

CHAPTER I

INTRODUCTION

Background and Significance

Quality of care

What do people need from health care services? Definitely, they need the salient necessity with the highest quality of care as possible and with affordable expense. What do health care providers aim to provide? Certainly, health care services with satisfactory quality of care and efficient management to control costs are targeted. What do health insurance organizations concern about health care services provided to their beneficiaries? Exceedingly, sufficient quality of care with reasonable expenditure is the primary concern. Therefore, quality of care is one of the major concerns of all these stakeholders in health care system. On the one hand, in general, health care systems with better quality of care will bring about better quality of life of people. Healthier people will normally have need of less health care resources. On the other hand, more spending of health care systems may inevitably need to be invested to intensify quality of health care. Accordingly, efficiency and effectiveness of the systems are required to be contemplated in order to enhance quality care and contain overall costs under limitations of health care resources.

In real-life situations, health care services provided in health care systems can be varied in relation to many influences. Many studies have indicated variations in many aspects of the quality. Payment incentives of health insurance schemes also have had impacts upon the quality. Some evidence has reported that propensity of drug used under capitation payment, which is a fix payment per patient, was lesser than the propensity under fee-for-service payment, which is a payment per unit or item of service (Shireman, et al., 2002, Chaix-couturier, et al., 2000, Shih, 1999, and Hutchinson and Foley, 1999). Clancy and Hilner (1989) have also found the similar trend for diagnostic lab tests. Chaix-couturier, et al. (2002) shown that number of hospital days of patients in capitation scheme was less than in fee-for-service scheme. Yesalis III, et al. (1984) reported more generic substitutes and cost savings in capitation than in fee-for-service schemes. However, Lurie, et al. (1994) found no difference in some health outcomes, for example, general health status physical functioning, and mental health status, in these two schemes.

In addition, some policies of health insurance payers on drug cost containment have had effects on drug utilization. Schneeweiss, et al. (2002) pointed out that reference-based pricing policy for angiotensin-converting enzyme inhibitors, a group of antihypertensive drugs, decreased the utilization of higher-priced cost-shared drugs in this group. Nevertheless, discontinuation of necessary drug use in some low-income patients was observed. Marra, et al. (2005) shown that utilization

of newer antibiotic drugs added in the drug formulary list was increased while the older antibiotic drugs was less prescribed. Changes in kind of antibiotic drug use might associate with changes in drug resistant patterns.

Studies in the situation of Thailand have also shown similar effects. Bryant and Prohmmo (2005) stated that patients under capitation scheme were prescribed less expensive drugs more than fee-for vice patients. Limwattananon S., Limwattananon, and Pannarunothai (2004) and Srisuphan, Sripairoj, and Tangcharoensathien (2004) found that COX2 inhibitors, expensive single-source drugs, were use for fee-for-service patients more than for capitation patient. Limwattananon C, Limwattananon, and Pannarunothai (2004) also found the same preference for inhaled corticosteroids. Tantivess (2002) and Mills, et al. (2000) found that generic substitution policy was applied for social security patients with capitation payment more than non capitation patients. Pitaknetinan, et al. (1999) found that hospitals with larger proportion of capitation patients – for example, social security scheme – tended to use more generic substitute drugs but less antibiotic drugs.

In April 2001, an abruptly momentous change in health care systems, the 30 Baht Policy for every Disease, was introduced into health care system in Thailand to mainly cover low income and uninsured patients. Payment methods of this Policy were capitation based for outpatient care and diagnostic-related group (DRG) based for inpatient care. One year after the policy implementation, an impact on medical ethics was reported by focusing on the morality of medical practitioner which may have a direct effect on quality of medical care (The Sub-Committee of the Medical Council of Thailand, 2002). About a half of the responded physicians had to adapt their medical treatment by trimming down costs of drugs, medical devices, and diagnostic procedures according to the policy of the hospital administrators. The report also indicated that the effects were noticeable in the internal medicine field more than other fields. In addition, the freedom to choose medical treatment procedure was diminished. However, these results were quite immediate consequences so that long term corollary needs to be contemplated.

Moreover, anecdotal evidence from many health care providers also has indicated that their might be different in hospital management and policies on drug use and care among different health insurance schemes when hospitals have to provide care for patients with different financial incentives like the 30-Baht Policy, for example:

1. Hospitals may provide different drug formulary for patients in different health insurance schemes, for example,
 - Use cheaper drug (e.g. generic drug) for capitation patients but more expensive drug (e.g. innovative drug) for fee-for-service patients
2. Hospitals may implement a single list of formulary for every kind of patient but have different restrictions on drug use, for example,
 - Limit expensive drug use with strong restrictions according to the National Essential List of Drug for capitation patients but loose restrictions for fee-for-service patients because this kind of patient can reimburse for every kind of drugs.

3. Hospitals may provide different kind of physicians to take care patients in different health insurance schemes, for example,
 - General practitioner (GP) for capitation patients but specialist for fee-for-service patients that may affect the quality of drug use and care
4. Hospitals may arrange different location to provide care for patients in different health insurance schemes, for example,
 - Separate a special building or clinic to provide care for patients with 30-Baht Policy which is the largest group of patients
5. Hospitals may provide different steps of care for outpatients with chronic disease like diabetic patients in different health insurance schemes, for example,
 - Provide primary care, focus on disease prevention and health promotion, for patients in 30-Baht Policy but secondary care for fee-for-service patients without any primary care for disease screening or life style modifications
6. Hospitals may provide different frequency of lab tests related to drug therapy and disease complication monitoring for patients in different health insurance schemes, for example,
 - Less frequency of lab tests for capitation patients but more frequent for fee-for-service patients that may affect the quality of drug use and care
7. Hospitals may shift costs of drug use from capitation patients to fee-for-service patient, for example,
 - Prescribe more expensive new drug for fee-for-service patients after the 30-Baht policy implementation than before because providers may earn more money without limitation from fee-for-service patients.

However, these potential impacts on the quality of drug use and care may be different from hospital to hospital and from time to time depending on the policy of drug use and care of each provider and each administrator.

Regarding these empirical studies, report and anecdotal evidence, the inconsistency and inequities in quality of health care services have been illustrated in health care systems that people have been taken delivery of. Payment mechanisms of health insurance schemes or health policies have had influence on variation in quality of care. Health care providers have had to adapt their own policies responding to related policies in health care systems in order to survive their organization. Health care professions have had to modify their routine practice. Health care services with different quality have had been provided to patients covered by different health insurance schemes according to the different payment incentives. In point of fact, most of patients have had unequal information, in terms of medical technical knowledge, to the medical profession. Consequently, they may not know what exact intensities of health care quality they obtained and how proper it is. Therefore, it's fair to say that every stakeholder in health care systems should concern about quality of care.

Quality measures in health care systems

Indisputably, one of the most important components of health insurance system is a monitoring mechanism to make sure that people get good quality care. Regarding the different incentives of payment mechanisms among health insurance schemes, quality of care contributed by each scheme may be diverse. It's possible for patients under different health insurance schemes to receive health care services with different quality. On the one hand, in reality, it's impossible for health care systems to provide services with the same uppermost quality of care for patients in every health insurance system with different payment incentives under the limitation of health care resources. On the other hand, optimal acceptable standards of care need to be assured for every patient in every health insurance scheme. Both over and under treatments are detrimental to the quality in health care systems (Ratanawijitrasin, 2005). Thus, the systems need to have measures to control and prevent the negative effects on care quality. Examples of the mechanisms to ensure quality of care in services with different payment incentives are

1. Medical audits

Routine evidence-based utilization reviews to monitor appropriateness of medical diagnostic procedures and treatments provided to patients could be used to identify the quality of care. Information for review may be gathered from medical record, physician's order sheet, prescription, etc.

2. Health care provider accreditation

Health insurance payers or independent organizations may develop standards of health care services and monitor health care providers periodically. The accreditation is needed to implement together with the development of total quality management (TQM) systems and external audits.

3. Patient choices

If patients have an opportunity to decide upon their preferred health facilities, it will be motivation for health care providers to improve their quality of care.

4. Complaint systems

When quality problems occur, channels to receive the grievances against the quality of care with transparency contemplation will be a useful tool to control the quality. However, since medical technology is complex, the burden of proof has to lie on professional specialists not on patients.

Although all these four measures have already been put into practice of health care systems in Thailand, the intensity of accomplishment may not be adequate according to the empirical and anecdotal evidence mentioned previously as a result. The foremost approach to ensure quality of health care service providers to date is hospital accreditation which focuses primarily on broad process of care provided. Other mechanisms dealing with outcome of health care services like medical audits have also been implemented on sampling basis by some health insurance payers. Routine health care resources utilization reviews by each provider have not been established generally among hospitals. Patient choices have also been absolutely allowed for fee-for-service patients. Social security capitation patients have been permitted to change registered providers yearly while the 30 Baht Policy beneficiaries have been permitted to change one after the first year of the policy implementation.

Nevertheless, in some remote areas which have limited hospitals, patients still have had no choices. For complaint systems, normally, patients can feedback quality problems to health insurance payers and health care providers but in some cases patients may not recognize some problems in terms of technical quality in medical treatment they obtained due to the unequal information.

According to the current situation, quality monitoring mechanisms in health care systems in Thailand seems to be insufficient, especially in the aspects of technical quality and efficiency of health care resources use. In addition, outcomes of care are also the important component of quality that patients themselves may have inadequate technical knowledge to judge whether the quality of care is appropriate or not.

For all these reasons about quality of care, studies on impacts of health insurance payments on variation in quality of care are exceedingly necessitated in order to comprehend more information, especially long term effects and outcomes of payment incentives. This kind of feedback information is essential for policy makers to introduce sufficient measures and monitoring mechanisms into health care systems to assure best possible quality of care for patients.

Health insurance schemes: Types and features

One of the main aims of health care policies and services is access, which involves both the clients and the system (Penchansky and Thomas, 1981). Five aspects of access that fit between the patient and the health care system are

1. *Availability*, which is the association between sufficiency volume and types of health care services and resources of providers and health needs of patients
2. *Accessibility*, which is related to easiness of patients to transport to health care settings
3. *Accommodation*, which associates with the ability of patients to accommodate services like appointment systems, hours of operation, walk-in facilities, and telephone services, etc.
4. *Affordability*, which involves with prices of services and provider's insurance and patient's income, ability to pay, and existing health insurance
5. *Acceptability*, which is the relationship between attitudes of patients on and actual characteristics of providers in terms of personal and practice characteristics, and vice versa.

Health insurance systems implemented in each country have many differences in feature of the system, especially payment mechanisms, with one of the main aims of improving the access. Different payment mechanisms come up with differences in amount and flow of money from a third-party health insurance payer and / or a patient to health care provider for health care services. According to Ratanawijitrasin (2005), Normand and Weber (1994) and the WHO Study Group (1993) seven main payment mechanisms were described as follows:

1. *Fee-for-service* is a payment per item or unit of service including individual acts of diagnosis, therapy, medication, and treatment. For this mechanism health care providers can get paid as much as they charge. Normally, this type of payment has incentives to increase propensity of health care resources use and costs of care but may also lead to a higher quality of service.
2. *Capitation* is a fixed payment for each person on a provider list. This mechanism is based on the pooling of risk by the provider. A profit from beneficiaries who never use health services will be shared with an expense of patients who consume exceeded health service resources, for example patients with chronic disease. This mechanism has an enormous positive effect on cost containment by cutting unnecessary costs but may shrink the encouragement to make available of good quality care. To solve this problem, therefore, standards of care for providers should be established and/or the right to change physicians should be permitted to patients.
3. *Case payment* is a payment for a package of services or an episode of care, for example, based on diagnosis-related groups (DRGs), with a single flat rate per case. Potential incentives of this mechanism for providers are to overstate more complicated diagnosis for more reimbursement called “DRG creep”, to submit claims for non-existent cases, to lessen cost per case that may lead to substandard care quality, or to select cases with likely less severity and refer more severe cases to other providers.
4. *Budget* is all-inclusive operating budgets paid in advance during a certain period of time. Budget estimations may be calculated on line-item or global expenditure bases. This payment method has incentives for providers to arrange the budget efficiently in order to contain costs of care that may bring about under treatment with less expensive and less effective care. Problems may be able to solve by a flexible budget relying on actual morbidity, quality control measures, and patient choices of providers.
5. *Daily charge* is a flat-rate charge of care or hospitalization for every treatment per day. Generally, hospitals with higher level of care like university hospital should be higher than hospitals in rural area. This payment method has incentives for providers to increase the number of patient days and to cut costs that may lead to sacrificing quality or enhancing management efficiency.
6. *Salary* is an annual income unrelated to workload or cost of services provided. Lack of staff’s motivation for performance enhancing and maintenance of care quality is a possible potential incentive of this mechanism.
7. *Flat rate (bonus payment)* is a direct payment of an agreed (usually global) fee for a type of service provided. An incentive to provide care with lower investment that may have negative effects on the quality.

Incentives of different payment mechanisms lead to differences in care provided by health care provider as shown in Table 1.1

Table 1.1 Incentives of payment mechanism

Payment mechanism	Unit of service	Main incentives
1. Fee-for-service	Per unit or item of service	<ul style="list-style-type: none"> • Strong incentive to over-provide health care services (physician-induce demand)
2. Capitation	Per person in the list of health care provider	<ul style="list-style-type: none"> • Strong incentive to improve efficiency that may cause providers to sacrifice quality of care (under-provide health care services)
3. Case payment	Per case or episode	<ul style="list-style-type: none"> • Reduce services per case • Increase number of cases • Improve efficiency per case
4. Budget	Per health care provider (line-item or global)	<ul style="list-style-type: none"> • Providers may under-provide health care services
5. Daily charge	Per day	<ul style="list-style-type: none"> • Increase length of stay • Reduce services per day
6. Salary	Per period of work	<ul style="list-style-type: none"> • Poor incentives to improve productivity • Lack of motivation to maintain care quality
7. Flat rate	Per certain investments or specific services	<ul style="list-style-type: none"> • Increase number of cases • Provide care with lower cost

Adapted from: WHO Study Group, 1993.

Health insurance schemes in Thailand

In Thailand, there has been a substantial change in health insurance systems since 2001. The Universal Health Care Coverage Policy (UC) dubbed “30-Baht for Every Disease” was established to increase accessibility to health care for people not covered by any government health insurance scheme. The main payment mechanism of this scheme is capitation. In 1999, before the implementation of this policy, these people were under the following schemes:

1. Medical Welfare Scheme (MWS) which used budget payment from the government, cover uninsured people and people who cannot afford health care expenses, accounted for 32.1% of population in Thailand
2. Health Card Scheme (HCS) which used budget payment from the government plus household voluntary payment of 500 Baht per family per year, cover rural population managed by hospitals under the Ministry of Public Health, accounted for 18.6% of population in Thailand
3. Out-Of Pocket (OOP) which means they paid by themselves, for uninsured and who can afford health care expenses, accounted for 30.1% of population in Thailand.

Besides, other groups of people were under other schemes, for example

1. Civil Servant Medical Benefit Scheme and Scheme for State Enterprise (CSMBS/SE) which use fee-for-service payment from the government, cover government and State Enterprise officers and their dependents, accounted for 8.9% of population in Thailand
2. Compulsory Social Insurance, accounted for 7.1% of population in Thailand
 - 2.1. Social Security Scheme (SSS), which use capitation payment from payroll of employees, employers, and tax from the government, cover private formal sector employee
 - 2.2. Workmen Compensation Scheme (WCS) which use fee-for-service payment from payroll of employees, employers, and tax from the government, cover private formal sector employee for work related illness or injuries
 - 2.3. Traffic Accident Insurance which use fee-for-service payment with schedule price from the insurance premium, cover people with traffic injuries under Traffic Accident Insurance Law
3. Private Health Insurance (PHI) which use fee-for-service payment with ceiling depending on types of benefit package, cover people who can afford the premium, accounted for 1.4% of population in Thailand
4. Other schemes, accounted for 1.7% of population in Thailand

Nowadays, there are five health insurance schemes in Thailand plus out of pocket, which the characteristics of them are shown in Table 1.2.

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Table 1.2 Characteristic of current health insurance and welfare schemes in Thailand

Characteristics	30-Baht Policy ^a	CSMBS / SE ^a	SSS ^a	WCS	PHI	OOP
1. Scheme nature	Social welfare	Fringe benefit	Compulsory	Compulsory	Voluntary	Voluntary
2. Choice of provider	Registered hospital and network for primary care services	Free choice	Registered hospital and network	Free choice	Free choice	Free choice
3. Source of funds	General tax	General tax	Employer, payroll, general tax	Employer	Household	Household
4. Financing body	National Health Security Office	The Ministry of Finance	Social Security Office	Social Security Office	Private insurance company	-
5. Payment mechanism	Capitation for OPD and DRG with global budget for IPD	Fee for service	Capitation	Fee for service	Fee for service	Fee for service
6. Copayment	30 baht	-	-	-	-	-
7. Drug benefit coverage ^b (by the letter of the rules)	ED + Anti HIV drugs (for prevention of HIV transmission from mother to child)	ED + Non-ED with physician's approval	ED	ED	No limit	No limit
8. Drug benefit with no coverage ^b (by the letter of the rules)	Anti HIV drugs for other purposes	Beyond Non-ED list without physician's approval	Beyond ceiling	Beyond ceiling	Beyond ceiling	All

Adapted from: Tangcharoensathien, Srithamrongsawat, and Pitayarangsarit, 2002

Note: ED = National Essential List of Drug

Non-ED = Non-National Essential List of Drug

^a = Major health insurance schemes in Thailand since 2001

^b Normally, coverage of drug benefit by each scheme may be changed over time. The items shown in the Table were stated during 2001-2002.

In the three major health insurance schemes which cover the largest portion of Thai citizens, the Government has attempted to expand the 30-Baht Policy to cover more and more Thai citizens. According to the e-Register Report of the National Health Security Office (NHSO) in February 2006, the 30-Baht Policy covered around three fourth of Thai citizens (76%). The rest were covered by the SSS (14%), the CSMBS/SE (6%), and the others and more than one scheme (4%). The Government also has a plan and a strong endeavor to consolidate all three schemes in the near future.

The 30-Baht Policy implementation

“Universal Coverage of Health Insurance Development” was a process to build up a health insurance system that everyone can access to health care to meet health need (The Secretariat Office, Ministry of Public Health, 2001). The government started the implementation of this policy by name of the 30-Baht Policy for every disease that was instigated mostly in the government hospitals, 6 pilot hospitals in April, 2001 at the beginning and was incorporated nearly all of the government hospitals and a few private hospitals in 2002. At the beginning of the policy implementation, budget allocated from the government to the Ministry of Public Health (MOPH) and then to the provincial administrative agency was 1,202.40 Baht per capita per year (The Ministry of Public Health, 2001). After the establishment of the National Health Security Office (NHSO), the budget has been managed by the NHSO instead of the MOPH. Payment methods of this policy were on capitation basis for outpatient services and on case payment (DRG) basis for inpatient services.

Framework of Assessment of Quality of care

Aspects of Quality of care

In general, definitions of “quality of care” are incredibly varied from study to study relying on different aspects, perceptions, levels, scopes, and other points. Donabedian (1988) defined the scope of quality of care to be assessed as two components:

- 1) *technical performance* which is judgments on technical quality contingent on the existing of best knowledge and technology and future expectations
- 2) *interpersonal management* which is information communications between patients and practitioners.

Three components of the quality were classified for assessments:

- 1) *structure* that indicate features of health care resources, for example, professionals, facilities, equipments, methods of reimbursement
- 2) *process* that involved actual activities of patients in care seeking and of practitioners in diagnosis and treatment
- 3) *outcome* that was the consequences of care on health status of patients and populations. A relationship of these three elements was that good structure was likely to bring about good process and good process was likely to initiate good outcome as a result. However, the relationship between structure and process was fairly weak and the relationship between interpersonal process and outcome of care was not assessed extensively. Outcome was not easy to

assess due to influences of multitude factors, for example, differences in case mix.

Campbell, Roland, and Buetow (2000) defined quality of care for individual patient as two dimensions and the components of structure, process, and outcome:

- 1) *Accessibility* – the ability of patients to access and involved
 - Health care system (structure) consisting of geographic/physical access, affordability, and availability
 - Patient-centered care (process) consisting of affordability and availability
 - Consequences of care (outcome) consisting of health status and user evaluation
- 2) *Effectiveness* – related to effectiveness of care that patients access and involved
 - Patient-centered care (process) consisting of effectiveness of clinical care and effectiveness of inter-personal care
 - Consequences of care (outcome) consisting of health status and user evaluation

In addition, quality of care for populations pondered two more components as follow:

- 1) *Equity*
- 2) *Efficiency* –referred to efficient use of health care resources to attain greatest benefit of desired outcome concerning
 - Allocative efficiency focusing on procedures which produce maximum benefit
 - Technical efficiency employing procedures in the most technically component manner

Brook, McGlynn, and Shekelle (2000) suggested measures to assess quality of care that evaluation of structure component was not a good indicator for quality assessment due to weak, inconsistent, and paradoxical association between structure and process components. Although the outcome component was a good indicator to assess impact of policies on the end result of health care, it was a weak indicator for the quality assessment owing to various confounding factors, for example, natural history of the disease, patient physiologic reserve, or patient age and owing to the delay in changes. The process component seemed to be a practical indicator to assess the quality of care in most of medical conditions, except the conditions that changes in process and outcome took about the same length of time or the process had an influence on the outcome predictors.

Furthermore, Rubin, Pronovost, and Diette (2001) suggested that process measures were able to indicate the precise and direct ways for providers to improve quality of care they provided and were able to incorporate into routine clinical care process using electronic medical records. Pros and cons of process and outcome measures were also compared as shown in Table 1.3

Table 1.3 Advantages and disadvantages: comparison of process and outcome measures

	Process measures	Outcome measures
Resources		
– Updating and maintenance of measures	Required for guidelines, review criteria, instrument and software for advance treatment	Required for known risk factors and models but less often
– Development of risk adjustment models and collection of data	Do not required for most measures but required good definition of eligible patients	Difficult risk adjustment and required models for each outcome
– Time needed for measurement	Required less time, smaller sample, and less observation time for process occurring	Required larger sample and long period of observation such as five- or ten-year survival
– Size of population for measurement	Required smaller sample size, especially in defined eligible patients	Required larger sample size for comparison among providers and treatments
– Additional follow-up tracking of patients for later data collection	When clinical process is occurring	Required follow-up for short- and long-term outcomes when routine data collection not occurring
– Use of routinely collected data	Potential to use routine clinical and administrative data	Often required collection of data element not included in the routine record
– Advanced statistical consultation for development of measures and analysis of data	Not required in general May be required in longitudinal analysis	Required for risk adjustment model

Table 1.3 Advantages and disadvantages: comparison of process and outcome measures (continued)

	Process measures	Outcome measures
Validity		
– Patient concerns	Often inaccessible, especially for the significant of a specific component of care	Generic outcomes of survival, health and well-being but specific and proxy outcomes
– Providers concerns	Face validity with providers and direct related to provider's process	Many influences of confounders, required risk adjustment models
Ease of use		
– Ease of specification and identification of population at risk	Difficult to specify population eligible, need obvious inclusion and exclusion	Easy to define population Many outcome are generic and practical to be compared across several conditions
– Creation of valid summary measures	Difficult to summarize due to rarely comprehensive	Many important outcome measures are global and generic and practical to compare across conditions and processes (i.e. survival, health well-being)
– Interpretability of feedback for quality improvement	Clear and interpretable feedback for quality improvement of providers Easy to benchmark	Most measures cannot be used to feedback to providers for direct actions to improve quality Required benchmarking among groups Difficult to understand adjusted outcome

Adapted from Rubin, Pronovost, and Diette (2001)

Therefore, in this study, a framework of quality of care for populations was pondered focusing on the process components. The major part of the study concentrated on the assessment of equity of patients covered by different health insurance schemes on drug use and care process, in terms of necessitating laboratory

tests and physical examinations, and effectiveness of clinical care process compared to the clinical practice guidelines. However, some structure components were also examined to link with the process part. Information on management and policies on drug use and care process of the studied hospitals was included in this studied to understand differences in some structures of care.

Choices of tracer

To assess quality of care for all of the medical conditions may be impractical by reasons of time and budget limitations and futile redundant information obtained. The effective and efficient way to study the quality of care is to use an appropriate choice of tracer that represented the prime characteristics of the care quality in health care settings. In this study, diabetes mellitus was the medical condition of choice to be investigated in order to understand impacts of health insurance schemes on patterns of drug use and care for many reasons.

Firstly, the rationale for using this disease is that diabetes mellitus is a chronic metabolic disease involved with plenty of complications of numerous body systems, for example, cataracts, retinopathy, neuropathy, and nephropathy (American Diabetes Association, 2004). In addition, a large number of diabetes patients may have concomitant diseases or conditions, for example, hypertension and hyperlipidemia. Goals of treatment in diabetic patients are to control hyperglycemia and other co-morbidity conditions such as hypertension and hyperlipidemia in order to prevent complications of these conditions as much as possible. Normally, the essential remedies for these conditions are diet control, exercise, and drug use. When the diet and exercise measures are unsatisfactory, drug use will play a major role in those patients. Once patients are obliged to use the medicine, most of them have to take it regularly for the rest of their lives, as a typical characteristic of the chronic disease. A variety of drugs are commonly used in diabetic patients, including hypoglycemic, antihypertensive, and antihyperlipidemic drugs. Expenditures of these drugs are quite a substantial burden of hospitals.

Secondly, most of hospitals have to take care of a large number of diabetic patients. The estimated national prevalence of diabetic patients in Thai adults, aged more than 35, was 9.6%, about 2.4 million people in 2000 (Aekplakorn, et al., 2003). Appropriate drug use and other investigation procedure for diabetic patients will be able to induce considerable improvements in costs and clinical outcomes of treatment (Rubin, Dietrich, and Hawk, 1998). Satisfactory glycemic and co-morbidity conditions control will certainly curtail the financial burden of hospitals and patients by avoiding preventable complications. Without appropriate treatments, diabetic patients may develop complications which normally need high cost therapy, especially end-stage renal disease.

Lastly, the major processes of diabetic care can be measured objectively such as types, amounts, and costs of prescription drug. In addition, the diabetic care processes in terms of required laboratory tests such as glycosylated hemoglobin (HbA_{1C}) test, and physical examination such as dilated eye examination and foot examination are also important monitoring methods of effects of diabetic

care and disease complications. Frequencies of them can be determined objectively as well.

In addition, in order to elucidate the picture of quality of care in the aspect of patterns of drug use and care process, outpatients is an apposite choice of study because costs of drugs, laboratory tests, and physical examinations are the crucial proportion of health care resources use.

Sources of data for assessment of quality of care

Data from a variety of sources is practical to use for quality assessments, for example, data from claims form, medical record, patient surveys, direct observation of patients, etc. (Brook, McGlynn, and Shekelle, 2000). Claims data is useful to assess care precisely provided to patients while medical record data is valuable to ascertain a variation of the quality in individual patient level because it encompasses all pertinent clinical data of patients. Data from patient surveys is suitable to understand health care services in patient's perception. Direct observation is advantageous to realize behavior of patients. Although medical record data seems to be beneficial for assessments of process of care, the problems of incompleteness and inaccuracy of the documents are significant (Donabedian, 1988).

Possibilities for using electronic drug dispensing database as a tool to evaluate variation in drug use were described by Limwattananon, Limwattananon, and Pannarunothai (2003). Classifications and costs of drug used for outpatient visits and inpatient admissions with different health care financing schemes were analyzed by using this kind of itemized drug dispensing data source. In addition, the analysis results could be compared drug use across hospitals. Nevertheless, standard data sets for drug use and reference drug code were recommended to be defined to facilitate linkage of drug use data among health care settings.

To comprehend quality of diabetic care in this study, four sources of data were included. The first data source was electronic prescription data from the computer database of hospitals that was the main source of data using to facilitate the long term time series analysis. The second data source was medical record data that contained physicians' orders for laboratory tests and physical examinations. The third data source was health care professional interviews that denoted reasons behind the prescribing behavior. The last data source was administrative documents such as policy on drug use recorded in minutes of the Pharmacy and Therapeutic Committees (PTC) of hospitals that supported some explanations of the first part.

Health insurance schemes and payment mechanisms

Public hospitals have responsibility for taking care of patients with many different health insurance schemes. Each scheme has different features and incentives including payment methods. From the view point of hospitals, efficient utilization of resources under the limited budgets is very important to sustain their organization. A variety of health insurance schemes have been implemented in public

hospitals. Before an implementation of the 30-Baht Policy, four major types of insurance schemes and payments for most of the outpatients in public hospitals were

1. CSMBS/SE, PHI, and uninsured patients with fee-for-service payment
2. SSS patients with capitation payment
3. MWS, for low income patients, with government budget payment
4. HCS with government subsidization and household voluntary payment of 500 baht per family per year.

After the implementation, three main types of the schemes and payments have been

1. CSMBS/SE, PHI, and uninsured patients with fee-for-service payment
2. SSS patients with capitation payment
3. 30-Baht patients with capitation payment for outpatients and DRGs with global budget.

According to the implementation of the 30-Baht Policy, patients covered by MWS and other uninsured patients have been included in this project to meet a target of increasing accessibility and equally entitlement of Thai citizens to quality health care based on health needs and notwithstanding different socio-economics status (Jongudomsuk and Tangcharoensathien, eds., 2004). In practice, all of MWS and HCS patients and other patients not covered by any government health insurances like CSMBS/SE and SSS patients have been insured by this scheme. Therefore, this study compares four main groups of payment incentives of health insurance schemes as follows:

1. **Group I (GB)** was a combination of MWS and HCS patients, with mainly payments of government budget. Since 1996, the budget payments of MWS for services expenditure allocated from the MOPH to hospitals had been calculated mainly from expenditure of the previous year, number of population, and number of patients of each hospital (Pannarunothai, 2002). A year later, the calculation had been based on number of the eligibility and weighted number of outpatients and inpatients. As for HCS, since 1999 the government had subsidized 1,000 baht per card per year whereas cardholders had paid 500 baht per card per year (Srithamrongsawat, 2002). However, other expenses of hospitals such as overheads and capital expenditure had been allocated by the MOPH. Normally, budget payment mechanism has incentives to increase efficiency of health care resource use in order to contain costs of care and to under-provide health care services that may risk poor quality of care provided.
2. **Group II (CAP:30B)** was a group of patients under the 30-Baht Policy, with capitation payments for outpatients. In practice, almost all of MWS and HCS patients in **Group I (GB)** together with some other uninsured persons who paid out-of-pocket before the 30-Baht Policy implementation and not included in **Group III (FFS)** and **Group IV (SSS)** after the implementation became the 30-Baht patients. Similar to budget payment mechanism, capitation also has incentives to increase efficiency of health care resource use but risk under treatment. In the time series data analysis of this study, patients in **Group I (GB)** were thus combined with patients in **Group II (CAP:30B)** for comparison with patients in other groups.

However, differences between patterns of drug use and care between patients in **Group I (GB)** and **Group II (CAP:30B)** were identified in the comparison of this combined group before and after the 30-Baht Policy implementation.

3. **Group III (CAP:SSS)** was a group of capitation patients under the social security scheme with similar clarifications before and after the 30-Baht Policy implementation. In general, payment incentives of this capitation mechanism are comparable to **Group II (CAP:30B)**, but payment rates and allocations of funds to hospitals may be different. Therefore, this capitation for SSS patients was examined separately from the capitation for the 30-Baht patients in order to distinguish payment incentives between these two schemes. In addition, the descriptions of SSS patients before and after the 30-Baht Policy implementation were not altered.
4. **Group IV (FFS)** was a combination of patients who paid fee-for-service directly for all service items to hospitals including both with reimbursement from the government, i.e. CSMBS/SE, and without reimbursement from the government, i.e. PHI patients and uninsured patients with out-of-pocket payment. This mechanism has incentives to over-provide health care services that may make it possible for reducing threat to quality of care provided while reducing efficiency of health care resource use. The descriptions of patients in this group before and after the 30-Baht Policy implementation were identical.

Hospital management and policies on drug use and care process

In order for hospitals to manage their finances from a mixture of patients covered by various health insurance payers, hospital management and policies on resources use have normally been developed. Normally, each hospital has individual strategies to run its organization depending on its financial situation and hospital administrator's vision. Different managing approaches may bring about differences in health care quality. In particular, after the 30-Baht Policy implementation, the significant changes in payment methods for health care services, hospitals have had to adapt their own management strategies in order to handle this reform. Consequently, improvements on efficiencies of hospitals' operations, especially on health care resources use, with the aim of cost containment have been the major concern.

On the one hand, hospital may have a policy or management to minimize drug use and care process with the intention to contain costs of diabetic care in patients under the capitation scheme. Normally, there is no incentive to cut costs in patients under the fee-for-service scheme or the uninsured with out-of-pocket payment because hospitals can generate their income from drug, laboratory test, or special physical examination prescribed. On the other hand, if hospitals diminish too much cost of care, patients may have potential risk of poor diabetic control that may develop more complications. More resources may be required to cope with the additional diseases, especially for end stage renal disease (ESRD) which consumes dialysis procedure, one of the highest cost diseases. In order to balance the annual income and expenses efficiently, each hospital responds to various payment

incentives differently from scheme to scheme and from hospital to hospital depending on its financial situation and management.

Perceptions and concerns of physicians on financial problems of hospitals and impacts of the 30-Baht Policy implementation

In addition to hospital management and policies on drug use and care process for diabetic patients, physicians concerns of financial problems of hospitals and impacts of the 30-Baht Policy implementation may have a direct effect on prescribing patterns and requesting of laboratory tests and physical examinations as well. The Sub-Committee of the Medical Council of Thailand (2002) reported that 59.6% of surveyed physicians, working in hospitals with the 30-Baht Policy, revealed their hospital administrator's policy on containing costs of drugs and medical supplies while only 52.9% of the physicians complied with the policy. Most of them had concern for survival of their hospitals. Moreover, 47.8% of the surveyed physicians never varied their method of treatments whereas 39.0% of them had to alter the treatments with drawbacks to quality of care. Regarding obstacles on operation of the 30-Baht Policy, increasing burden of a rise in number of patients, problems in administrative systems, and financial problems were major concerns.

It seemed that physicians themselves also had their own perceptions and concerns on financial problems of hospitals and impacts of the 30-Baht Policy implementation that might directly influence their medical practices, apart from hospital management and policy did. According to the report of the Sub-Committee mentioned, the potential perceptions and concerns of physicians that might be influential in patterns of drug use and care process were increases in number of patients and financial problems of the hospitals.

In general, to justify the appropriateness of human resources and financial viability for individual hospital operation, it needs actual information of number of patients, budget allocations, and other pertinent factors. Nevertheless, in practice, not all of the clinicians who take care of patients in the hospitals will realize these administrative perspectives. Consequently, whatever they perceive or concern may have a potential to impart direct effects on their prescribing behavior, although the perceptions and concerns were very subjective. Therefore, these perspectives of physicians were also considered in this study.

Study designs

To gain a thorough understanding of distinguishing characteristics of health insurance payment incentives on quality of diabetic care, multiple methodological techniques of both qualitative and quantitative methods have an advantage over a single approach (Khunti, 1999). With the intention of scrupulous research, this study was divided into three part parts: health care professional interviews and document reviews, dispensing database analysis, and medical record reviews. A qualitative study design was exploited for the first part and quantitative designs for the last two parts.

Part I Health care professional interviews and document reviews

This part of the study aimed at accomplishing of two components that may have effects on patterns of drug use and care process imparted to patients:

1) hospital management and policies on drug use and care process and 2) perceptions and concerns of health care professionals, especially prescribers, on financial problems of hospitals and impacts of the 30-Baht Policy implementation. The potential impacts of the two components are described as follows:

1. Hospital management and policies on drug use and care process

Possible hospital management and policies on resources use responding to the budget constraint of each payment of health insurance schemes may involve drug use, laboratory test and physical exam prescribed, and type of physicians assigned to take care of diabetic patients. For example, some hospitals have a policy to provide more original drugs to fee-for-service patients who can reimburse most of the expenditure from the government. Whereas more generic or therapeutic substituted drugs policies have been implemented to capitation patients whose costs of care seem to be an expenditure of hospitals.

Accordingly, this part of the study was aimed to ascertain the management and policies on drug use and care process of the studied hospitals to make sense of potential dilemma about health care qualities. The information was collected from health care professional interviews and reviews of pertinent administrative documents relating to policies on drug use and certain laboratory tests and physical examinations.

In fact, this part of study seemed to make better sense to interview the hospital directors, who were precisely responsible for the management and policies, than the physicians, who applied these rules. However, perspectives of the directors were represented by documents involving management and policies of the hospitals and perspectives of the physicians had more direct effects on patterns of drug use and care process. Therefore, this part of the study carried out both document reviews and health care professional interviews. In addition, undocumented management and policies were also revealed in the interviews.

2. Perceptions and concerns of physicians on financial problems of hospitals and impacts of the 30-Baht Policy implementation.

This part of study included interviews with physicians to understand their perceptions and concerns on financial problems of hospitals and impacts of the 30-Baht Policy implementation. Burdens of the expansion in number of patients and number of visits of patients and financial burdens of the hospitals that might have an influence on drug use and care process were focused attention on.

Part II Dispensing database analysis

This part of the study involved two components: 1) effects of payment incentives of health insurance schemes on patterns of drug use and 2) dynamic changes in number of patients before and after the 30-Baht Policy implementation.

1. Effects of payment incentives of health insurance schemes on patterns of drug use before and after the 30-Baht Policy implementation

Typically, to understand impacts of an intervention, longitudinal studies have an advantage over cross-sectional studies because of the strength to determine on-going changes over time (Babbie, 2002). In addition, a time-series design is a kind of longitudinal study that has an immense advantage over a design of two point of time studied before and after an intervention in terms of portraying dynamics of change over time. Although findings from the two point of time study can also describe effects of an intervention, findings of dynamics of change from the time series study can elaborate more specific details to comprehend more explanation behind the changes. Accordingly, a design of quasi-experimental interrupted time-series studies is a useful longitudinal method to ascertain continuous consequences of some events or interventions (Cook and Campbell, 1979, McDowall, et al., 1980, and SPSS, Inc., 1999).

Examples of the social science disciplines that employ a great deal of this technique are of political sciences, economics, sociology, history, and psychology and education. This approach is also very useful to analyze intervention effects, especially in the field of quality of medication use and/or cost containment and drug benefit policy evaluations (Wagner, et al., 2002 and Schneeweiss, Maclure, et al., 2002, and Schneeweiss, et al., 2001). Some studies on impacts of interventions on antibiotic drug use, for instance, antibiotic guidelines implementation and academic detailing, formulary policy on antimicrobial drug utilization, educational intervention, and reference-based pricing policy have been succeeded by using this study design (Mol, et al., 2005, Marra, et al., 2004, Pérez, et al., 2003, and Schneeweiss, et al., 2002, respectively).

Regarding the statistical procedure, segmented regression analysis is a useful method to identify influential factors on patterns of drug use, for example, payment incentives of health insurance schemes and the 30-Baht Policy implementation. In other countries, segmented regression analysis has been applied in studies on drug use and policy intervention, for example, Mol et al. (2005), Ansari et al. (2003), and Wagner et al. (2002).

Nowadays, public hospitals in Thailand are responsible for taking care of people under a variety of health insurance schemes with an assortment of payment mechanisms as mentioned earlier. Different payment incentives may engender potential variations among health resources use and quality of care. Furthermore, an emerging of the 30-Baht Policy, with capitation payment for outpatient services and case payment based on DRG for inpatient services, implemented for the largest part of people in 2001 has been a radical change in health care systems in Thailand. This immense intervention may influence patterns of drug use and care process accordingly.

Therefore, a quasi-experimental interrupted time-series design with segmented regression analysis is an apposite procedure to scrutinize effects among all these health insurance schemes over time, particularly before and after the 30-Baht Policy implementation. In addition, many studies engaged in drug use among patients with disparate types of health benefit schemes have employed multiplicity of cross-sectional methods (Bryant and Prohmmo, 2005, Limwattananon,S., Limwattananon and Pannarunothai, 2004, Limwattananon,C., Limwattananon and Pannarunothai, 2004, Srisuphan, et al., 2004, Srisuphan, Sripairoj, and Tangcharoensathien, 2004, Limwattananon, Limwattananon and Pannarunothai, 2003, and Chansung, et al., 2003).

In order to grasp the picture of dynamic changes, a seeming deficiency of trend research into long term effects of health insurance schemes on drug use and care over time, before and after the 30-Baht Policy implementation, has been typical. Accordingly, this part of the study was endeavored to investigate these effects among the schemes on drug use in diabetic outpatients and disparities in the utilization between before and after the 30-Baht Policy implementation using electronic dispensing database of each hospital. Additionally, changes in patterns of drug use for patients with each payment method of the schemes before and after the 30-Baht Policy implementation could indicate response of hospitals to financial incentives of the policy. The details of the effects were investigated from electronic prescription data of all applicable patients in the computer database of hospitals.

2. Dynamic changes in number of patients before and after the 30-Baht Policy implementation

According to Part I that increases in number of patients may have an effect on quality of care thus the study on the dynamic changes in number of patients could provide hard evidence to support the physicians' subjective point of view in Part I.

Part III Medical record reviews

Apart from drug use, laboratory tests and physical examinations to monitor disease progression and effects of drug use are also important entailing processes of diabetic care. Ordinarily, physicians' orders of these procedures are recorded in the medical record cards or booklets. Very few public hospitals in Thailand use electronic medical record or computerized physicians' order entry. Therefore, this part of the study assembled this data from the samples of outpatient medical records in order to determine effects of payment incentives of health insurance schemes and impacts of the 30-Baht Policy implementation on diabetic care processes.

Research Gaps

In Thailand, very few studies have examined effects of the payment mechanisms of health insurance schemes on health service quality continuously over time in order to monitor the magnitude and trends of the variations. Particularly, the responses of health care provider, in management of and policy on drug use and care, to the 30-Baht Policy implementation may bring about some changes in trends of drug use and care that might influence the quality of health care services. The obvious advantages of interrupted time series design over cross-sectional design in studying on the 30-Baht Policy intervention are remarkable abilities to determine effects of the policy after the policy implementation compared to the control of non policy phase before the implementation. Furthermore, responses of hospitals to the policy in terms of interaction among schemes, such as cost-shifting, after the implementation (if any) could also be determined by this kind of longitudinal design in terms of changes in every consecutive period of time with multiple points of data comparisons. This benefit of valuable knowledge, that has not been available much in the field of study on health insurance systems in Thailand, can not be obtained from cross-sectional studies.

In addition, rare studies have described linkage between policies on and behavior towards drug use. For that reason, this study aims to get at details on types and extents of hospital measures on drug use and care over time among diabetic outpatients covered by health insurance schemes with different payment methods, focusing on capitation and fee-for-service payment, in some public hospitals in Thailand. Furthermore, the potential relationship between rules and practices was discerned.

Research Questions

1. How do hospital management and policies on drug use and care process differ among patients covered by health insurance schemes with different payment incentives in terms of
 - 1.1. Prescriber, for example
 - Incentives to physicians for taking care of patients in particular health insurance schemes
 - Types of physicians assigned to treat patients
 - 1.2. Drug use, for example
 - List of drugs in hospital formulary and applications of restriction on drug use
 - Generic or therapeutic substitution

1.3. Process of care, for example

- List of laboratory tests and physical exams related to drug therapy monitoring that physicians can prescribe to patients?
2. How do perceptions and concerns of physicians on financial problems of hospitals and impacts of the 30-Baht Policy implementation have a potential effect on patterns of drug use and diabetic care process?
 3. How do patterns of drug use and care differ among patients covered by health insurance schemes with different payment incentives in terms of
 - Types of drug use (e.g. innovative expensive drugs)
 - Average charge of drug prescribed
 - Types and frequencies of laboratory test and physical exam prescribed?
 4. Do the differences sustain over time or have dynamic changes with increasing and/or decreasing trends over each consecutive period of time?
 5. Do the differences influence similarity in quality of drug use and care provided among the schemes?

Objectives of the Study

1. To describe response of hospitals to different payment incentives of health insurance schemes in terms of hospital management and policies on drug use and care process for diabetic outpatients
2. To describe response of physicians to different payment incentives of health insurance schemes in terms of physician perceptions and concerns on drug use and care process for diabetic outpatients
3. To compare patterns of drug use and care process among diabetic outpatients covered by health insurance schemes with different payment incentives
4. To explicate effects of the payment incentives on dynamics of change in the patterns of drug use over time, before and after the implementation of the 30-Baht Policy for every Disease

Scope of the Study

The study was conducted on four hospitals selected based on availability and accessibility of the electronic prescription data and patient medical records. Data of diabetic outpatients, ranging in age from 41 to 60, from each selected hospital were investigated. Pertinent health care professional interviews and document review were carried out for information and reasons of hospital management and policies on drug use and care process.

Basic Assumption

Prescribing patterns of drug use were analyzed from the electronic routine dispensing data by assuming that patients received or purchased all prescribing drugs from the hospitals according to the dispensing database. Similarly, patterns of care process, routine laboratory tests and physical examinations were determined from the physicians' orders or print-out of investigations in patient medical records or from the electronic secondary data of the investigations (if any) by assuming that the available data of the orders were completely recorded.

Contributions of the Study

1. The findings of this study elucidate how payment mechanisms affect the provisions of diabetic outpatient care. The recommendations for monitoring of quality and cost of care are able to use as evidence-based information support for policymakers of each major health insurance schemes. Legitimate policies on monitoring systems of quality of health care services are needed to be instituted. At the same time, health insurance payer should pay more attention to the support provided to health care providers, especially reasonable budgets and payments, to encourage them to impart quality care.
2. The publications of evidence-based information from this study are useful for health insurance payers, health care providers, and people to gain the knowledge in consequences of health insurance systems.