions. Examples include the ED, surgery, radiology, or an inpatient ward. A department could also be ancillary, such as house-keeping, medical records, or transportation. For the patient, departments typically have clearly defined points of entry and points of exit, which may be time-stamped and correspond to responsibilities for care (Jarrett, 1988). Like whole centers, departments are often judged based on financial return. Medical outcomes and quality of care, however, are often more difficult to assess at the department level, as these depend on the totality of service provided by the center over the entire duration of stay.

With respect to patient flow, departments must both support the mission of the center as a whole through effective coordination, and be effective in their own right. Neither should a department create unnecessary delay within, nor should they impose delay elsewhere (e.g., delays in accepting patients, or by failing to prepare a patient for transfer when he or she is needed elsewhere). The employees must be trained and rewarded for the priority of minimizing delays through prompt service; they should employ realistic appointment systems; they should ensure proper staffing, and advance planning prior to the arrival of patients (Jarrett, 1988).

2.5 Methods

Healthcare delays can be reduced through awareness of best practices, application of quantitative methods and a commitment to change. Organizations such as the Institute for Healthcare Improvement (IHI, 1996) and the American College of Emergency Physicians (ACEP, 2002) have assembled numerous ideas for improvement. Most generally, the solutions to delay problems come in three forms (Hall, 1989):

2.5.1 **Alter the service process:** through scheduling, coordination, process changes, communication, automation, etc., increase the capacity for serving customers, and increase the synchronization between capacity and customer arrival patterns.

2.5.2 **Alter the arrival process:** through appointments, pricing, information, education programs, etc., influence the patterns by which patients present for service, improving the alignment between capacity and demand.

2.5.3 **Alter the queuing process:** through triage moving waiting from the health care facility to the home, redesign of waiting areas changes in prioritization, etc., ensure that the adverse consequences of waiting are minimized.

These three form a hierarchy, as the first priority should be optimizing service to meet the needs of patients; when this is infeasible or uneconomical, explore changes to patient patterns; and, if all else fails, focus on managing queues to maximum efficiency.

2.6 Queuing Theory

Queuing theory is the mathematical study of waiting lines (or queues). The theory enables mathematical analysis of several related processes, including arriving at the back of the queue, waiting in the queue, and being served at the front of the queue (Spangler et al., 2004). The theory permits the derivation and calculation of several performance measures including the average waiting time in the queue or the system, the expected number waiting or receiving service and the probability of encountering the system in certain states, such as empty, full, having an available server or having to wait a certain time to be served. The results of queuing theory are used in the context of operations management when making decisions about the resources needed to provide service.

2.7 System Constraints

System constraints are factors upon which the performance of the whole system depends, otherwise known as bottlenecks. In hospitals, system constraints are typically the operating rooms (ORs). Since the efficiency and effectiveness of the system depends mainly on the system constraints, identifying system constraints is critical to understanding and improving the system (Denton et al., 2007).

2.8 Hospital Accreditation (HA)

2.8.1 History of Hospital's quality development

Quality and safety are the expectation of healthy service system in all countries. Although the development is continuing, there is the undesirable, unsatisfied, contradiction, risk and wasteful all the time. It is important to develop mechanism to support and stimulate the effective of hospital's quality development and healthy service which adaptable to each situation.

The hospital's quality development is supported continually, such as Basic Minimum Requirement, hospital's star project, hospital reappearance project of ministry of public health. The hospital standard is initiated by The Medical Council of Thailand afterward Social Security Office applied to be hospital standard of Social Security Office, Health systems research institute studied and make a procedure to apply this standard to assessment beside that the ministry of public health, healthy organization and several organizations make the patient's right practiced and healthy vocation standard.

In Thailand, Hospital Accreditation (HA) began from Total Quality Management (TQM) or Continuous Quality Improvement (CQI) concept which is applied in 8 hospitals since 1992. The hospital standard for accreditation was set and tried out in 1997 in term of research and development project. The research and development project causes the association for hospital's quality assessment and accreditation including the changing of research and development project to be the healthcare accreditation of Health Systems Research institute. So the development of hospital accreditation began with 5 standards in America since 70 years ago for hospital assessment which is medical training institute for surgeon and develop to be the cooperation of Joint Commission for Healthcare in due time (Healthcare Accreditation Institute).

There is a changing of persuasion term of accreditation for training to be Medicare service hospital which belongs to governance organization, this concept slowly changes in line with global quality development concept from the standardize inspection in the beginning to be use tools for assess and develop themselves continuously and use visiting like external peer review. The practice of these in Thailand has the important process consists of initial appointment of a committee to establish the role and responsibilities of the peer review as treaty of development system, apply standard to assess and develop themselves in according to their roles, clearly define core value, terms and expectations, external review to assure the assessment by themselves which help to find blind spots and stimulate widely view point, praise by certificate or acknowledgement.

The universal health care policy causes the hope and awakened to quality, HA process is responded by 3 steps management of HA together with readiness of each hospital. The first step is quality concept learning by practice easily and pertinently, using problems, risk, undesirable effects to learning and improves for protection. The hospitals which practice with understanding seem to have the firm first step for quality development in the next steps (Healthcare Accreditation Institute).

The first step of HA is learning from problems and undesirable situations by using concept of "work routine well, talk and reconsider"

The second step of HA is systematic internal hospital development, there are service department, patient system, and organization. The systematic development such as wheeling, development and learning by using concept of "clearly aim, evaluate, worthy and no adhere"

The third step of HA is quality culture, safety culture and learning culture creation. There is a practice which causes acceptable and good trend effects.

The aim of HA is to support healthy service system to develop continuously, that is for quality, safety and healthy. It begins with health service in the hospital, integrate with health reinforce concept that would be more widely expand than healthy service of hospital in the future. Bangmunnak Hopsipital already achieved Hospital Accreditation (HA) standard since in year 2007 as shown in figure 4.

Figure 2.2: Bangmunnak Hospital's Hospital Accreditation sign.

The core concept of ultimate advantage HA is all relevant partners try to make HA as learning process, aim to quality and safety, which is the bigger and longer-standing than accreditation by assessment and development of team in the hospital and external review (Healthcare Accreditation Institute). The external review is the assurance of assessment by themselves and stimulate the chance of development in widely view. Such the external review is the inspection of hospital readiness how concisely of hospital system. The valuable of external review depends on suggestions for continuous development or core value of service. The accreditation seems to be spirit for working well and encourage for continuous working or seems to be value of development.

CHAPTER 3

RESEARCH METHODOLOGY

To achieve the research objectives, it is essential to give importance to the research methodology. An accurate result may only be displayed if the right methodology has been chosen (Kumar, 2008). The purpose of this section is to state the kind of research methodology being used to carry out the primary and secondary research, limitations and ethical aspects will also be discussed as part of this section.

The research methodology requires a clear and in-depth knowledge of related researches being applied to make sure it covers three main aspects. At first, it helps the research define the kind of evidence to be collected, verified and interpreted and the research strategy to be adopted. Secondly, the limitations of the study are to be discussed in order to judge which appropriate method should be applied for the purpose of the research. Lastly, the method selection seems to be much more innovative if the research philosophy is clearly identified (Easterby-Smith, Thorpe and Jackson, 2008). All justifications of the research are based on the philosophy that has been chosen for the particular research (Carr, 2006). Two approaches are present when a philosophical perspective needs to be selected. They are the positivism which is nature of society and interpretive which is nature of science (Holden & Lynch 2004).

Positivism is demonstrated that is based on a realistic assessment. The assumption in this approach is that the laws and social objects are analyzed keeping natural objects in mind in order to discover the truth. It states that the actual truth is dependent upon the examination, observation and belief of the external reality (Smith 1998 and Holden and Lynch 2004). Hence, the positivism approach has the effect to the social research into two categories of qualitative research and quantitative research.

Considering the philosophy of research, helps to contribute deep perspective research decisions in order to achieve a deep and thorough understanding of the scenario.

3.1 Scope of the study

This research is designed to demonstrating hospital workflows and identifying operational problems existing in the Thai big public community hospital, the selected of Bangmunnak hospital.

3.2 Research Method Development

In the contemporary world today, process and trends are changing fast which is why it is necessary to keep up with the changing environment. If this change is not adopted, a thorough understanding of the subject would not be possible. The main objective behind conducting a research is to deeply assess the phenomenon.(Williams, 2007). The research methodology has been stated by Kumar (2008) as the approach used by a researcher to conduct a research study. Also, the basic fundamentals in research methods is concern with how the actual data and information will be collected, how it has been done and the effectiveness of data collection for the primary and secondary study (Kothari 2006).

The two common research approaches that can be adopted are qualitative and quantitative research studies. If a researcher needs to explore and analyze a human or social activity on an individual basis then the use of a qualitative research is appropriate. Also this tool is usually chosen in complex situations or inductive focus researches. On the other hand, the quantitative research mainly concern in statistics, the realities, gathering data, analyzing for research more than delving into deep individual feelings (Adcock, Halborg and Ross, 2001).

Keeping aspects what researcher has mentioned in mind, the following research will use the qualitative and quantitative method. The data will be collected keeping

primary and secondary research methods and by specifically using an in-depth interview and analysis will be done accordingly.

3.2.1 Benchmarking

Benchmarking refers to comparing one's current performance against the world leader in any particular area (Compton, 1992). The comparison, according to McCaffer& Harris (2001) may be with similar internal units in the same organization or with external competitors operating in a different industry. The primary objective of benchmarking is to achieve 'best practice' principally by measuring effectiveness against quality of end product or service to the customer, productivity, cost level, safety and delivery time criteria (McCaffer& Harris, 2001).

3.2.2 Sampling Technique

Sampling technique is classified as Probability sampling and Non-probability sampling. With probability sampling, each member of the population has a known non-zero probability of being selected. Probability sampling methods include random sampling, systematic sampling, and stratified sampling. In Non-probability sampling, members are selected from the population in some nonrandom manner. These include convenience sampling, judgment sampling, quota sampling, and snowball sampling. Probability sampling has the benefit as sampling error can be calculated. Sampling error is the degree to which a sample might differ from the population. When inferring to the population, results are reported plus or minus the sampling error. In Non-probability sampling, the degree to which the sample differs from the population remains unknown. (Rodrigues, Stank and Lynch. 2004).

3.2.3 Random Sampling

Random sampling is the purest form of probability sampling. Each member of the population has an equal and known chance of being selected. With large population sizes, identifying every member of the population seems to be impossible and the pool of available subjects becomes biased.

3.2.4 Sample size

Sampling is viewed as the last step in the research method before data is gathered, and is concerned with recognizing objects for sample techniques (Zikmund, 2003). This study has focused on the population of 150 patients. In the data collection process, objectives of this study were explained briefly to the respondents. The survey questions were designed in the questionnaire. With detailed descriptions of the research process, respondents would understand their important role to complete the study.

3.3 Sources of Information

The in-depth interview will be conducted as part of the research since the knowledge that involved in hospital operations management is needed to be analyzed. The study case has been chosen from Bangmunnak Hospital, Phichit, Thailand. Primary and secondary sources will both be used for the data collection.

Secondary data has been defined as that information which is already available in journals or other forms of publications by other researchers (Churchill and Brown 2004). Secondary data can be available in the form of qualitative or quantitative research and is considered as raw data, which needs to be refined. It has been gathered for the purpose of another research and can only provide limited knowledge of the study at hand. It is able to state a few facts or guidelines for the research being conducted (Chisnall 2005). Secondary data requires less time and effort as compared to primary data analysis. However, this data may be out of data or the data may not suit the desired requirements (Holbert and Speece 1993). Which in this research, some of the main sources from secondary are from the following.

1. Library: secondary data mostly used as literature reviews which come from publications that are present in the form of textbooks that widely available at libraries. Academic journal, marketing books, hospitability management journals etc. are some of the publications that the author used.

2. Database: the Internet contains vast information which is easily accessible. Large databases are present that consist of the required information like drink and food market information etc.

Primary data is collected and analyzed according to the specific research project at hand (Kumar 2008). All socioeconomic, demographic, psychological aspects may be covered by using this kind of research. The attitudes, knowledge, opinions, awareness may also be extracted by choosing the right kind of approach in collecting information (ibid). There are five collection methods which can be used. They are focus groups, observations, experiments, survey and behavioral data (Kotler and Kelly 2006). There is another suggestion from Harris (2010) that there are only three methods which can be used which are questionnaires, in-depth and semi-structured interviews and observations. Nonetheless, how many kind of the primary data can be collected, the crucial advantage of it still be the same, which method being applied for the purpose of data collection is important and provides similar data that is required by the research. The collected data also must be up to date in order to be relevant for the purpose of the study. For the purpose of this research, the questionnaire technique will be used.

3.3.1 Interviews

In order to gather firsthand information from the hospital, key informant interviews were used to collect data from the hospital's authorities. In line with this, those who are supposedly knowledgeable about the business process of the hospital and willing to communicate about them were contacted (Kumar, 2008).

3.3.2 Participant Observation

Participant observation began in October-December 2012. The researcher observed the business process by following patients from the OPD (where patient first report) to the Pharmacy (where they collect their medicine) to when they leave the hospital. The use of participation can bring out information that would otherwise be unavailable and through the viewpoint of `insiders' (Yin, 2002). Through daily interactions with key hospital authorities and patients, the researcher was able to obtain, among

other observations, a general understanding of the business process of the hospital. The observable events also helped the researcher to design the questionnaires for the study.

3.3.3 Questionnaire

Data collection began in February 2013. Questionnaires were administered for the collection of the data. Questionnaires are one of the most widely used instruments for collecting data in research. Bryman (2004) suggests that the utilization of questionnaire partly stems from its cheapness and quickness in terms of administration, the absence of the interviewer effect and its convenience for correspondence. This makes the questionnaire an indispensable tool in gathering primary data about people, their behavior, attitudes, opinions and awareness of specific issues.

3.4 Research Procedures

In this research, researcher has divided the research into four key steps. In each step, researcher added more description about the steps is given to understand how researcher works until the work is success.

3.4.1 Scope and choosing the hospital

Researcher has studied and analyzed from textbooks, journals and other researches that related to hospital management concepts and theories of nursing care both domestic and international. The data from the study serves as a basic framework for organizing the use of work in this research. Researcher has contacted Bangmunnak Hospital which is a big sized community hospital with 90 patient's beds and has 268 employees in total at Bangmunnak district, Phichit province, Thailand where have been selected for a case study. Bangmunnak Hospital was ranked in one of the top hospital in Phichit Province with the average number of outpatients of 300 people per day. Bangmunnak Hospital has a strong commitment to contribute the health in the community and provide charity care to people.

3.4.2 Collecting data by interviewing and observing the operation in the hospital to understand workflows and gather other related information.

First, Researcher starts to observe the working process and interview in order to collected data from Bangmunnak hospital's staffs that stay in outpatient department and outpatient medical department. Then, research start timing in seven OPD service stations in Bangmunnak, Tapanhin, and Potalae hostpial which defines Bangmunnak hospital's problems by compare with two nearby hospitals. Finally, researcher designs and distributes 150 questionnaires survey to patients. The aim is to gather information regards to the workflows and operational problems in big public community hospital.

3.4.3 Data analysis and creating a case study for the provision of health services in the future.

After the collection of data from Bangmunnak hospital has finished, researcher analyzed and compiled data from Bangmunnak hospital. Researcher has analyzed and summarized hospital workflows and operational problems from two departments that researcher have visit by using all hospital data that researcher could have found. At the same time, researcher also collected information from various sources such as international journal and books which are related to the research topic in order to support this research.

3.4.4 Research summarized.

Researcher summarized all data in terms of workflows and operational problems in Bangmunnak hospital by gathering and applying all information that obtained from the analysis to provide the recommendation regards to improvement to Bangmunnak hospital in order to create better services to the patient with more efficiency and also writing a report to bring a written case study.

3.5 Data Analysis

The data collected from the questionnaire has been analyzed using the Statistical Package for the Social Sciences (SPSS). The numeric information and descriptive statistics information has been presented in frequencies and percentages. A visual form of information is provided with the help of tables and charts using this software. For the

non-numeric information will be presented along with the results from in-depth interview and observations.

3.5.1 Limitations

1. Some points of view may remain invisible as researcher alone who observe.
2. Lack of co-operation from in collecting the data
3. The answers provided by some of the respondents may be biased since they might have specific desire to help or hurt the reputation of the hospital and this highly influences the purpose of the research.
4. The time management in response to data collection.

3.6 Ethical Considerations

When conducting a research, confidentiality is highly essential. There needs to be trust between the researcher and the respondents which cannot be broken. Cooper and Schindler (2006) state that the responses provided are the actual feelings of the respondents which are why their answers need to remain private and only used for the purpose of the specific research study while doing in-depth interview. The respondents should also remain anonymous so that they are comfortable in answering the questions. They should not be scared about being identified otherwise the answers would be biased. Informed consent may also be important as the researcher needs to have this prior agreement with the respondents in the interview section. The researcher has an ethical duty towards the respondents and within this structure the researcher is bound to inform them about the purpose, scope and nature of the study. The respondents are then allowed to decide whether they would like to participate in the study or would refrain from providing their personal opinions.

3.7 Conclusion

Information has been extracted from books, journals, articles and the Internet for this research. The researcher has made use of the quantitative method in order to manage the research analysis and the positivism theory was applied to enhance the knowledge besides the in-depth interview. The interviews were face-to-face basis in

order to receive fast and timely response. The information gathered through some numeric questions were analyzed using the SPSS software which helped provide a visual of the information in the form of charts and tables. The researcher also kept in mind all ethical considerations to make sure the respondents were comfortable in providing their personal responses and opinions. The confidentiality of the data is a promise to the respondents by the researcher and all the data would be deleted after the required conclusion has been drawn.

CHAPTER 4

ANALYSIS AND RESULTS

4.1 Background and Basis Information

First, researcher starts with the background and basis information regarding on Bangmunnak Hospital. Since it started to operate in 1976, the hospital contains 90 beds and staffs as shown in the following table.

Staffs	2008	2009	2010	2011	2012
Doctors	11	8	8	10	15
Dentists	5	5	5	5	7
Pharmacists	7	6	6	7	10
Registered Nurses	65	79	80	83	91
Technical Nurses	2	3	2	2	2
Public Health Technical Officers	2	2	2	3	2
Medical Technologists	4	4	3	3	3
Medical Scientists	1	1	1	2	2
Radiological Technologists	2	2	2	2	3
Public Health Officers	4	4	4	5	6
Dental Assistants	3	5	4	4	4
Pharmaceutical Assistants	3	5	6	5	5
Rehabilitation Assistants	1	1	1	4	4
Others	76	82	76	117	114
Total	**186**	**207**	**200**	**252**	**268**

Table 4.1: Number of Bangmunnak Hospital's staffs

In 2011, the numbers of staffs have been increasing a lot from 2010 by almost 26% and 6.35% in 2012. The numbers of outpatients are shown in the following table:

Outpatients	2008	2009	2010	2011	2012
Total (people per year)	70,153	73,089	76,053	75,220	78,037.
Average (people per month)	5,846	6,091	6,338	6,268	6,503
Total (visit per year)	101,841	106,671	110,084	109,117	113,994
Average (visit per month)	8,487	8,889	9,174	9,093	9,500

Table 4.2: Number of Outpatient at Bangmunnak Hospital

From the table above, the number of patients have been obviously increasing in 5 years according to the number of staffs have also been increasing too. In order to treat patients with the same quality of services, more staffs to response the services rationally. The average of each people visit was only slightly increased, this may indicate that people come to visit this hospital as usual as before even though the growth in the population was more but according to Department of Provencal Administration Thailand (2012), the statistics in 5 years showed the decline trend of the number of population in Phichit from 554,112 people in (2008) to 549,395 (2012). From this evidence, it could be inferred that people around here come to visit the hospital more often than they used to be.

And the numbers of inpatients are shown in the following table:

Inpatients		2008	2009	2010	2011	2012
Amount	People	5,977	6,562	6,894	6,274	5,992
	Average per month	498	547	575	523	499
Days	Total	21,730	24,802	25,220	25,464	23,155
	Average per month	1,810.83	2,066.83	2,101.67	2,122	1,930
	Days/People	3.64	3.78	3.66	4.06	3.86

Table 4.3: Number of Inpatient at Bangmunnak Hospital

The number of average days that inpatients stay at a time for last two years were higher than 2008 to 2009 but the total number of people and the number of days that inpatients had stayed decreased. It can be shortly said that less people come to stay and each of them stay a bit longer.

And the numbers of beds that are occupied were:

Occupied beds	2008	2009	2010	2011	2012
Percentage	65.97	75.50	76.77	77.52	71.40

Table 4.4: Number of Bed occupied

From this table, it showed that the hospital has no problem regards on the number of beds in the hospital for inpatients. Referring to capacity management in healthcare, with recent number of 15 doctors and 90 bed and Inpatients spent averaged days in bed of 4.06 (maximum). Besides the number of outpatients that doctors need to treat every day, this evidence can be assumed that the number of doctors could be the bottleneck for the system regardless the operating rooms.

By focusing on outpatient department, researcher can simplify the work flow as following:

4.2 OPD Patient Flow

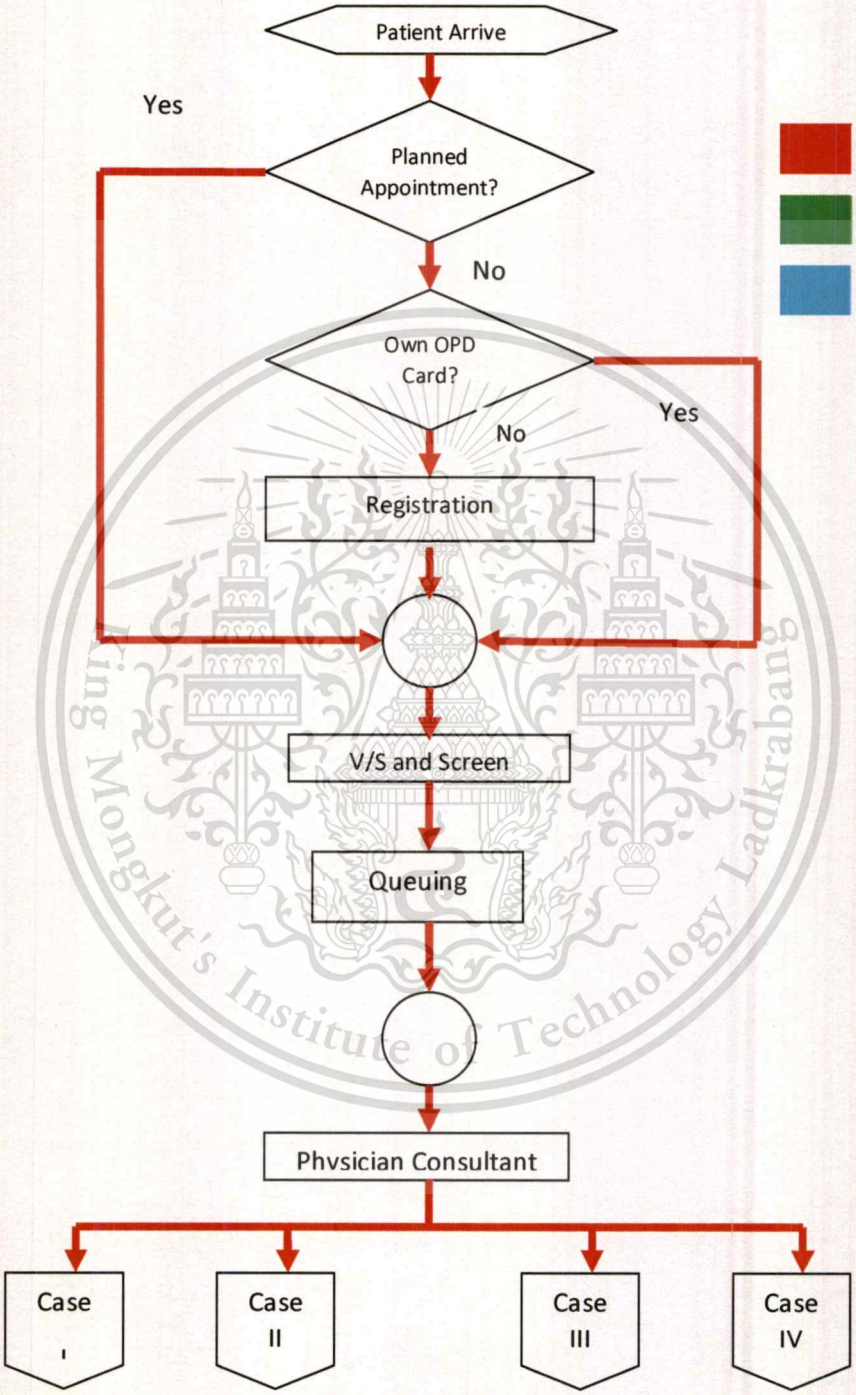

Figure 4.1: OPD Patient Flow

4.2.1 Case I

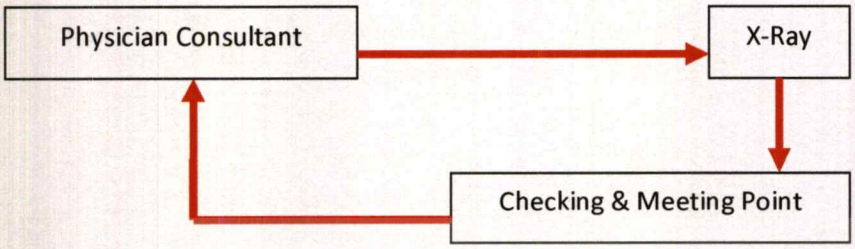

Figure 4.2: Case I Flow

4.2.2 Case II

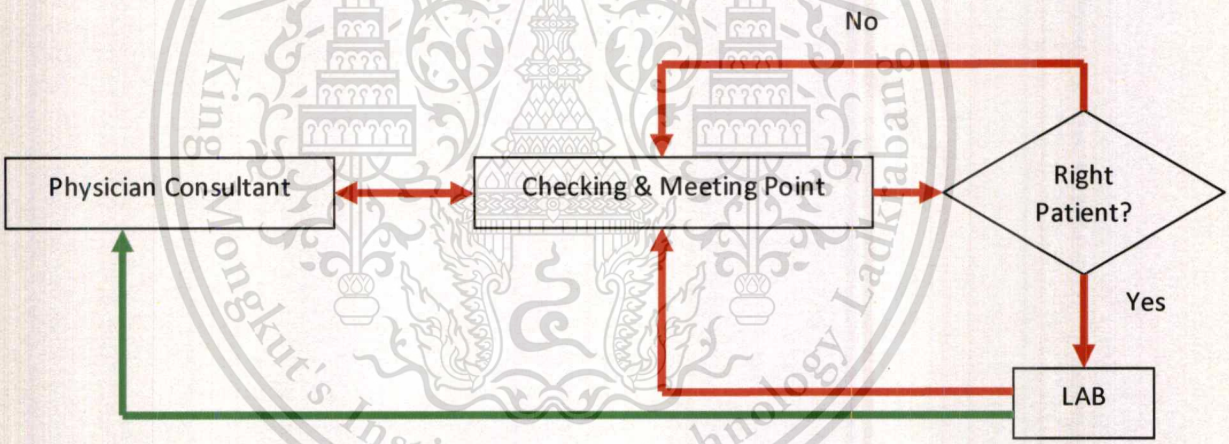

Figure 4.3: Case II Flow

4.2.3 Case III

Figure 4.4: Case III Flow

4.2.4 Case IV

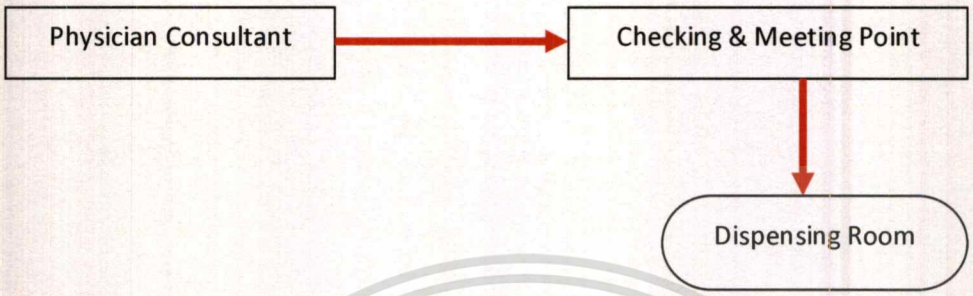

Figure 4.5: Case IV Flow

Outpatient Department or OPD provides primary diagnostic service and treatment for patients to be referred to other specialized departments at a later stage.

The first service point for patients that come in without an appointment is the Medical Record Department by hospital personnel investigate initial patient information, whether new or returning patients, along with inquiring about special privileges in getting treatments such as the Universal Health Care benefits (30 Baht) or Social Security benefits. Bangmunnak Hospital divides registration into two separate locations as followed:

1. A registration location for Social Security patients, either reimbursed at the Social Security Office or patients pay first on their own

2. A registration location for patients using benefits under the Universal Health Care Policy

After registration, hospital personnel will send patients to examination room in order to separate patients at "Virtual Screen" point by collecting background information and assessing patient conditions and seriousness of their illness by measuring their weights, blood pressure, temperature and pulse. If hospital personnel find that a patient has certain conditions that require immediate care, the patient will be

sent to the emergency department instantly. (If the patient has an appointment on that day, they will be skipped to the process of virtual screen immediately within having to wait for searching medical records or OPD card, since patient files have been prepared in advance for the appointment.)

After assessing the urgency of care, the next step is to wait in queue to see a physician in order to get a diagnosis or treatment. The hospital has a medical team consisting of five physicians. Currently, Bangmunnak Hospital has set up a queue system as a 2:1 method. Such method lays a system in which two patients with appointment are called into the examination room, alternating the queue with one patient with a no appointment. Patients are call in to see a physician according to this method until there is no more patient with an appointment. Then, a patient who has no appointment will continue to be called in until the last of them.

For examination, physicians may need to request more prognoses for patients such as:

- Additional X-ray from Radiology Department. The process begins when a physician order an X-ray, a nurse will send the patient to Radiology Department. Once an X-ray is completed and results sent via computer through a CR System. With this method, the patient does not need to carry a film back to the physician and loss or damage to the X-ray film can be avoided.

- Additional testing from the Operation Rooms. A nurse will send the patient to get tested according to the physician's order. Some of the tests include blood, urine or phlegm tests, for example. Once the test is completed, the patient takes the results back to the nurse and return to see the physician for further diagnosis.

Once physicians examine and find that a patient has a serious illness and requires more thorough examination, the patient will be admitted into the hospital for close care and treatment. For patients will non-severe condition where they can

medicate and care for themselves, physicians will prescribe medications and advise them how to behave properly in order to rehabilitate themselves at home. Some patients may be scheduled to come back to see the physicians for follow-up or further treatment.

For the 2:1 queuing system, the researchers find that there was a positive transformation in general where patients who make appointments and come on time can see physicians quickly, reducing the time waited to be examined. Moreover, the system has made the patients realize the importance of attending to doctor's appointments on time. From general observation, the overall operations have improved. If patients do not come according to their doctor's appointment, they must start the whole process again as well. This helps to emphasize the importance of showing up for their appointment and reduce the no show rate of pre-appointed patients.

At the inspection and appointment locations, at least one to two nurses are needed to perform two main tasks: to arrange a queue and separate patients according to the seriousness of their illness. One of these main tasks, arranging a queue, can deploy human resources from other areas to help manage the system the relieve nurses to go perform more important nursing duties to reduce medical personnel shortages.

4.3 OPD Medical Flow

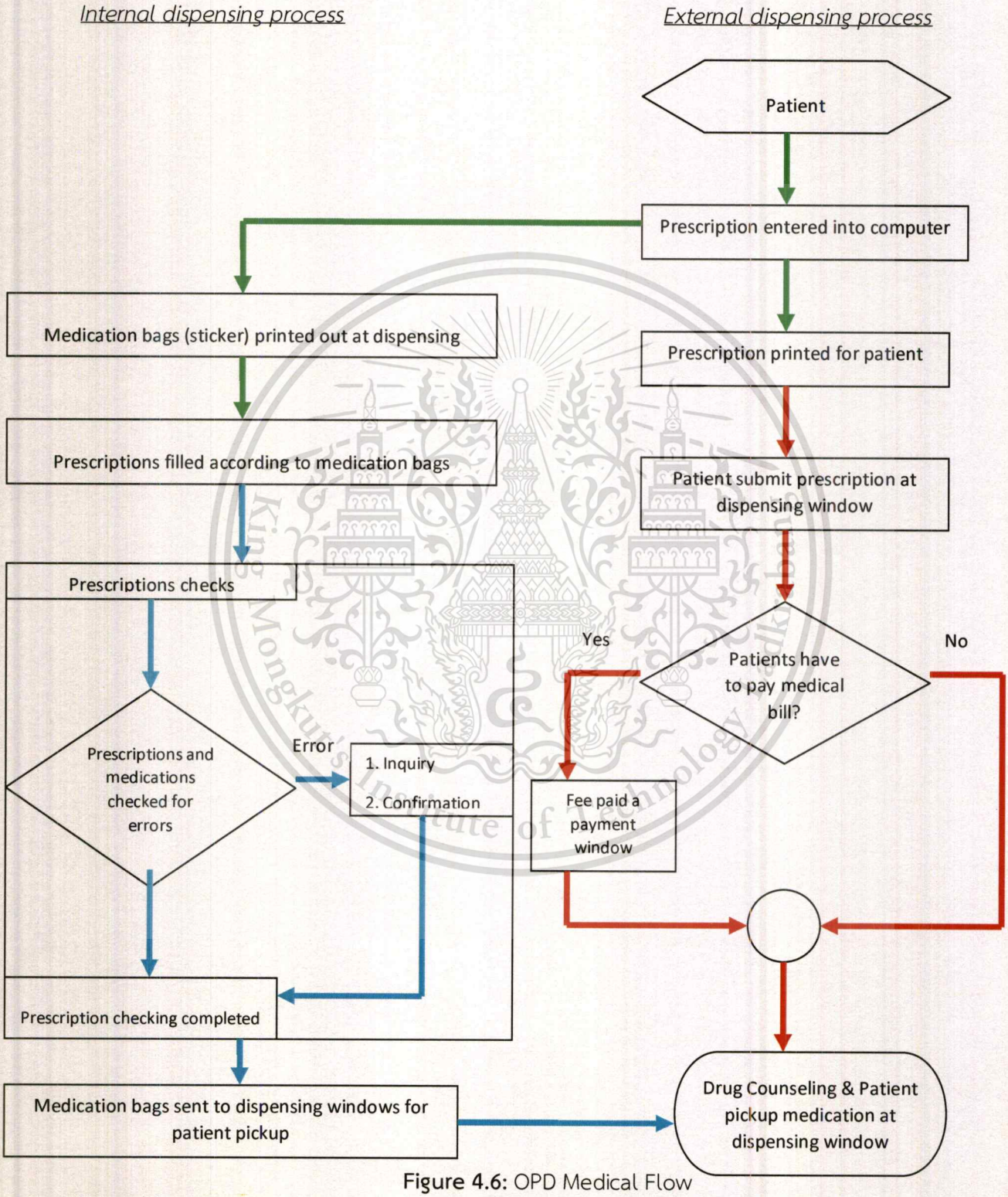

Figure 4.6: OPD Medical Flow

Pharmaceutical Department has a main duty of managing medication depository and allocating medicines to different departments within the hospital, along with prescribing medicines to patients. Bangmunnak Hospital has divided medication room into four separate parts. Part 1 is the main stock with one room. Part 2, a sub-stock, also contains one room. Part 3 and 4 are distribution units that contain two rooms. The main stock has a responsibility of storing all medication in the hospital. All the medication used within the hospital will always pass through the main stock first before being distributed to the sub-stock once per week in order to reduce loss and maintain proper temperature for the best storage conditions. After that, the sub-stock will, in turn, distribute medications to these two distribution units every day. The distribution unit at service points will not store too much medication to prevent problems that may arise from the incorrect use of "First - In, First - Out" storage rule which may waste the medication due to their expirations.

The flow of medication in OPD Department begins with a physician order a treatment through a computer program in the examination room. The order will be sent through a computer-based system to a distribution unit and counter to issue an OPD appointment card for the patient.

When a hospital officer at the distribution unit received the physician's order through the computer system, the officer will print out an adhesive tag to be placed in front of the medication pouch in order for an assistant pharmacist to prepare the medication according to the tagged pouch prior to having a real pharmacist verify the medications for the patients again. Consequently, the pharmacist can prepare the medication faster, reducing the waiting time for patients. Meanwhile at the inspection and meeting points, nurses will print out a prescription and hand it to the patient in order for the patient to show it as evidence to the distribution unit. Nurses provide guidance and necessary advices to the patient, along with making an appointment for follow-up. Then the patient will take the prescription and hand it to the medication distribution unit assigned. Upon receiving the prescription, a pharmacist will compare it with the medication in the tagged pouch to see if the medication is accurate and match

the physician's order. This is a verification measure to make sure that there is no mistake with the medication released to the patient. Once the verification process is completed, the pharmacist will offer advices on how to take the medication prior to sending the patient to Accounting Department to settle the payment.

In the case that the privileges from the Universal Health Care Policy applies or the patient can get reimbursed from his/her original affiliation (patients do not need to pay themselves), the patient can go home directly.

Due to constraint of time in order to analysis the critical path researcher needs actual data of average time in each process to determine the bottleneck for a system and another reason is that outpatient department's work flow was almost a straight line which allowed researcher to approximate from another type of analysis.

The researcher starts to collected the average time per patient in seven service process stations at Bangmunnak hospital and also collected average time per patient in seven service process stations from two nearby hospitals which are Potale Hospital and Taphanhin Hospital in order to benchmark with Bangmunnak Hospital to see current performance against with two nearby hospitals.

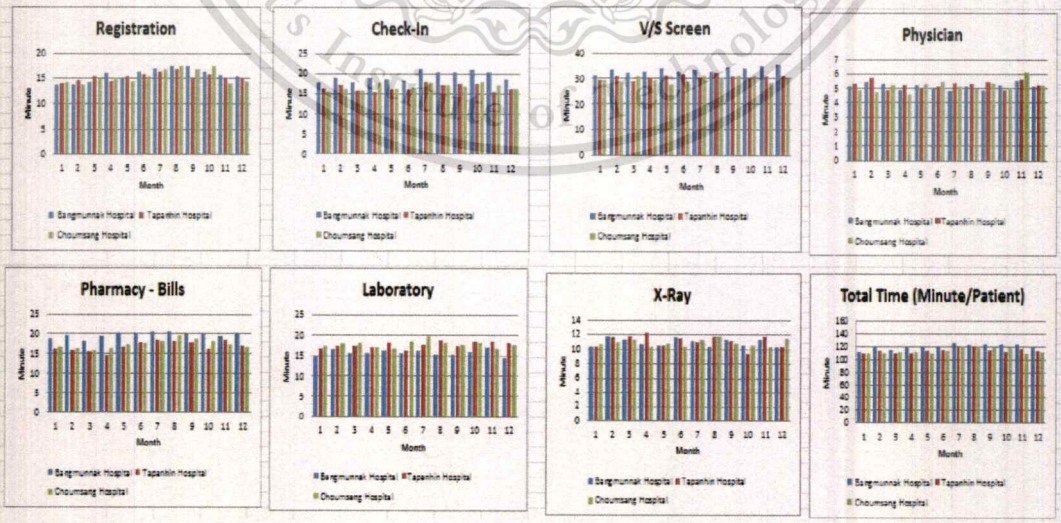

Figure 4.7: Average time per patient at in all service stations

According to Figure 4.8-4.10, the researcher has found out that Bangmunnak Hospital has performed the highest average time per patient in Check-In, V/S Screen, Pharmacy and bills service stations in the past one year which compare with two nearby hospitals as it shown below.

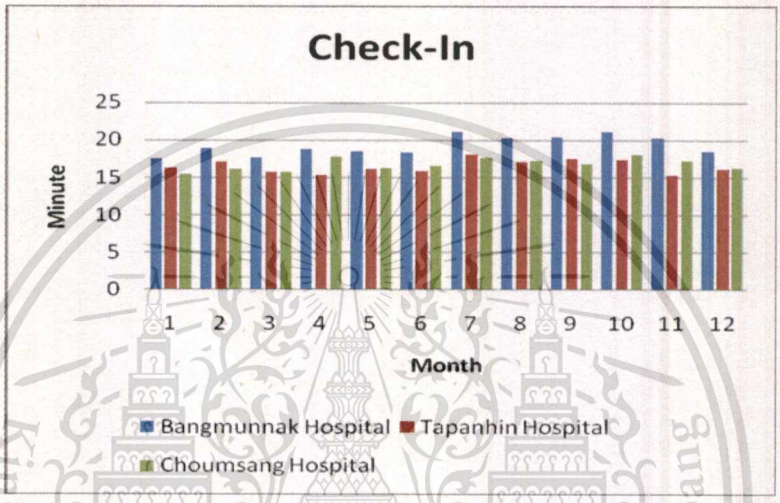

Figure 4.8: The average time per patient in Check-In process station

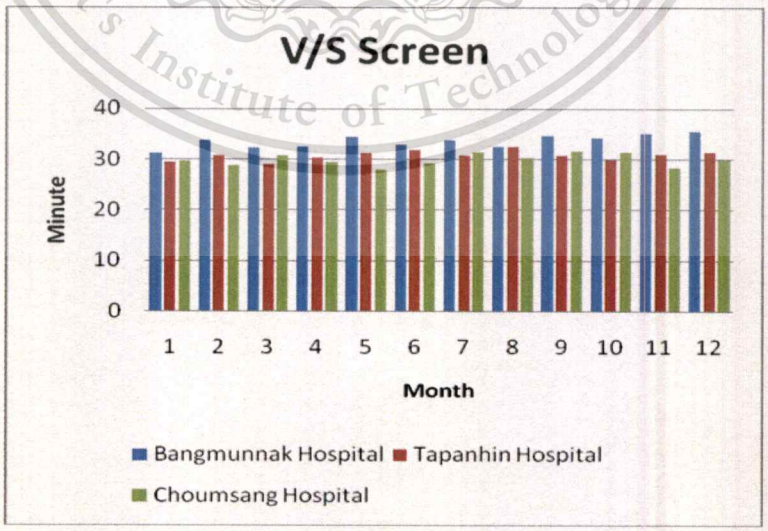

Figure 4.9: The average time per patients in V/S Screen station

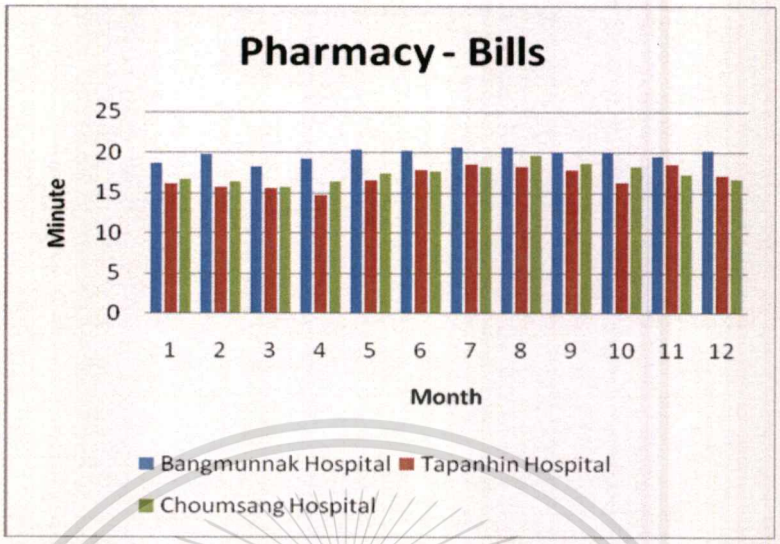

Figure 4.10: The average time per patients in Pharmacy and Bills station

After the researcher found out that Bangmunnak hospital has performed the highest average time per patient in Check-In, V/S Screen, Pharmacy and Bills service stations compare with two nearby hospitals. Therefore, researcher has designed the questionnaire to ask people opinions in service process, staffs, physical evidence perspective for who come to visit in this hospital after they finished regards on their satisfaction with the amount of 150 respondents in 3 parts. The first part was to measure their satisfaction at check in desk, the second point was at the V/S Screen station before they checked in the examination rooms. And the third point was when just before they finished after pharmacy and bills process.

4.4 Bangmunnak Hospital's patient information

The results from questionnaires can be represents in the following table.

Gender	Frequency	Percent
Male	67	44.7
Female	83	55.3
Total	**150**	**100.0**

Table 4.5: A sample of patients at Bangmunnak Hospital, classified by gender

From the table, the result shows that most of respondents were female with the amount of 83 responses (55.3%) and another 67 of respondents were male (44.7%).

Age	Frequency	Percent
15 – 19 year old	15	10.0
20 - 29 year old	23	15.3
30 - 39 year old	27	18.0
40 - 49 year old	48	32.0
50 – 59 year old	32	21.3
60 year old and over	5	3.4
Total	**150**	**100.0**

Table 4.6: A sample of patients at Bangmunnak Hospital, classified by age

From the table, the result shows that age interval of most respondents were 40-49 year old with the amount of 48 responses (32.0%) and only 5 of respondents were 60 year old or over which is the lowest frequency among all age interval (3.4%).

Education background	Frequency	Percent
No Education	2	1.3
Primary School	9	6.0
Secondary School	20	13.3
High School	22	14.7
Vocational Certificate	33	22.0
Vocational Diploma	30	20.0
Bachelor's degree	25	16.7
Master degree and over	9	6.0
Total	**150**	**100.0**

Table 4.7: A sample of patients at Bangmunnak Hospital, classified by education level

From the table, the result shows that the education backgrounds of most respondents were vocational certificate with the amount of 33 responses (22.0%) and 2 of respondents had no education background which got the lowest frequency (1.3%).

Occupation	Frequency	Percent
Government Officer	28	18.7
Private Employee	23	15.3
Self-employed	29	19.3
Farmer	32	21.3
Freelancer	18	12.0
Student	18	12.0
Housewife/Househusband	2	1.4
Total	**150**	**100.0**

Table 4.8: A sample of patients at Bangmunnak Hospital, classified by occupation

From the table, the result shows that the occupations of most respondents were farmer with the amount of 32 responses (21.3%) and 2 of respondents were housewife or househusband which got the lowest frequency (1.4%).

4.5 Bangmunnak Hospital's patient expectations in service stations

And respondents' attitudes toward their satisfaction in each point can be represents as follow.

Check-In	$\bar{X}$	S.D.
Service Process		
1. Signs or procedure information were available	2.85	1.013
2. Actual procedures followed what were on the signs	3.43	1.070
3. First come first served	3.61	1.117
4. Actual time consumed was what on the signs	2.50	1.091
Total	**3.10**	**1.159**
Staffs		
1. Staffs practiced along the declared procedures	3.29	0.980
2. Staffs were ready and fast-service	3.06	1.025
3. Staffs suggested the service procedures and places	2.46	1.053
4. Staffs suited well with their jobs	4.11	0.812
5. Staffs did not discriminate.	3.97	0.794
Total	**3.38**	**1.116**
Physical Evidence		
1. Information on signs were complete	2.38	0.974
2. Equipment were convenience	2.47	1.085
3. Sufficient equipment and facilities	3.58	1.044
4. Comment box or suggestions	3.31	1.024
5. Cleanliness	3.97	0.768
Total	**3.14**	**1.164**

Table 4.9: The levels of patient's satisfaction in Check-In station

From the table, the results of the respondent attitudes toward satisfaction regards on service process were in neutral level in overall with the mean of 3.10 and standard deviation of 1.159. The most response was item no.3 "First come first served" with the mean of 3.61 and standard deviation of 1.117 which was in agree level, and item no.4 "Actual time consumed was what on the signs" was the least response with the mean of 2.50 and standard deviation of 1.091 which was in disagree level.

The results of the respondent attitudes toward satisfaction regards on staffs were in neutral level in overall with the mean of 3.38 and standard deviation of 1.116. The most response was item no.4 "Staffs suited well with their jobs" with the mean of 4.11 and standard deviation of 0.812 which was in agree level, and item no.3 "Staffs suggested the service procedures and places" was the least response with the mean of 2.46 and standard deviation of 1.053 which was in disagree level.

And the results of the respondent attitudes toward satisfaction regards on physical evidence were in neutral level in overall with the mean of 3.14 and standard deviation of 1.164. The most response was item no.5 "Cleanliness" with the mean of 3.97 and standard deviation of 0.768 which was in agree level, and item no.1 "Information on signs were complete" was the least response with the mean of 2.38 and standard deviation of 0.974 which was in disagree level.

V/S Screen	$\bar{X}$	S.D.
Service Process		
1. Signs or procedure information were available	3.05	1.200
2. Actual procedures followed what were on the signs	3.42	0.929
3. First come first served	3.79	0.885
4. Actual time consumed was what on the signs	2.55	0.901
Total	**3.20**	**1.087**
Staffs		
1. Staffs practiced along the declared procedures	3.70	0.896
2. Staffs were ready and fast-service	2.69	1.088
3. Staffs suggested the service procedures and places	2.33	0.953
4. Staffs suited well with their jobs	3.95	0.775
5. Staffs did not discriminate.	4.13	0.757
Total	**3.36**	**1.150**
Physical Evidence		
1. Information on signs were complete	2.45	0.894
2. Equipment were convenience	2.47	0.917
3. Sufficient equipment and facilities	3.63	0.944
4. Comment box or suggestions	3.43	0.951
5. Cleanliness	4.23	0.709
Total	**3.24**	**1.123**

Table 4.10: The levels of patient's satisfaction in V/S Screen station

From the table, the results of the respondent attitudes toward satisfaction regards on service process were in neutral level in overall with the mean of 3.20 and standard deviation of 1.087. The most response was item no.3 "First come first served" with the mean of 3.79 and standard deviation of 0.885 which was in agree level, and item no.4 "Actual time consumed was what on the signs" was the least response with the mean of 2.55 and standard deviation of 0.901 which was in disagree level.

The results of the respondent attitudes toward satisfaction regards on staffs were in neutral level in overall with the mean of 3.36 and standard deviation of 1.150. The most response was item no.5 "Staffs did not discriminate" with the mean of 4.13 and standard deviation of 0.757 which was in agree level, and item no.3 "Staffs suggested the service procedures and places" was the least response with the mean of 2.33 and standard deviation of 0.953 which was in disagree level.

And the results of the respondent attitudes toward satisfaction regards on physical evidence were in neutral level in overall with the mean of 3.24 and standard deviation of 1.123. The most response was item no.5 "Cleanliness" with the mean of 4.23 and standard deviation of 0.709 which was in strongly agree level, and item no.1 "Information on signs were complete" was the least response with the mean of 2.45 and standard deviation of 0.894 which was in disagree level.

Pharmacy and bills	$\bar{X}$	S.D.
Service Process		
1. Signs or procedure information were available	2.85	0.925
2. Actual procedures followed what were on the signs	3.75	0.969
3. First come first served	3.85	0.865
4. Actual time consumed was what on the signs	2.58	1.018
Total	**3.26**	**1.094**
Staffs		
1. Staffs practiced along the declared procedures	3.53	1.066
2. Staffs were ready and fast-service	3.31	1.062
3. Staffs suggested the service procedures and places	2.65	0.942
4. Staffs suited well with their jobs	3.95	0.915
5. Staffs did not discriminate.	3.91	0.867
Total	**3.47**	**1.082**
Physical Evidence		
1. Information on signs were complete	2.84	0.883
2. Equipment were convenience	3.79	1.040
3. Sufficient equipment and facilities	3.82	0.883
4. Comment box or suggestions	3.36	1.089
5. Cleanliness	3.70	0.954
Total	**3.50**	**1.038**

Table 4.11: The levels of patient's satisfaction in Pharmacy and Bills station

From the table, the results of the respondent attitudes toward satisfaction regards on service process were in neutral level in overall with the mean of 3.26 and standard deviation of 1.094. The most response was item no.3 "First come first served" with the mean of 3.85 and standard deviation of 0.865 which was in agree level, and item no.4 "Actual time consumed was what on the signs" was the least response with the mean of 2.58 and standard deviation of 1.018 which was in disagree level.

The results of the respondent attitudes toward satisfaction regards on staffs was in agree level in overall with the mean of 3.47 and standard deviation of 1.082. The most response was item no.5 "Staffs did not discriminate" with the mean of 3.91 and standard deviation of 0.867 which was in agree level, and item no.3 "Staffs suggested the service procedures and places" was the least response with the mean of 2.65 and standard deviation of 0.942 which was in disagree level.

And the results of the respondent attitudes toward satisfaction regards on physical evidence was in agree level in overall with the mean of 3.50 and standard deviation of 1.038. The most response was item no.3 "Sufficient equipment and facilities" with the mean of 3.82 and standard deviation of 0.883 which was in agree level, and item no.1 "Information on signs were complete" was the least response with the mean of 2.84 and standard deviation of 0.883 which was in disagree level.

From the respondent satisfaction observation, researcher found a common agreeableness which is in the service process. Even though in overall their means show no significant difference in data but the lowest mean could be inferred the disadvantages of the hospital. The item no.4 "Actual time consumed was what on the signs" most people disagree on this which lead to the assumption that average spent time in each service process here cannot rely on the data from the signs or the information that this hospital provides which also lead to actual data collection as researcher has mentioned earlier.

Another observation that researcher have found is that on staffs, most respondents showed the evidence that staffs could not properly suggest the service procedures and places in all 3 areas. This problem would lead to analysis job performance for further evaluation which also could be a bottleneck for a system.

4.6 The analysis of the differences in demographic regards on patient's satisfaction

The next part presents the analysis of the differences in demographic regards on their satisfaction in each area.

Station	Gender	N	t-test for Equality of Means		
			t	df	Sig.
Check In	Male	67	0.407	148	0.684
	Female	83			
V/S Screen	Male	67	0.192	148	0.848
	Female	83			
Pharmacy and bills	Male	67	2.483	148	**0.014***
	Female	83			

Table 4.12: The analysis of the differences in gender regards on significance value

According to Lund (2010) stated that if the significance value is less than 0.05 then there are statistically significant differences between groups. Thus, for this part we use the significant value of 0.05 to consider the different perception among these three service stations at Bangmunnak Hospital.

From this information, it showed that there was a significant level at 0.05 differences in gender has different satisfaction in Pharmacy and bills. Researcher can analyze precisely by looking at the overall means in the following table.

Station	Gender	N	Mean	Std. Deviation	Std. Error Mean
Check In	Male	67	3.2239	0.26896	0.03286
	Female	83	3.2065	0.25118	0.02757
V/S Screen	Male	67	3.2783	0.25058	0.03061
	Female	83	3.2702	0.25852	0.02838
Pharmacy and bills	Male	67	**3.4744**	0.21562	0.02634
	Female	83	**3.3769**	0.25640	0.02814

Table 4.13: The analysis of patient's satisfaction regard on significance value

From this table, it showed that at pharmacy and bills process, male were more satisfied than female. By other processes, researcher found no difference in their satisfaction at significant level of 0.05.

Age Interval		Sum of Squares	df	Mean Square	F	Sig.
Check In	Between Groups	0.353	5	0.071	1.057	0.387
	Within Groups	9.607	144	0.067		
	Total	9.959	149			
V/S Screen	Between Groups	0.214	5	0.043	.655	0.658
	Within Groups	9.413	144	0.065		
	Total	9.627	149			
Pharmacy and bill	Between Groups	0.838	5	0.168	3.027	**0.013***
	Within Groups	7.974	144	0.055		
	Total	8.812	149			

Table 4.14: The analysis of variance between age interval and patient's satisfaction

From the analysis of variance between age interval and their satisfaction in each spot. The results also showed only difference between age interval and satisfaction in pharmacy and bill area as the same as gender at significant level 0.05.

Education Background		Sum of Squares	df	Mean Square	F	Sig.
Check In	Between Groups	0.111	7	0.016	0.228	0.978
	Within Groups	9.849	142	0.069		
	Total	9.959	149			
V/S Screen	Between Groups	0.869	7	0.124	2.014	**0.047***
	Within Groups	8.757	142	0.062		
	Total	9.627	149			
Pharmacy and bill	Between Groups	0.302	7	0.043	0.719	0.656
	Within Groups	8.510	142	0.060		
	Total	8.812	149			

Table 4.15: The analysis of variance between education background and patient's satisfaction

From the analysis of variance between education background and their satisfaction in each spot. The results showed only difference between education background and satisfaction in V/S Screen at significant level 0.05.

Occupation		Sum of Squares	df	Mean Square	F	Sig.
Check In	Between Groups	0.248	6	0.041	0.609	0.723
	Within Groups	9.711	143	0.068		
	Total	9.959	149			
V/S Screen	Between Groups	0.069	6	0.012	0.173	0.984
	Within Groups	9.558	143	0.067		
	Total	9.627	149			
Pharmacy and bill	Between Groups	0.122	6	0.020	0.335	0.917
	Within Groups	8.689	143	0.061		
	Total	8.812	149			

Table 4.16: The analysis of variance between occupation and patient's satisfaction

From the analysis of variance between occupation and their satisfaction in each spot. The results showed no difference between occupation and satisfaction in any area at any significant level. From all analysis of variance, research can summarize respondents' satisfaction as follow:

In check in area, there was no any difference in satisfaction in any different demographic background. In waiting areas, there was only difference in satisfaction regards on education background only. In pharmacy and bills, there were differences in satisfaction regards on gender and age interval. And difference in occupation has no different satisfaction in any area.

CHAPTER 5

CONCLUSTION AND RECOMMENDATION

In this chapter researcher summarize the background and basis information regarding on Bangmunnak Hospital. And several analyses based on the background information and the questionnaires.

5.1 Background Information

The number of staffs has been increasing a lot from 2010 by almost 26% (from 200 to 252 people) and 6.35% in 2012 (from 252 to 268 people). For outpatients departments, the number of patients have been obviously increasing in 5 years according to the number of staffs has also been increasing simultaneously. The average of each people visit was only slightly increased but the statistics in 5 years showed the decline trend of the number of population in Phichit, it could be inferred that people around here come to visit the hospital more often than they used to be. For inpatients, the number of average days that inpatients stay at a time for last two years were higher than before but the total number of people and the number of days that inpatients had stayed decreased. It can be simplified that less people come to stay and each of them stayed a bit longer. From numbers that show usage percentage of beds, without reaching 100%, this hospital always have sufficient beds to provide.

From the workflow for outpatients, the processes are quite straight and simple but the analysis have to be conducted meticulously due to constraint of time, in order to analysis the critical path researcher needed actual data of average time in each process to determine the bottleneck for a system. Researcher has designed the questionnaire to speculate roughly in this process which will be mentioned in the next part.

5.2 Questionnaires

5.2.1 Demographic

With 150 respondents regards on the attitudes toward their satisfaction based on the services that hospital provided in 3 spots (check in, v/s screen pharmacy and bills). Most respondents were female with the amount of 83 responses (55.3%) and another 67 of respondents were male (44.7%) who were 40-49 year old with the amount of 48 responses (32.0%) and only 5 of respondents were 60 year old or over which is the lowest frequency among all age interval (3.4%).

The education background of most respondents were vocational certificate with the amount of 33 responses (22.0%) and 2 of respondents had no education background which got the lowest frequency (1.3%) and their occupation of most respondents were farmer with the amount of 32 responses (21.3%) and 2 of respondents were housewife or househusband which got the lowest frequency (1.4%).

5.2.2 Attitudes toward satisfaction in service process

The result of the respondent attitudes toward satisfaction at check in area was in neutral level in overall with the mean of 3.10 and standard deviation of 1.159. The most response was item no.3 "First come first served" with the mean of 3.61 and standard deviation of 1.117 which was in agree level, and item no.4 "Actual time consumed was what on the signs" was the least response with the mean of 2.50 and standard deviation of 1.091 which was in disagree level.

The result of the respondent attitudes toward satisfaction at V/S Screen was in neutral level in overall with the mean of 3.20 and standard deviation of 1.087. The most response was item no.3 "First come first served" with the mean of 3.79 and standard deviation of 0.885 which was in agree level, and item no.4 "Actual time consumed was what on the signs" was the least response with the mean of 2.55 and standard deviation of 0.901 which was in disagree level.

The result of the respondent attitudes toward satisfaction at pharmacy and bills was in neutral level in overall with the mean of 3.26 and standard deviation of 1.094. The most response was item no.3 "First come first served" with the mean of

3.85 and standard deviation of 0.865 which was in agree level, and item no.4 "Actual time consumed was what on the signs" was the least response with the mean of 2.58 and standard deviation of 1.018 which was in disagree level.

5.2.3 **Attitudes toward satisfaction in staffs**

The result of the respondent attitudes toward satisfaction at check in area was in neutral level in overall with the mean of 3.38 and standard deviation of 1.116. The most response was item no.4 "Staffs suited well with their jobs" with the mean of 4.11 and standard deviation of 0.812 which was in agree level, and item no.3 "Staffs suggested the service procedures and places" was the least response with the mean of 2.46 and standard deviation of 1.053 which was in disagree level.

The result of the respondent attitudes toward satisfaction at V/S Screen was in neutral level in overall with the mean of 3.36 and standard deviation of 1.150. The most response was item no.5 "Staffs did not discriminate" with the mean of 4.13 and standard deviation of 0.757 which was in agree level, and item no.3 "Staffs suggested the service procedures and places" was the least response with the mean of 2.33 and standard deviation of 0.953 which was in disagree level.

The results of the respondent attitudes toward satisfaction at pharmacy and bills was in agree level in overall with the mean of 3.47 and standard deviation of 1.082. The most response was item no.5 "Staffs did not discriminate" with the mean of 3.91 and standard deviation of 0.867 which was in agree level, and item no.3 "Staffs suggested the service procedures and places" was the least response with the mean of 2.65 and standard deviation of 0.942 which was in disagree level.

5.2.4 **Attitudes toward satisfaction in physical evidence**

The result of the respondent attitudes toward satisfaction at check in area was in neutral level in overall with the mean of 3.14 and standard deviation of 1.164. The most response was item no.5 "Cleanliness" with the mean of 3.97 and standard deviation of 0.768 which was in agree level, and item no.1 "Information on signs were complete" was the least response with the mean of 2.38 and standard deviation of 0.974 which was in disagree level.

The result of the respondent attitudes toward satisfaction at V/S Screen was in neutral level in overall with the mean of 3.24 and standard deviation of 1.123. The most response was item no.5 "Cleanliness" with the mean of 4.23 and standard deviation of 0.709 which was in strongly agree level, and item no.1 "Information on signs were complete" was the least response with the mean of 2.45 and standard deviation of 0.894 which was in disagree level.

The results of the respondent attitudes toward satisfaction at pharmacy and bills was in agree level in overall with the mean of 3.50 and standard deviation of 1.038. The most response was item no.3 "Sufficient equipment and facilities" with the mean of 3.82 and standard deviation of 0.883 which was in agree level, and item no.1 "Information on signs were complete" was the least response with the mean of 2.84 and standard deviation of 0.883 which was in disagree level.

5.2.5 **Statistical Analyses**

From all analysis of variance, research can summarize respondents' satisfaction as follow. In check in area, there was no any difference in satisfaction in any different demographic background. In V/S screen, there was only difference in satisfaction regards on education background only. In pharmacy and bills, there were differences in satisfaction regards on gender and age interval. And difference in occupation has no different satisfaction in any area.

5.3 Conclusions

Patients attending each hospital are responsible for spreading the good image of the hospital and therefore satisfaction of patients attending the hospital is equally important for hospital management. Various studies about outpatient services have elicited problems like-overcrowding, delay in consultation, proper behavior of the staff etc. the study reveals the average time spent by the patients and also expresses their view towards the hospital and hospital's services in undergoing various procedures. The study throws light on the various services provided by the hospital and the total time consumed on each activity

Firstly, the bottleneck for a system of Bangmunnak hospital depends on number of doctors and staff importantly as the doctors and staff have to treat both inpatients and outpatients who come every day at the approximate average of 300 people. Secondly, the physical evidence such as procedure information signs, public relations staffs are the factors that cause the bottleneck for a system. Lastly, staff performance and skills are also the important role to cause the bottleneck for a system of Bangmunnak hospital.

As the hospital workflow is quite straight, the whole process is depended on each process time consumed and allowed researcher to estimate roughly by using questionnaire. Researcher found that in service process the average of attitudes were not much different. The check in spot had the lowest average which could be inferred that particular services were not as well as the others. For staffs, researcher found that the average of attitudes were also not quite different in 3 parts but it showed that at the pharmacy and bills were higher than other 2 spots which could be noticed that in first 2 spots, the processes may not as good as the third spot. In physical evidence, the pharmacy and bills area showed the most average of attitude toward satisfaction out of other 2 spots obviously.

From the present study, it is concluded that the OPD services form an important component of Hospital service and feed back of patients are vital in quality improvement maximum patients are satisfied with the waiting time in OPD but some are dissatisfied. The overall image of the hospital is enough to build a good image and to attract new patients.

5.4 Recommendations

1. Besides staff management that has to be flexible, staff performance is another raised issue to be considered in order to analyze all processes more precisely.

2. Number of staffs should be increased in the department with large number of patients.

3. Number of Check-In and V/S Screen counters should be increased because during the peak hours it may cause discomfort for patient who may result in the negative image of the hospital in the mind of the patients.

4. Hospital should give separate outpatient feedback form to see what the patient feedback for further improvement.

5. Number of procedure information signs should be increased because the patient can know what to do in order reduce the waiting time.

6. Hospital should provide training course for staff to improve the skills in order to give a better performance and service to patients.

7. Hospital should provide a staff that can help and give the information about service procedure and place to the patient

8. Numbers of counters and staffs in the pharmacy should be increased to avoid long waiting time for the patients.

5.5 Future Direction of the Study

5.5.1 **Opportunities:**

1. The number of sample should be conducted more in order to perceive information that represents the population more accurately.

2. The comparative study can be done between in the region.

3. The study can be done regarding to design impact of OPD on out patients satisfaction.

5.5.2 **Challenges:**

1. There may be problems in getting true responses from the patients as well as from the hospital side.

2. OPD staffs maybe too busy to co-operate with the query procedure.

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APPENDIX

Questionnaire

Dear Sir/Madam,

I, Noppharut Buathong would like to conduct "ANALYSIS OF HOSPITAL OPERATIONS: CASE STUDY OF BANGMUNNAK HOSPITAL" as part of my master degree in Logistics and Supply Chain Management under International College King Mongkut's Institute of Technology Ladkrabang.

Please help us to serve better by completing this questionnaire; we need your frank opinion and the matter will be kept confidential also.

Thank you for your cooperation

Noppharut Buathong

Tick (√) only one answer of each question which you think is most appropriate.

Survey Location: Bangmunnak Hospital, Phichit Province

Date: ..... Month: ..... Year: 2013Time:.....

Day: ○Monday ○Tuesday ○Wednesday ○Thursday ○Friday ○Saturday ○Sunday

Part1. Respondent's Personal Information		
1.1 Gender		
○1) Male	○2) Female	
1.2 Age		
○1) 15 – 19Year Old	○2) 20 – 29Year Old	○3) 30 – 39Year Old
○4) 40 – 49Year Old	○5) 50 – 59Year Old	○6) 60Year Old Above
1.3 Education Background		
○1) No Education	○2) Primary School	○3) Secondary School
○4) High School	○5) Vocational Certificate	○6) Vocational Diploma
○7) Bachelor's Degree	○8) Master Degree and Over	○9) Etc. (Please Specify).....
1.4 Current Occupation		
○1) Government Officer	○2) Private Employee	○3) Self-employed
○4) Farmer	○5) Freelancer	○6) Student
○7) Housewife/Househusband	○8) No Occupation	○9) Etc. (Please Specify).....

Part 2. The satisfaction in service quality					
Satisfaction in Check-In Station	Satisfaction Level				
	Very Satisfied (5)	Satisfied (4)	Neither Satisfied (3)	Dissatisfied (2)	Very Dissatisfied (1)
1.1 Service Process					
1) Signs or procedure information were available					
2) Actual procedures followed what were on the signs					
3) First come first served					
4) Actual time consumed was what on the signs					
1.2 Staffs					
1) Staffs practiced along the declared procedures					
2) Staffs were ready and fast-service					
3) Staffs suggested the service procedures and places					
4) Staffs suited well with their jobs					
5) Staffs did not discriminate					
1.3 Physical Evidence					
1) Information on signs were complete					
2) Equipment were convenience					
3) Sufficient equipment and facilities					
4) Comment box or suggestions					
5) Cleanliness					

Satisfaction in V/S Screen Station	Satisfaction Level				
	Very Satisfied (5)	Satisfied (4)	Neither Satisfied (3)	Dissatisfied (2)	Dissatisfied (1)
2.1 Service Process					
1) Signs or procedure information were available					
2) Actual procedures followed what were on the signs					
3) First come first served					
4) Actual time consumed was what on the signs					
2.2 Staffs					
1) Staffs practiced along the declared procedures					
2) Staffs were ready and fast-service					
3) Staffs suggested the service procedures and places					
4) Staffs suited well with their jobs					
5) Staffs did not discriminate					
2.3 Physical Evidence					
1) Information on signs were complete					
2) Equipment were convenience					
3) Sufficient equipment and facilities					
4) Comment box or suggestions					
5) Cleanliness					

Satisfaction in Pharmacy and bills Station	Satisfaction Level				
	Very Satisfied (5)	Satisfied (4)	Neither Satisfied (3)	Dissatisfied (2)	Dissatisfied (1)
3.1 Service Process					
1) Signs or procedure information were available					
2) Actual procedures followed what were on the signs					
3) First come first served					
4) Actual time consumed was what on the signs					
3.2 Staffs					
1) Staffs practiced along the declared procedures					
2) Staffs were ready and fast-service					
3) Staffs suggested the service procedures and places					
4) Staffs suited well with their jobs					
5) Staffs did not discriminate					
3.3 Physical Evidence					
1) Information on signs were complete					
2) Equipment were convenience					
3) Sufficient equipment and facilities					
4) Comment box or suggestions					
5) Cleanliness					

Any Suggestion for further improvement in three stations.

1. .....

2. .....

3. .....

4. .....

5. .....