

**HOSPITAL CHARGE POLICY: A CASE STUDY
IN THAILAND REGIONAL HOSPITALS**

By

Jarurat Yanggratoke

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School of Public Administration

The Examining Committee Approved This Dissertation Submitted in
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(Development Administration)

Associate Professor *Vinit Songpratoom* Committee Chairman
(Vinit Songpratoom, Ph.D.)

Associate Professor..... *Thant Vorathep* Committee
(Thavanrat Vorathepputipong, Ph.D.)

Associate Professor *Supasit Pannarunothai* Committee
(Supasit Pannarunothai , M.D. , Ph.D.)

Assistant Professor..... *Udom Thumkosit* Committee
(Udom Thumkosit, Ph.D.)

ABSTRACT

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This study aims to investigate relevant factors contributing to inpatient charge of public hospitals in Thailand. Since the country's health care financing has been claimed of health efficiency and equity. Annual increasing of medical expenses of the Civil Servant Medical Benefit Scheme has appeared to be one of the evidences of inefficient financing. In addition, inadequate funding for the poor and underprivileged groups revealed the equity. Recently, the government decided to use a new classification system of patients (Diagnosis-related Group Disease system, DRGs) for budget allocation and retrospective payments. The system has been speculated about its effects on financial management of public hospitals. This study proposed a framework to understand factors influencing hospital pricing and factors affecting inpatient charge which include DRGs relative weight.

The study was a case study of three selected, regional hospitals having the criterion, specified by the researcher. Secondary data available were financial accounts and reports as well as patient-record abstracts of the fiscal year 1999. The sample hospitals were the Buddhachinaraj Hospital, the Chiangrai Hospital and the Hatyai Hospital. The patient-record files were manipulated to have DRGs relative weight and charge items by the Center of Health Equity Monitoring, Naresuan University.

Research methods were both quantitative and qualitative analyses. Descriptive analyses were conducted for the Ministry of Public Health's regulations and criterion of third-party payment. Quantitative analyses were applied to financial records of the hospitals. Multiple regression, followed with path analysis was applied to the selected DRGs, patient-record files. And lastly, multivariate analysis of variance was used to disclose price discrimination of certain charge items of particular DRGs.

The major result of this study was a revised model of inpatient charge, which includes six factors contributing to inpatient charge. They were the criterion of third-party payers, the Ministry of Public Health's regulations regarding public-hospital administration, age of patient, length of stay, the MOPH-subsidized patient, and number of operative procedure. Although DRGs relative weight was not significantly related to inpatient charge, it was significantly affected by severity of illness and inpatient costs.

In order to formulate a Hospital Charge Policy, the researcher further analyzed four domains of health care financing. It included special and high-cost payments of third-party payers, price discrimination of particular charge items, and financial burdens of public hospitals if they were subjected to the implementation of the Universal Coverage of Health Care Policy. They have to reengineer their internal management systems such as financial information system, worker-compensation system, internal audit system of medical records.

To implement the government's new announcement, Universal Coverage of Health Care Policy, this study suggested future researches relevant to factors leading to success or failure of the policy, unit cost analysis of hospital products, and the question of fairness to public hospitals after the re-calibration and price setting of the DRGs system. These future studies should be sponsored by the government's new independent office for national health insurance.

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	:	ในโรงพยาบาล ศูนย์ในประเทศไทย
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การวิจัยนี้มุ่งที่จะศึกษาตัวแปรที่มีผลต่อค่ารักษาพยาบาลผู้ป่วยใน ในโรงพยาบาลของรัฐ เนื่องจากการคลังสาธารณสุขของไทย มีปัญหาเรื่องความมีประสิทธิภาพและความเป็นธรรม การเพิ่มค่าใช้จ่ายของสวัสดิการรักษายาพยาบาลของราชการทุกปี เป็นข้อมูลเชิงประจักษ์อันหนึ่ง นอกจากนั้น ความไม่พอเพียงของงบประมาณอุดหนุนผู้มีรายได้น้อยและบุคคลที่สังคม ควรช่วยเหลือเกื้อกูลเป็นเครื่องชี้ความไม่เป็นธรรมทางสุขภาพ เมื่อเรารู้ว่า รัฐบาลใช้ระบบ กลุ่มวินิจฉัยโรคร่วมในการจัดสรรงบประมาณอุดหนุนผู้มีรายได้น้อยและจ่ายเงินสำหรับผู้ป่วยใน ซึ่งเป็นที่คาดว่าอาจจะมีผลกระทบต่อระบบการเงินและผลกระทบต่อโรงพยาบาลของรัฐ ดังนั้น การวิจัยนี้จึงเสนอกรอบความคิด เพื่อศึกษาตัวแปรที่มีอิทธิพลต่อการกำหนดราคาค่ารักษาพยาบาล และศึกษาตัวแปรที่มีผลต่อค่ารักษาพยาบาล ซึ่งรวมค่าดัชนีกลุ่มวินิจฉัยโรคร่วมไว้ด้วย

การศึกษานี้เป็น กรณีศึกษา สำหรับโรงพยาบาลศูนย์ 3 แห่งซึ่งมีเงื่อนไขครบถ้วนตามที่ผู้วิจัยกำหนด ซึ่งต้องมีข้อมูลทุติยภูมิที่สำคัญ ได้แก่ ข้อมูลทางการเงินในอดีต และข้อมูลผู้ป่วยในที่มีจำนวนค่ารักษาพยาบาลตามรายการครบถ้วนทุกรายการ และเป็นผู้ป่วยในปีงบประมาณ 1999 โรงพยาบาลตัวอย่างได้แก่ โรงพยาบาลพุทธชินราช โรงพยาบาลเชียงรายประชานุเคราะห์ และโรงพยาบาลหาดใหญ่ ข้อมูลการเงินในอดีตได้จากรายงานการใช้จ่ายงบประมาณของโรงพยาบาลของ กองโรงพยาบาลภูมิภาค และรายงานทางการเงินประจำปีของโรงพยาบาลตัวอย่าง ส่วนข้อมูลผู้ป่วยในเป็นข้อมูลที่ได้รับการจัดกลุ่มแบบกลุ่มวินิจฉัยโรคร่วมแล้วจากสถาบันศึกษาความเป็นธรรมทางสุขภาพ มหาวิทยาลัยขอนแก่น

การวิเคราะห์ข้อมูลมีทั้งการวิเคราะห์เชิงคุณภาพ และเชิงปริมาณ โดยมีการวิเคราะห์เชิงปริมาณสำหรับข้อมูลทางการเงินของโรงพยาบาล การบรรยายหลักการจ่ายเงินของผู้จ่ายที่สาม และระเบียบบริหารโรงพยาบาลของกระทรวงสาธารณสุข และยัง มีการวิเคราะห์ข้อมูลผู้ป่วย ด้วยการวิเคราะห์ถดถอยตามด้วย การวิเคราะห์เส้นโยงสำหรับข้อมูลผู้ป่วยใน และการวิเคราะห์

ความแปรปรวน ที่มีตัวแปรตามหลายตัว ซึ่งเป็นค่าใช้จ่ายตามรายการของผู้ป่วยในกลุ่มโรคบางกลุ่มที่กำหนด

ผลของการศึกษาได้ ตัวแบบใหม่ในการอธิบาย ปัจจัยที่มีอิทธิพลและมีผลต่อค่ารักษาพยาบาล ซึ่งประกอบด้วย 6 ปัจจัย ได้แก่ เงื่อนไขการจ่ายเงินของผู้จ่ายเงินที่สาม กฎหมายที่เกี่ยวข้องกับการบริหารโรงพยาบาลของรัฐ อายุผู้ป่วย จำนวนวันนอนของการป่วยแต่ละครั้ง ประเภทผู้ป่วยที่ได้รับการอุดหนุนค่ารักษาพยาบาลจากกระทรวงสาธารณสุข และจำนวนครั้งของการผ่าตัด แม้ว่าค่าดัชนีของกลุ่มวินิจฉัยโรคร่วมจะ ไม่มีความสัมพันธ์เชิงสาเหตุและผลต่อค่ารักษาพยาบาล แต่ค่าดัชนีมีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติกับ ความรุนแรงของโรคและทรัพยากรที่ใช้ในการรักษาผู้ป่วยในแต่ละครั้ง เราจึงสามารถใช้ค่าดัชนีเปรียบเทียบความรุนแรงของโรคของผู้ป่วยระหว่างโรงพยาบาล และทำนายต้นทุนในการรักษาพยาบาลผู้ป่วยในได้

เพื่อกำหนดนโยบายค่ารักษาพยาบาลสำหรับผู้ป่วยในด้วยราคากลาง ผู้วิจัยได้วิเคราะห์ต่อเนื่องไปอีก ได้แก่ การจ่ายเงินของผู้ป่วยที่ต้องใช้ค่าใช้จ่ายสูงและผู้ป่วยเฉพาะโรค ที่สำนักงานประกันสุขภาพและสำนักงานประกันสังคมกำหนด การวิเคราะห์ความเบี่ยงเบนทางราคาสำหรับผู้ป่วยที่สังกัดกลุ่มจ่ายเงินต่างกัน และสุดท้ายคือการวิเคราะห์ปัญหาทางการเงินของโรงพยาบาลของรัฐในอนาคต

การวิจัยนี้เสนอให้มึนนโยบายการจ่ายเงินผู้ป่วยในทุกรายในโรงพยาบาลของรัฐด้วยราคากลางตามดัชนีของกลุ่มวินิจฉัยโรคร่วม ในการนี้มีข้อเสนอแนะทางการบริหารหลายประการ ได้แก่ การวิเคราะห์ระบบข้อมูลการเงินของโรงพยาบาล การออกแบบระบบค่าตอบแทนสำหรับเจ้าหน้าที่โรงพยาบาล การสร้างระบบการทบทวนเวชระเบียนภายในโรงพยาบาล การคำนวณค่าน้ำหนักสัมพัทธ์ใหม่ และการกำหนดราคาต่อหน่วยน้ำหนักของดัชนีของโรงพยาบาลแต่ละประเภท

ในการนำนโยบายประกันสุขภาพถ้วนหน้าไปสู่การปฏิบัตินั้น การวิจัยนี้เสนอให้มีการวิจัยในอนาคต ได้แก่ การศึกษาวิจัยในส่วนที่เกี่ยวข้องกับปัจจัยที่นำไปสู่ความสำเร็จหรือล้มเหลวของนโยบาย การใช้ค่าดัชนีกลุ่มวินิจฉัยโรคร่วมเป็นราคากลางในการจ่ายเงินผู้ป่วยใน การศึกษาราคาค่าหน่วยบริการของผลผลิตในโรงพยาบาล และการศึกษาความยุติธรรมในการกำหนดราคาต่อค่าดัชนีสัมพัทธ์ และความเข้าใจของโรงพยาบาลเกี่ยวกับวิธีการจ่ายเงินแบบใหม่ ซึ่งการวิจัยเหล่านี้ควรได้รับการสนับสนุนงบประมาณจากสำนักงานประกันสุขภาพถ้วนหน้าของประชาชนที่เป็นองค์กรอิสระที่จะตั้งขึ้นใหม่ในอนาคต

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ABBREVIATIONS AND SYMBOLS

Abbreviations

Equivalence

ANOVA	Analysis of Variance
BCBSA	Blue Cross and Blue Shield Association
cc	Complication
CHAMPUS	Civilian Health and Medical Program of the Uniformed Services
CMI	Medicare Case Mix Index
CPHA	Commission for Professional and Hospital Activities
CSMBS	Civil Servant Medical Benefit Scheme
Diag	Diagnosis
DRG 14	Specific Cerebrovascular Disorders Except TIA
DRG 167	Appendectomy without complicated principle diagnosis without complication
DRG 183	Esophagitis,Gastroents&Miscellaneous Digestive Disorders, age >17 without complication
DRG 184	Esophagitis,Gastroents&Miscellaneous Digestive Disorders, age <18
DRG 243	Medical Back Problems
DRG 27	Traumatic Stupor & Coma, Coma >1 hr.
DRG 29	Traumatic Stupor & Coma, Coma <1 hr. Age> 17 w/o cc
DRG 371	Cesarean Section with complication
DRG 373	Vaginal Delivery Without Complicating Diagnoses
DRG 486	Other Procedures for Multiple Significant Trauma
DRG 489	HIV with Major Related Conditions
DRG 88	Chronic Obstructive Pulmonary Disease
DRG 90	Simple Pneumonia and Pleurisy ,age >17 w/o cc
DRG 206	Disorders of liver except malig,cirr,alc hepa w/o cc
DRG 205	Disorders of liver except malig,cirr,alc hepa w cc

DRG 391	Normal Newborn
DRG 98	Bronchitis and Asthma age 0-17
DRGs	Diagnosis-related Group Diseases
FFS	Fee-for-service
GDP	Gross Domestic Product
GPE	Global Program on Evidence of Health Policy
ICD10	International Statistical Classification of Diseases and Related Health Problems (the tenth edition)
IP-day	Inpatient-Day (aggregated number of inpatients multiplied by the LOS of each admission
IPRW	Calculated Relative Weight According to Inpatients
LICS	Low-income Scheme
LOS	Length of Stay
MDC	Major Diagnostic Categories
MOPH	Ministry of Public Health
NGO	Non-governmental Organization
NHA	National Health Account
OP visit per day	Outpatient Visits Per Day
OPD	Outpatient Department
OPRW	Calculated Relative Weight According to Outpatients
OR	Operation Procedure
PPS	Prospective Payment System
RW	DRG's relative weight
SI	Social Insurance
SII	Severity of Illness Index
SSO	Social Security Office
WTP	Willingness-To-Pay

CHAPTER 1

INTRODUCTION

There are several general health problems in Thailand. Majority of people, especially the poor, still lacks of knowledge regarding health and how to take care of their own and their families' health problems. Environment in urban areas is deteriorating. About 25% of Thai people are not covered by any health insurance. They have to be responsible for their own health expenses. And most of health care services are western. Traditional wisdom in health care has been neglected for a long time. However, its recovery is rapid but incomplete.

Regarding to health insurance, several social problems are prominent. Diverse health insurance schemes do not provide optimal solutions to the above problems. Health insurance and welfare schemes are job-driven benefits. They have different insurance benefits. The level of subsidy from the government also markedly differs. It is claimed as equity problem. For instance, civil servants and their families as well as the members of the Workmen Compensation Schemes have been claimed to over utilize hospital services. Other patients such as the non-worked related patients of Social Security Scheme have underutilized the services. The MOPH-subsidized groups including the low-income eligible, health-card holders and the other underprivileged have confronted with service discrimination.

Patients who can afford resort to the private sector are faced with extraordinary high charge with questionably better services. This makes the uninsured people at risk of financial catastrophic illness. Patients always complain from time to time about high pricing of private hospitals. Almost no measures are now available to deal with the problem systematically.

Dow Monkolsmai (1997:91,95-96) disclosed the increased utilization in private providers that

...Between 1988 and 1993, the number of outpatient visits to private facilities were more than tripled, from 3.9 million to 12.5 million, while that in public facilities

increased only 5 million, from 36.1 to 41 million...

...The amount spent on private facilities may be accounted for price differentials rather than increased volume, since it has been reported that the private sector charges two to three times more than public hospitals for diagnostic laboratory tests and X-rays, and about five to ten times more for room charges...

Berman (1997:128-129) also suggested that

...Legal and regulatory interventions can affect the costs and availability of inputs needed by private providers, the prices of the services they produce, the quantity and distribution of, and the quality of services. Laws may be used to set broader directions and intent to empower agents of the state to regulate while regulations and regulatory actions of different agencies generally encompass the more detailed applications of laws in specific setting. These legal interventions are typically coercive and used to restrict undesirable behavior, in contrast to indirect financing interventions, whose intent is persuasive, rather than coercive, and which are used to encourage desirable behavior..." Direct price regulation is typically not used for health care services by private physicians or hospitals. However, governments may attempt to regulate private sector prices through price-setting for comparable public sector services. Where there is effective competition between public and private providers, this can serve to limit private provider behavior...

In addition to health equity problems, quality and efficiency of the health service delivery system show serious problems. Although primary health care system in Thailand has been recognized internationally, a good model of indigent participation of health voluntary system but only some provinces can achieve the Health For All Goal, measured by 72 sustainable health indicators. (Samrerng Yanggratoke, 1999: 103-111) The primary health care model both empowers and educates health volunteers and then provides essential medical equipment, supported to sub-district and village health units. Effective health volunteers can understand and apply self-care as well as participate in disease control programs. They also act as mediators to disseminate communicable disease

news and the MOPH interventions. Unfortunately about only few provinces are capable to the specified level.

Weak primary healthcare services cause bypass behavior of villagers to higher institutional care. They might due to the following reasons. First, the lowest level of health care such as health centers is not well integrated into rural localities and some of them are not socially accountable to the people. Some are even alienated from the community. Legal and obligatory physicians just finished from their education, usually work in community hospitals shortly before entering specialist programs. There are not enough physicians for every sub-district health units.

Second, big hospitals attract more patients whereas the lower-level health care facilities are perceived as the second class. People always bypass from the lower level ones to the bigger hospitals. As the result, service congestion at these hospitals does not allow sufficient contact time between doctors and patients. Therefore not holistic care has been delivered.

Third, the referral system is not effective. Special hospitals and large medical centers have to provide primary care services while the general hospitals compete for more patients by providing specialized services, having more sophisticated diagnostic and therapeutic capacities as well as recruiting medical specialists to attract patients.

Forth, the system has been characterized by the brain drain of professionals from public to private hospitals. During 1990s, Thailand's economic status was improved and people had more purchasing power, public hospitals were unable to fulfill their needs. The market forces automatically encourage growing of the private ones. Conventional private hospitals, formally run by government doctors and conducting private practices after official hours, started to grow. With higher payment in the private hospitals and bureaucratic constraints have driven qualified doctors and other allied health professionals to the private ones. According to the problems above, the government remedied the shortage of professionals by a piecemeal basis including the introduction of remuneration by case load, special monthly top-up salary, etc. The special payment widens the professional gaps among hospital workers and causes financial burdens to public hospitals.

Fifth, the standard of medical facilities and standard services are in question. However, it is just recently, the concept of Hospital Accreditation by

participatory and continuous quality improvement are introduced into public hospitals and some of private hospitals. Criteria of quality of care assessment should be mandated in the next health legislature. In addition, the MOPH has changed budget allocation criterion to performance basis. Unfortunately, the bureau still lacks of specific performance indicators to assess the health care units.

Sixth, patient do not have sufficient knowledge in the care provided to them and how to maintain good health by self-care. Consumers' rights are inadequately informed. The patient-centered medical care, as should be desirable healthcare strategy, is hardly implemented because of bureaucratic structure and health provider awareness.

Seventh, there is large influx of migrant workers from neighboring countries. Most of these workers entered the country illegally. The workers have come with new emerging diseases and substance abuse. Due to Thailand's weak legal enforcement, their employers still not register them into formal healthcare system of the Social Security Scheme. As the result, not only uncontrollable communicable diseases are emerging but also major part of medical care costs is borne by the government instead of the third-party payment.

In short, three problem areas exist. They are equity problem, efficiency and quality problems. The situation that follows would reflect these problems. Thai people are still not universally covered by existing health insurance. People still faces with financial barrier to access to health care. Although the public and private hospitals are now competing to attract customers, particular, social security members, they still have quality problems. Primary health care stills immature because the Ministry of Public Health direction has been geared towards curative services. In addition, the health system is not socially accountable to the need of indigent people because the people hardly participate in health system.

1.1 Statement and Significance of the Study

There are three major areas of health care that should be reformed. They are health administration, health service delivery and health care financing. This study attended to investigate the last one, health care financing. General problems of the health care financing were described as the following.

Regarding health care financing concerns, the national health account discloses that, for years, proportion of health expenditure has been continuously rising over the growth rate of GNP. Out-of-pocket patients spend major part of the national health expenditure. The poorer families spend a higher proportion of their income on health than the richer ones. On the contrary, government spending is accounted for only 25% of total health expenditure. In addition, studies on the budget allocation were sporadic and limited to only the Ministry of Public Health and few other ministries. As the result, no system has been set up to build the epidemic databases and monitoring national health spending.

The Ministry of Public Health (MOPH) is only one main agency responsible for financing, organizing and delivering of health services. Regarding to the financing, most of the budget is, in a large part, allocated for curative services of hospital sector rather than health promotion, disease prevention, and rehabilitative services in public health programs. Nowadays, there is no scheme clearly mentions the cost-effective health care, such as how promotion and preventive services can be encouraged and how long-term care can be covered by the coverage.

The government provides main health care facilities, at the same time, the main purchaser of health care. Both roles in the same time had caused efficiency, equity and quality problems. To remedy the problems, the government's financial measures were significantly weakened. It is not strong enough to assure qualified services providing to all citizens. In addition, available health insurance and welfare schemes do not provide a safety net. They are difference in terms of level of premium, contribution, level of government subsidy, benefits coverage, and payment to providers.

Thailand health care reform is in a rapid transition. Several initiatives, however, have been introduced very recently. Some of them are a new payment system by diagnosis-related groups, performance budgeting, reallocation of financial resources to local authorities, and reorganization of public health units to be autonomous bodies. The MOPH nowadays encourages community health financing and changes its role regarding public hospitals. According to the MOPH intervention, people might ask about future hospital pricing of autonomous hospitals and what might be the effects of hospitals' cost recovery on household expense.

Both hospital pricing and cost recovery from service charges directly relate to hospital revenue. Normally, hospitals get major sources of revenue from customers, health insurance organizations, public subsidies and other sources of revenue. The way hospitals obtained revenue from patient-service charge induces cross-subsidization among hospital payers because the payers impose different payment methods.

Inpatient charge plays three significant roles in health care financing. First, they are a major source of hospital revenue. Hospitals need the revenue to cover operating costs because government subsidies are not adequate to cover the total costs. Second, the charge is a proxy measurement of the used resources for each patient. Health planning usually utilizes the charge as estimated non-labor recurrent expenditure. And third, the charge reflects an increasing trend of an inefficient payment mechanism that leads to high national public health expenditures.

1.2 Major Objectives and Scope of the Study

Regarding one of government interventions of health care financing, the Ministry of Public Health has introduced a new intervention by the use of DRG or Diagnosis Related Group Diseases System. It aims to use the system to pay for medical care costs of public hospitals.

It is assumed that public hospitals should be paid with a standard price for patient admission. Since the DRGs system provides each episode's relative weight which can be a proxy index of inpatient cost. In other word, DRG's relative weight represents the relative amount of consumed resources of each admission compared with the average used resources per admission of all patients in particular groups of hospitals in a regional area. The question is whether the DRGs system is a good measurement of inpatient cost in Thailand? This study concern the justification of using DRGs' RW for representing inpatient cost.

Not only the payment intervention above, nowadays the government imposes a universal coverage policy, which is implemented by allocating provincial budgets according to number of population in each province. Public hospitals are presently confronted with the limited budgets. Their administrative questions are how to cope with the situations that really need efficient use of all types of hospital resources.

In order to build more understandings about alternative sources of hospital revenue, and its financial constraints, this study proposed a framework to study relevant factors contributing to hospital pricing and inpatient charge.

This study proposes some hypothetical factors that are likely to affect hospital pricing such as sources of hospital revenue, financial burden, indirect payments and their criterion and financial regulation. The description and interpretation of these hospital contexts might reveal motivational forces towards administrative decision to set hospital pricing, which would discriminate patients by payment criteria.

If the above price discrimination would exist, patients of different payment groups, with the same DRGs and being adjusted for length of stay, would have been charged differently. This study aimed to test the hypothesis regarding whether different patients according to payment groups, of the particular DRGs, were charged differently.

Since the problem areas of this study concern the hospitals' inpatient charge and application of DRG payment. It is worthwhile to discover the answers of the following questions:

1. What are factors influencing administrative decision regarding hospital pricing?
2. What are significant factors, which determine inpatient charge?
3. What kinds of government intervention used to control hospital charge?

There are five objectives of this study as follows.

1. To find major factors influencing hospital pricing
2. To find significant factors affecting inpatient charge.
3. To compare inpatient charge of common DRGs by patient groups.
4. To describe administrative shortfall of third-party payments
5. To suggest new formulation of a Hospital Charge Policy by payment with DRGs' relative weight.

1.3 Research Limitations

This study has three aspects of research limitation. First, the study uses retrospective data for analysis. Because the proposed framework of this study constitutes of particular variables which can be measured and constructed from historical data. However, at that time (1997) there were very few public hospitals had computerized collection of financial and patient information. Then this study analyzed the available secondary data.

Second, after we obtained a proposed framework for determining inpatient charge, we discovered that some of the variables were hardly quantified. They are physician perception about patient's health insurance and practical skills. These variables should be verified only by qualitative methods. Then it would have taken a very long time for collection data. Hence these two variables-physician perceptions and practical skills was left out of the framework. However, they should be studied in another research.

Third, after exploring several hospitals we found that only few hospitals had complete charge items in the patient-record files those being sent to the Health Insurance Office in the fiscal year 1998-1999. In addition, few MOPH hospitals reported annual financial statement of operation and revenue to the Hospital Division, MOPH. Fortunately during the first-round study of potential hospitals, three hospitals meet the criteria of having rather complete financial and patient information. They had valid annual financial reports and complete patient medical abstracts. They were the Buddhachinaraj Hospital, the Chiangrai Hospital, Hatyai Hospital respectively. Because this study has to select only hospitals that meet the criterion, the findings of this study can not represent all regional hospitals in Thailand.

This study was conducted since 1998-2001. During the time national health care reform was very prominent theme of the MOPH. Although many problems were addressed and several competing models were proposed with the financial supports of both domestic and foreign funds, endless conferences and meetings were held without final consensus for national health financing reform. This study was conducted among the transitional period, starting from emerging ideas of changing third-party payment types and decentralization of health care functions to local authority, to the announcement of the Universal Coverage of Health Care Policy by April 1, 2001. (Matichon News. 2001, 23 March: 27.) Among social movement to the universal coverage and quality of health care, every thing seems to be on status quo in major parts of health service delivery units, and sometimes, fragmented and argued implementations.

1.4 Definitions

1.4.1 Financial Burden

Financial burden is defined as a hospital' s problems regarding cost recovery and operating expenses. It can be measured by labor expenses that are not subsidized by the Ministry of Public Health and amount of money to subsidize free patients.

1.4.2 Potential Sources of Revenue

Potential sources of revenue are defined as major sources of hospital revenues. Since a hospital receives aggregate revenue from both public and private sources. The potential source of each hospital may be one of the following sources- public subsidies from the Ministry of Public Health for Low-Income Insurance Scheme, Health Card Revolving Fund, Reimbursed Payments from CSMBS, Capitation Payment from Social Security Office and hospital charges at the point of service.

1.4.3 Criteria of Third-party payment

Criteria of Third-Party Payment refers to all specific conditions for service provision to the eligible of each health insurance organization which impose on their contracting hospitals.

1.4.4 Government Regulation

Public hospitals under the jurisdiction of the Ministry of Public Health have to comply with all administrative regulations issued by the authority. Government regulations in this study is defined as financial and pricing regulations with which the MOPH's hospitals have to comply. Hospital Pricing regulation refers to the price lists and guidelines of how to charge each kind of service.

1.4.5 Price Discrimination

Price Discrimination is defined as the variation of hospital price of the same kind of service to different patients. It reflects the relationship between hospital pricing and inpatient charge of particular groups of patients.

1.4.6 Patient Clinical Characteristics

Patient Clinical Characteristic is defined as the patient descriptions that physicians use in summarizing the health status of a patient during hospitalization. It is comprised of demographic and clinical characteristics as well as financial charge of the patient. A medical record includes age, principle diagnosis, co-morbidity and/or complications, and any other diagnoses, with or without operative procedures, length of stay, discharged status and service charge amounts.

1.4.7 Diagnosis Related Groups or DRGs

Fetter (1983:8) operationalized DRGs as the products of a hospital.

..An interactive version of A.I.D. analysis was applied to a database of information from hospital discharge summaries, provided by the Commission for Professional and Hospital Activities (CPHA). The purpose of the analysis was to identify characteristics of patients or 'type of cases' with similar patterns of services or resource use. The A.I.D. approach examines the interrelationships of the variables in the database and determines which ones are related to some specific measure of interest, referred to as the dependent variable...

Several countries adapted the system for prospective payment including Thailand. DRGs research in Thailand has started about 10 years after the United States has used DRGs in the prospective payment of the Medicare Program. During 1993 to 1997, Thailand's DRGs researches have been expanded to several groups of patients. In 1998, the MOPH announced to use DRG's relative weight to pay high-cost patients of the Low-income Project. Financial strategy of the payment has encouraged general hospitals to develop valid patient-record system. (Supasit Pannarunothai, 1999) DRGs are relatively homologous groups in patient cases which are patient groupings both medically meaningful and similar in hospital resource consumption. They are measured by inpatient days of stay or medical care costs. They are presented as a category with a specific number or DRG code and its relative weight and an English description.

Each DRG has its own relative weight. The English descriptors are not meant to be entirely descriptive for all patients within a DRG; rather they represent that description of the largest portions of patients. It aims to achieve a balance of understandability for physicians, administrators, nurses, and other hospital and hospital related personnel.

1.4.8 Used Resource Per Admission

Used resource per admission is the amount of resource consumed by a patient during admission. In this study Used Resources Per Admission is measured by the DRG's relative weight.

1.4.9 Inpatient Charge

In patient charge refers to the amount of money a hospital intends to charge each inpatient. It may not be totally collected directly from the patient. It is calculated from a summation of all the charged items in a patient's admission.

1.4.10 Length of stay

Length of stay refers to duration of a patient's stay in a hospital per each admission

1.4.11 Discharge Type

Discharge Type is the health status of an inpatient after assessment by a physician before leaving the admitted hospital.

1.4.12 Payment mechanism

Payment Mechanism refers to a method used to pay hospital care costs. They are two types of mechanisms including prospective and retrospective payment. Regarding to the retrospective payment or fee-for-service basis, a hospital has its own right to charge fee to their payers according to hospital pricing and the quantity of services provided.

On the contrary, prospective payment, providers will be given the sums of money in advance for providing care according to the number of insured members in a given capitation period. The plans' beneficiaries may have or have not to pay co-payments when receiving services. It depends on the criterion of their insured benefits and negotiation between payers and providers.

1.5 Organization of Chapters

This study is reported in eight chapters. Chapter one is relevant to the important of the study, its objectives, scope, limitation, definition of key variables and expected outputs of the study. Chapter two describes the experience of Thailand's health system, national health insurance, overall situation analysis of major health insurance schemes, health status and major problems of health service delivery.

Regarding to the third chapter, relevant theories, models and concepts of health care financing, hospital behavior and functions, and briefly displays some studies of social welfare, DRGs research and health care financing research. Then a proposed model of inpatient charge is deducted from the logical relationship of the concepts. The proposed model is presented coupled with its hypotheses.

Chapter four and five concerns research methodology and the construction of new composite variables. Chapter six describes the major finding by testing the hypotheses, which is resulted in a revised model of inpatient charge. Then the seventh chapter further analyzed administrative and financial problems of third-party payment organizations. As the consequence, a new

Hospital Charge Policy should be announced by the RTG to solve the diverse payment system. And at the last chapter, the author summarizes the findings and recommends several management options and future researches.

1.6 Expected Outputs of the Study

This finding provides a revised model of inpatient charge. It gives us greater understanding of decision making within public hospitals, hospital pricing, price discrimination, cost shifting and cross subsidization. The finding clarifies ambiguity in using DRGs' relative weight as a proxy for inpatient cost. In addition, comparing charge items across DRG groups of patient reflects the price discrimination by payment groups.

CHAPTER 2

THAILAND HEALTH CARE FINANCING

This chapter highlights current situation of Thailand's health care financing. It deals with national health expenditure, source of health care financing, health insurance systems and conduct of regulation. The problem of diverse payment systems lead us to consider the issue relevance of health equity, health efficiency and quality of care.

2.1 Thailand Health Care Financing

Thailand's health expenditure has been increasing since 1980-1998. The total recurrent and capital health expenditure of all sources of financing in 1994 was 128,305. million Baht, or 3.6 percent of GDP, and that the public to private sector ratio was 49:51 respectively. (Donaldson, Supasit Pannarunothai and Viroj Tangchareonsathien, 1999: 6-9) In consistently, the MOPH showed 1998 total health expenditure was 283,576 million Baht. Proportions of the health expenditure in 1998 prices were calculated for public sector, private sector and foreign aid which were 34.74, 65.19 and 0.06 % respectively. (Ministry of Public Health, 2000:200)

Pattern of household expenditure has changed dramatically. According to changing trends of household expenditure by source of care, a study was conducted for the whole country and for each of the 5 regions, for the period 1986 to 1996. The study found that

... Thai population was moving away from self-treatment to other sources of care. For the whole country, the real decline in self-treatment expenditure was 30 percent, down to 41 Baht per household per month in 1996. On the other hand, expenditure for treatment by public hospitals increased in real terms by 66 percent to 134 Baht per household per month in 1996...Comparing with private sources, expenditure for treatment by private hospitals or clinics increased in real

terms by 125 percent to 148 Baht per household per month... Overall, monthly household health expenditure from all sources increased by 55 percent to 343 Baht in 1996. (Donaldson, et al., 1999:17)

National health care financing has an important tool, National Health Account (NHA). It demonstrates how a country's health resources are spent, on what services and who pays for them. The NHA can be used by policy-makers for monitoring health expenditure patterns and policy instruments to re-orient the pattern. Since the National Economic and Social Development Board (NESDB) of Thailand produced aggregate health expenditure data but its estimation methods had several limitations. The NESDB consumption expenditure estimated in 1994 was 180,516 million Baht or 5.01% of GDP, of which private sources were dominant (82.17%) and public sources, played a minor role (17.83%). This had led to the research and development of a domestic NHA in 1994. The study found that health expenditure was accounted for 3.56% of GDP, which the discrepancy of consumption expenditure between the two estimates was 2.01 % of GDP.

The study for domestic prototype of NHA was conducted in 1994, through an agreed definition of health expenditure and methodology, in consultation with peer groups and other stakeholders. Without external supports, the initiative by local researchers emphasized on an inductive approach. It involved two steps: firstly, the flow of funds from ultimate sources of finance to financing agencies; and secondly, the use of the funds by the financing agencies. Five ultimate sources and 12 financing agencies (seven public and five private) were identified. The surprising result was that public sources of finance were responsible for 48.79% and the private for 51.21 % of total health expenditure in 1994. ((Viroj Tangcharoensathien, et al., 1999:342-353) It is likely that the NHA was correct according to the objectivity of research methods.

Five ultimate sources are the Ministry of Finance, households, employers, state enterprises and donation. Twelve financing agencies are the Ministry of Public Health, other ministries, Civil Servant Medical Benefit Scheme (CSMBS), municipalities, state enterprises, Social Security Office (SSO), Work Compensation Fund, private institutions, Employee Benefits, Traffic Act Fund, households and non-profit organizations respectively.

The statistical findings of the study disclosed that two major ultimate sources were the Ministry of Finance and households which took 44.7 and 49.4 % respectively while the other two major financing agencies were households and the MOPH which accounted for 40.15 and 26.97 % respectively. (Adisorn Laichuthai, et al., 1998:22-23)

The NHA study divided the total expenditure into two parts of consumption and capital expenditure. The consumption expenditure is distributed by financing agencies. As shown in Table 2.1 in Appendix A, Allocation of Consumption and Capital Expenditure by Source of Financing FY 1994, the total health expenditure was 128,305 Baht or 100%. There were five aggregated financing agencies including the MOPH and other ministries, other central government, local government, households and other private agencies. The MOPH and other ministries shared 32.35 percent while households that is only one among other private source, shared 44.38 % of the total health expenditure.

Regarding to the distribution by type of expenditure, the total consumption and the total capital expenditure were 107,867 and 20,438 million Baht respectively. Among the consumption part, households shared a major part of 46.05% while the capital part, the MOPH and other ministries shared about 60%. This implies that public source of health expenditure was consumed for construction and hardware investments whereas the private money was paid for the operation of health service delivery system.

Regarding problems of national health expenditure and source of finance, the researcher raised three policy questions; whether major health insurance schemes can increase their stakes in national health care financing in order to decrease individual financial burden? What are other government interventions for health care financing? And, what are optimal health policies and public choices, which may not lead to other problems?

2.2 Thailand National Health Insurance

There are four aspects of problems in Thailand's health insurance system. They are equity , efficiency, fairness and perceived quality of care. Regarding to health equity, there are some groups of people have no health insurance and the particular groups have shielded from existing health plans . The poor citizens who can not get low-income card because they have a little excess

of monthly income that is above the low-income program's criterion. Examples of the group are workers of agricultural sectors, autonomous and free lance professionals, labor workers etc. When they become serious ill and needs high medical care expenses such as cancer, AIDs, surgery, they can not afford the hospital charges. Although public hospitals allow the reduction of charge by hospitals' subsidized divisions, they need to pay in advance some of the charges. This cause households' debts. In addition, in case of accident and emergency sickness, they used to be refused from private hospitals.

Efficiency problems of health insurance can be verified by the following four examples. First, there are groups of people have two or more health insurance rights. Second, some groups of the insured uses unnecessary health care because of their perceptions of priceless care. Third, there are several medical care payments. For instance, public hospitals, which treated the CSMBS patient, had no incentive to economically use medical resources and hospital accommodations. On the contrary, capitation payment imposes health providers to control costs which sometimes it undermines the standard of medical care. And finally, the insurance system is not efficient because it emphasizes on curative care and deliver medical care, which is derived from the western medicine. It is not health insurance that covers all four necessary aspects including health prevention, health promotion, curative care and rehabilitation.

Due to both equity and efficiency problems mentioned above, people are still not convinced by primary health care system. The social security members are not satisfied with provided hospital care and lack of trust in quality assessment system and protection of beneficial rights.

2.2.1 Demand of Health Insurance Reform

Most developed countries provide health insurance system to their citizens. It is perceived as basic rights which every indigent is deserved to be protect from the government.. Health insurance protects ill people from financial loss. Different economic status should not hinder the ill people from all type of health care. Thailand now is developing country and our economic growth is not less than other neighbors in the same global region. The government should provide health safety net for every Thai.

Evolution of Thailand's health insurance has long been implemented with diverse plans and each plan has its own positive development. Particularly during the Seventh National and Economic Development Plan, the Ministry of Public Health expanded health insurance for the low-income indigents and the underprivileged groups. These free public health care has been a prime policy of succeeding governments since 1975. It enlarged to cover the six underprivileged groups including the elderly, children under 12, the disable, former soldier family, religious members, community leader and health volunteer.

In addition to the free health care policy, Thai government has also subsidized the Health Card Project since 1983. The plan was voluntary health insurance plan, which had not been sustainable according to several problems. Then the project has been adapted from village funding to the formal establishment under the jurisdiction of provincial health office and community hospitals since 1993. However, both health insurance projects are subjected to the Ministry of Public Health, which acts both role of purchaser and provider of health care. It has advantage of cost containment but it can not response to provider finance. (Sanguan Nitayarumpong, Supasit Pannarunothai and Samrit Srithumrongsawat, 2000:7)

Macroeconomic problem of the MOPH is the spiral increasing of national health expenditure. Its growth rate is more than GDP's growth rate. Although a recent National Health Account shows that proportion of public and private health expenditure are almost equal. (NHA1999) It implies that households purchases medical goods and services individually while collective funding and third party payers play rather minor roles. Therefore, it should be health insurance system for every people by using local collective funding to form community solidarity and encouraging third-party payers to enhance efficiency in health service delivery system.

2.2.2 Health Insurance Diversity

Chronological events for developing Thailand's health insurance plans are displayed in Table 2.5. Private insurance business was first established in 1929. Since 1990, passage of the Social Security Act has contributed enormously to the development of a social insurance for private employees. According to the most recent report of health financing in Thailand, there are five comprehensive subsidized health insurance schemes. In addition, there are special insurance programs for

work (Workmen's Compensation Scheme-WCS and Traffic Accident Protection Scheme). (Ministry of Public Health, Health System Research Institute, Management Sciences for Health, 1999: 6)

Table 2.6 shows characteristics of the schemes by type, percent, age of covered population, eligible characteristics, source and financing agencies. For instance, the low-income care scheme (LICS) is a social welfare type. The Ministry of Public Health finances from tax. It covers about 27 million people or 45 % of the population. Civil Servants, pensioners and dependents covered by government central budget are about 6.6 million people or 11% of the population.

The following clusters reflect the diversity of health insurance. National health insurance can be characterized by integration of four main groups of programs:

1. Public assistance programs to the indigents and underprivileged groups
2. Compulsory social insurance for private employees and car owners
3. Subsidy of medical care expense for public and public enterprise employees and their families
4. Voluntary health insurance plans of public and private organizations

2.2.3 Health Insurance Benefits

Not only does diversity of health insurance plans exist in Thailand's national health insurance, each scheme has its own distinctive health benefits. Table 2.7 displays a comparison of the benefits. For instance, aspects of the benefits differ including : choice of provider either restricted or free; cash benefits; inclusive conditions and services not covered, etc. Regarding the restricting choice of service, social security patients access to free care only at their main contractors and networks. Public assistance patients should follow the referral line of the public integrated health system.

The CSMBS has been changed its benefit packages since 1998. During the economic crisis, started in July 1997, the Finance Minister and Director General of the Controller General Department utilize several demand side interventions as short term and interim strategies to control the CSMBS costs. The Cabinet endorsed the measures in February 1998. Major contents of the strategies are full co-payment for the cost of non-

essential drugs with exceptions by the discretion of the hospital committee; co-payment for the extra-days of stay for private room; termination for the use of private patient care and doctor fee in evening clinics.

(Ministry of Public Health, Health System Research Institute, Management Sciences for Health, 1999:16-17)

Difference between health insurance systems affects health system equity. It causes poor income distribution. Poor citizens bear relatively high proportion of financial burden to income than others. The diverse health plans provide different benefits which signal health inequity. The difference between the CSMBS and the others have equity impact, efficiency, quality, accessibility, social accountability, and consumer protection which are all together the component of human rights according to Thailand's constitution.

(Universal Coverage of Health Care Committee, 2001:7)

In addition, difference in medical benefits and insurance causes unequal accessibility and lower integrity. Ordinary citizens who are not civil servants, social security members, private health insurance members or the ability to pay perceive poorer status than the others.

2.2.4 Public and Private sectors' Roles in Health Insurance

Health insurance may be financed by either public or public plus private or private financiers. Table 2.8 displays a typology of classifying insurance schemes by financier and provider. Social Welfare schemes and the Civil Servant Medical Benefit Scheme are financed by the general tax. Social security members and health-card holders are financed by premium integrated from public and private sources. And private insurance companies run business from a pool of premiums contributed by its members.

Regarding healthcare provision, both public and private providers share their health services. Conventionally, curative care has been given first priority. It seems to be less emphasized on health promotion and disease prevention. If there is no restriction of provider choice, people favors the private facilities than the public ones.

In general, there are two factors determining provider choice, the level of premium and the owner of healthcare facilities. For instance, the Health Card Scheme provides very low premium but also restricted choice of provider. On the contrary, the Social Security

Plan requires the earners' monthly premium but provides annual selected provider. This may be because they have not their own health facilities. The plan has to contract with either public or private hospitals for providing medical care to its members. Some special private plans utilize the provider choice to control the medical care costs, which allow the facilities that must be on the list approved by the financier. (Anuwat Supachutikul, 1996:44)

2.2.5 Payment mechanism

In addition to diverse insurance plans and covered benefits, payment mechanisms also differ. As shown in Table 2.9, the modes of paying providers vary by type of insurance. There are three major payment mechanisms including public budgeting, capitation and fee-for-service. Table 2.10 provides information comparing insurance plans' payment mechanisms, co-payment requirements, and utilization rates by admission per 100 member, the average length of stay, outpatient visits per capita and the average expense per capita per year.

Comparing medical care utilization among insurance schemes, it shows that not only is the average annual expense for the CSMBS is the highest among others, but the number of outpatient visits, the number of admission, and the average length of stay are also the highest figures. A civil servant beneficiary spends about 12 days in hospital while low-income indigents stay 5.1 days. In addition, Social Security patients are admitted at a rate of 2.6 admissions per 100 member. However, the fringe benefit patients are admitted at the rate of 13.6 admissions per 100 member. It can be concluded that fee-for-service, as the type of payment for the fringe benefits plan, has induced demand for unnecessary care as well as medical care.

As already known, the cost containment of most insurance plans can be controlled by particular payment mechanism, namely, capitation. Prospective and capitated payment is more cost-effective than the retrospective, fee-for-service one. The Civil Servant Fringe Benefit Scheme with the criteria of fee-for-service payment, has been claimed to be a non cost-effective payment mechanism.

Regarding to cost containment, a type of co-payment has been introduced to control medical care costs. The fringe benefit patients have to pay hospital charge for non-essential drugs and pay an extra accommodation charge

for inpatient days. It is a short-term intervention to control medical care demand by the Ministry of Finance. This mechanism is likely to limit utilization of the beneficiaries but we do not know how it affects hospital revenue and cost containment.

On the contrary, almost half of the total population of the SSO patients uses healthcare benefits in public hospitals. Outpatient visit is 1.4 visits per year compared to 5.5 visits for the fringe benefits. Some measures have been introduced to increase the utilization rate of this group. The Social Security Office increases the demand on the provider side. Hospitals that sent monthly utilization reports and deliver a higher rate of services will be awarded the extra money for relatively high level utilization, which is believed to reflect quality of care delivered to SSO's members. However, it is not the case.

In conclusion, the nature of health insurance including its demand, diversity, health benefits, the roles of financier and provider, and quality problems derived from different payment mechanisms are described above. We can conclude that Thailand has diverse types of insurance plan like other countries. Problems such as high cost and inappropriate care have their roots from fee-for-service reimbursement. Government measures to contain cost in the scheme have not yet really been effective. It is useful to explore those factors contributing to hospital fees. Whether differences in payment types induce the variation in hospital charge? In order to understand more about each plan's problems. Next we will move to description and comparison of the social welfare and the fringe benefits scheme.

2.3 Health Insurance Situation Analysis

2.3.1 The Social Welfare

The background of social welfare was disclosed by previous studies of healthcare financing. A main reason for government subsidy for medical care was the concern of social equity. Thai government has provided free health care to particular groups of citizen such as the low-income eligible, elderly, disable, children under 12 years and others. The program subsidized more than 45 % of the population or 27 million people in 1994. The appropriate budget in 1995 was 4,143 million Baht. (Anuwat Supachutikul, 1996: 49)

One of the public subsidy programs was the Low-income Insurance Care Scheme (LICS) which started in 1975 within the Fourth Health Development Plan (1976-1981). The initial targeting for the low-income plan was only 7-8 million person per year. At the outset during 1976-1980, eligibility card was not legally issued. Subsidy decision to the poor was at charity perception and self-discretion of public hospitals' staffs.

There had been continuous improvement of the criterion for selecting the program's eligible. The first documentation of low-income identification card was provided in 1981. It aimed to waive the verified low-income citizens during three-year period. The second, third and forth issuing of the card was issued during the period of 1984-1987, 1987-1990, and 1990-1993 respectively. In 1994, the scheme changed the means test criterion from the earning of 1,500 Baht for single individual and 2,000 Baht per month for one household to 2,000 and 2,800 Baht per month respectively. It was perceived that there had been succeeding developments of the program by changing the means test criterion.

The program had fast increased the coverage of population. A health policy study of low-income plans showed that the annual increasing of the low-income card holders were inconsistent with the poor citizen of the country. Although there has been proportionate increasing of the low-income budgets each year with the number of the eligible in every region but the allocated budgets were not proportionate with the number of all underprivileged groups. Medical expense of the uninsured groups was relatively higher than the low-income eligible. Most public providers perceived inadequate budget and uneven distribution. (Chutima Suraratdecha. 1999: iv)

According to her study, while the number of people under the poverty line reduced, the number of low-income cardholders has continuously increased . Table 2.12 in Appendix A showed the amount and the percentage of the low-income cards, compared with the number of poor persons and poor families between 1996-1998. Both the percentage of the poor persons and the percentage of people in the poor families were much less than those of the low-income eligible. For instance, the poor accounted for 14.45 % of the total population, compared with the cardholders as 22.38% in 1996. It was likely that the scarce resources had been channeled to the inappropriate groups, which reflects social inequity or not all of the eligible are poor.

There were patients who had not showed any health insurance cards, being treated in public hospitals too. It implies that the really poor can not be provided public subsidy via the LICS. The report disclosed that there were the B-type patients. As shown in Table 2.13 there was enormous number of the poor with no insurance being provided both outpatient visits and inpatient admission. In 1996, about 3,642,714 outpatient visits by the uninsured. And in the following year 1997, more than 1.5 million admissions were attributed to the group. They are people who are not legally access to necessary healthcare. The real problem of the LICS was not only inadequate funding but also wrong targeting of the needed. Dow Monkolsmai (1993:57) contended that

...However, apart from the problem of coverage, the free medical care program for the low income was often criticized of misclassify the poor, and hence a significant proportion of the patient benefiting from the program were not eligible. Two studies on the coverage of the program may help to verify this criticism..

In short, there was inefficient allocation of appropriated resources in this program, which affected health equity. There has been continuous increase in low-income cardholders as there has been the increase public subsidized budgets. As shown in Table 2.15, the channeled budget for the low-income has increased every year since 1996. From 1996 to 1998, the budget has increased from 4,000 million Baht to 5,800 million Baht. (Chutima Suraratdecha, 1999: 27-30) The increase was partly the result of the expanded efforts in reaching the target groups. Although the Health Insurance Office has changed resource allocation criterion, may be the dysfunction of provincial health bureaus would be claimed for the disproportionate distribution of provincial resources among community hospitals and public health units.

It can be concluded that one of the Thailand's social welfare programs have affected health inequity to the society. There are substantial numbers of those who deserve to have the rights but do not get the low-income cards. It implies that the program does not only serve the non-poor but also those public hospitals have to subsidize many patients. Those who deserve to receive the rights have been neglected, implying that a certain number of people lack the opportunity to access medical care.

2.3.2 The Fringe Benefit Scheme

Public employees, like other private counterparts, have to be provided additional compensation or fringe benefits. The inpatient reimbursements for civil servants, pensioners and dependents are directly reimbursed to public hospitals by the Controller General Department of the Ministry of Finance. The government burden of the CSMBS expense has been rising steadily since 1988. The rate of increase was very sharp, especially after 1992. In 1993, the medical expenses for government employees was nearly four times that of the indigent budget, while the number of low-income cardholders was three times that of the government beneficiaries. (Anuwat Supachutikul, 1996: 47)

The rising medical costs may due to the changed pattern of utilization and elderly problems. The central budgets for the CSMBS were substantial increased with bias to inpatient rather than outpatient expenses. Table 2.17 disclosed the CSMBS expense by type of service. The ratio between outpatient and inpatient services changed from 41:59 in 1988 to 34:66 during in 1994. Total expense for 1994 was about 10,000 million Baht. The increasing rate of inpatient expenses was faster than outpatient expenses.

In comparison by type between civil servant and pensioner, the increased rate of inpatient expense for the former was less than the latter. Table 2.19 shows that the increase rate of inpatient expense for the civil servants and pensioners since 1989 to 1994 were 9 to 27%. On the contrary, the increased rates of inpatient expense for the pensioners in the same period were 26 to 39 % respectively. A reasonable explanation for this difference may be the more serious health status of the pensioners. Demographic characteristics of the pensioner group are more subject to serious illness than the civil servant group.

Historically, the CSMBS provided comprehensive benefits, including inpatient reimbursement from the private hospitals. Table 2.18 displayed the variation of expenditures between civil servant group and pensioner group in public and private facilities from 1988 to 1994. For the civil servant group, the rates of increase in utilization in the private hospitals were more than in

public hospitals. For instance, between 1993-1994, the rate of increase expenditure of civil servant patients using private hospitals was 35 % compared with 25 % at public hospitals.

This implies that the civil servant group preferred to use private facilities rather than the public ones. On the contrary, the pensioner group preferred to use public facilities to the private. This may have been because of limited income and the co-payment criteria for using private hospitals at that time. However, the private allowance has been abandoned. However, ratios of utilization between public to private facilities were similar. They were 74:26 and 75:25 for the civil servant and pensioner group respectively. This may be due to the limited amount of inpatient reimbursements of private utilization of the CSMBS.

The reimbursement of the CSMBS reflects inefficient use of tax resources and eventually causes financial burden to the government. The phenomena were resulted from several structural problems. First, Controller General Department does not have a cap limit of the CSMBS expense per year. Public hospitals' direct reimbursements induce unnecessary care and higher charges than all other patients. Second, there are no systematic collection of actual number of the beneficiaries, utilization and quality of medical providers. They are approximately 8 million people who might have several types of health insurance. There is no central office to systematically monitor abuse claims (if any). And third, because of the absence of co-payment, which serves as intrinsic incentives to control patient demands and high charged behavior of public hospitals, it is rather difficult to control CSMBS expenditures.

It can be concluded that there are two causes for the increasing expenditure of the CSMBS. First is the criterion of payment and the second is the lack of a responsible office for cost containment. Both our descriptions of the LICS and the CSMBS have ample evidences of inefficient use of resources and widen health inequity. Future burden of social welfare might due to the demographic change.

2.3.3 Health Status of the Population: the Elderly

Utilization pattern of the CSMBS showed that the more older group of patient uses more resources. Not only the LICS insures the elderly, there has been increasing trend of elderly proportion of the CSMBS patients too.

Increasing elderly groups enhances the probability of the government's financial burden. For instance, a survey of the elderly in 1995 discloses the demand of medical care of the elderly over 60 years. (Janpen Chuprapawan, 1995) Table 2.21 shows age distribution by sex and a comparison of Thailand's survey data and predicted data from the United Nations. Both data show that there is a consistent growth of the proportion of female elderly.

The study analyzed that the more information the elderly obtained, the less was the perception of poor health. Regarding the elderly perception of their own health, one third of the sample evaluated themselves as poor health. They demanded medical care. The study also compared the relationship between getting health promotion information and the perception of health status. According to Table 2.22 displayed the perception of own health status by the elderly over 60 by sex, 23.9 percent of them perceived themselves having poor health and 10.8% of them, weak health. Therefore, one third may need medical care.

The study also found that there was decreases incidence of most chronic diseases of the elderly between 1994 and 1995. Displayed in Table 2.23, for males, the incident of hypertension decreases from 22.1 percent in male elderly to 14.4 %. For both sexes, the percentage of incidence of peptic ulcers reduces from 20.5% to 13.1 % respectively. Only diabetes showed a rate of slightly increase in the female group from 5.6% to 6.8% between 1995-1994. In short age is one demographic characteristic that relates to severity of illness. With increasing proportion of female elderly and diabetes incidence, the remedy action should be advocating behavior change of the elderly.

2.3.4 Medical Service Delivery System

The following description of Thailand's medical service system roughly describes the factors influencing medical service delivery system. There are six major factors relevant to problems of health providers. They are population change, change in the sickness pattern, change in hospital role, limited national resources with trend of increasing health expenditures, shortage of both physicians and specialists in rural areas. (Supata Srivanitchakorn, et al., 1996) The study provides descriptive analyses of all the factors mentioned above.

Public health services should be responsive to local population needs. The system has to adjust to the change

in its population structure. Present characteristics and the structure of population has been changed. The number of younger children less than 15 years has fallen from 45.1 % to 33.4 %. Working adults have increased from 50% to 60.6%. The proportion change may affect sickness incidence. In addition, people have a tendency to be sick from chronic diseases and disease caused by behavioral change.

Behavioral change is the effect of change in their ways of life. People migrate from rural to urban areas. Daily life changes from agricultural and self-sufficient culture to civilized and material-driven patterns. Whenever human behavior changes, patterns of sickness change correspondingly. More and more people have been suffering from depression symptoms, chronic diseases, AIDs and disease according to biological hygiene and natural intrusion environments.

Table 2.24 provides the changing proportion of population in sub-urban areas between 1978 and 1987. The sub-urban area is defined as a locality with a population density of 1,000 person per square kilometer and has more than 5,000 people in the community. On average urban population increases from 23.0 to 26.6 percent within the past decade. The central region has the rate of change higher than the others. Urban population in the central region increased from 18.3 % to 29.9 % in the same period. Evidence of urbanization has affected the pattern of disease.

Second factors affecting the development of health service delivery system are changes in the disease pattern. There has been incidence of some problematic diseases and the increasing incidence of behavioral diseases as shown in Table 2.25. Among the ten leading diseases that used to be major causes of death, some have reduced their rate of occurrence during the period 1967-1988. The reduced diseases are Tuberculosis of all forms, Pneumonia, Diarrhea diseases, Malaria, Diseases of the Stomach and Duodenum, and Nutritional Deficiencies. On the contrary the increased rate of diseases are Injuries and Poisoning, Disease of the heart, Malignant Neoplasm. For instance, heart disease had increased from 16.5 to 44.5 % and Malignant Neoplasm raised from 12 to 33.5 %. It can be concluded that major causes of death are diseases relevant to behavioral change and environments.

Third, physicians in health service delivery system should be changed according to attitudes toward patients. In order to avoid readmission and disease complications, health care should be holistic with total and continuous

quality improvements. Physicians in public hospitals should be alert to change their attitudes to be proactive care. Conventionally, health care depends on hospital care, which is viewed as non-cost effective healthcare. Since health care is comprised of acute and chronic care, the role of public hospitals are conceived as a provider of ambulatory care, cures for complicated diseases, and special equipped with medical treatments. It must be changed to more cost-effective healthcare.

Nowadays, patients with behavioral and chronic diseases have required another close-up care, home care and training of self-care. Healthcare providers should facilitate cost-effective healthcare including health prevention, health promotion, traditional medicine, alternative medicine and home care.

Fourth is the conflicting problem of increasing health care expenditures and limited government resources. Comparison between the percentage of change in GDP and national health expenditure reflects the inefficiency. Evidence of the lack of allocation efficiency are the private sector growth, the non-compliance to appropriate referral conditions and direct access to hospital care and no control of expensive equipment.

Fifth, the shortage of physicians and specialists in public hospitals in rural areas appears to be the result of non-proportional distribution of human resources. Although there has been an increasing trend towards producing physicians, the outputs are not equally distributed between rural and urban areas, primary healthcare and higher hospital cares. Half of the graduate physicians work in Bangkok, which is the habitat of only 10 % of the total population. Although there has been a rapid increase in the number of medical specialty and sub-specialty in medical schools, particular fields remain inadequately staffed. (Supata Srivanitchakorn, et al., 1996:22)

Sixth, unqualified primary health care unit is the last structured problem. In rural areas, two health care units provide primary health care is community hospitals and sub-district health offices. Most indigent people prefer community hospitals than local health offices. Ayuthaya Project in 1990 found that the common health problems of the indigents can be effectively and economically treated at sub-district health offices.

In short, the problems and normative changes in the medical service system in Thailand lie around six domains. They involve demographic change, pattern of

disease, physician attitude, inadequate resources and inefficient management, disproportionate distribution of physicians, and the unacceptable quality of primary health care units.

2.4 The Conduct of Regulation

Thailand's healthcare regulations should be reformed immediately. How to draft appropriate regulations to be a legal umbrella for the whole system remains ambiguous. Normally, government agencies use rule making to carry out their office practices. Rules, or regulations, are conceived as an agency's statements that implement, interpret, or prescribe mandate guidelines. Rules may be generated to carry out a new law or to modify rules under an older law. For example, after established by the first Royal Decree in 1980 and amended several times later, in February 1998 the CSMBS was imposed by the Cabinet to terminate any use of normal, private medical care. The regulation required its legitimization by the 1999 Royal Decree. In this case, the Ministry of Finance just only modified the rule.

Often legislation contains only prescribed directions for agencies while allows them some discretion. For instance, present civil servants are allowed to reimburse expenses from private facilities only in the case of emergency within the conditions, specified by the Ministry of Public Health. The allowance needs an issuance of medical necessities from the admission hospital's medical committee. If any high technological devices are not available in the hospital, his physician can prescribe the equipment utilization in private hospitals. This reflects the flexibility of the regulations.

Because of the technical and professional nature of physician practices, there has typically been close involvement of physicians in developing laws and regulations as well as their interpretations. National medical association is usually given formal recognition and may be empowered to establish licensing and registration procedures for physicians and hospitals. The association should investigate professional misconduct and imposing legal and social sanctions. However, it is only in theory. Self-policing role of professional bodies have often been viewed as a regulatory capture. It can be concluded that professional personnel take major role in both generating rules and putting them into effect.

2.4.1 Characteristics of Regulation

According to Peabody, et al. (1997:327)

...Regulations must themselves meet certain conditions if they are to be successful. First, what is demanded by the regulation must be clear and unambiguous. Vagueness, such as mandating 'adequate facilities' led to ambiguities that defied enforcement and were not successful.... Licensing requirements for institutional providers should include minimum standards for hygienic environments and minimum standards for qualified personnel. Second, regulations must be feasible and complying with the regulations must not be too costly for the regulated. This is necessary to lower incentives for persons to ignore regulations. Finally, the government must have both the will and a credible mechanism to enforce regulations and to detect and punish infringements...

Proponents of regulation making contend that many rules and directives have yielded numerous benefits to the public whereas opponents warn negative impacts. For instance, General Controller Department has put demand side interventions as a short-term interim strategy since 1998. The cost saving is between 13-15 percent annually. Although the magnitude of cost saving is not convincing, it has made rational use of resources.

However, the regulatory process generates its own negative impacts. For instance, the reimbursement conditions that specify beneficiaries to pay for the cost of non-essential drugs and the cost of private rooms beyond the length-of-stay limit. The regulation reform has deterred chronic patients. Co-payment for extra-room and board has reduced the average length of stay. The stroke victims, renal failure, operation or other chronic condition patients are subject to be discharged inappropriately.

An example of negative effects of the MOPH's regulation appeared to be the case of drug procurement of public hospitals. The MOPH made a directive of drug management reform in February 1998, non-essential drug items in hospitals' list were trimmed down according to the mandate with increasing proportion of essential drugs. Types of prescribed drug by physicians are needed for patients who might be issued under the non-essential drug list. Patients have to buy the prescribed, non-

essential drug from private pharmacies. They bear these extra costs which might undermine utilization.

Because of the very substantial costs and other adverse side effects that government regulation gives rise to, our society has to take a hard look at the array of government controls over healthcare. In theory, government regulation should be carried to the point where the incremental benefits equal the incremental costs. Over-regulation, which can be defined as situations where the costs to society exceed the benefits, should be avoided. In practice, however, it is difficult to measure with the necessary precision to make such determinations.

In short, many developing countries, public governance structure, private institutions, and information availability is less developed state. Preconditions for effective regulation require the development of a good governance structure as well as public integrated with private institutional networks, effective implementation and periodical evaluation of health sectors. For regulation to be complied with, governments must have coherent organizational structures, technically competent, multi-disciplinary staffs, effective intergovernmental relationships, which allows efficient information flow and implementation at all levels-national, regional and local.

2.4.2 Health Financing Regulation

Legal and regulatory interventions usually affect recurrent costs; availability of inputs needed by providers; prices of services; distribution of services and the quantity as well as quality of services. The legal interventions are typically coercive to control undesirable behavior. They are contrast to indirect financing regulations, whose content is persuasive rather than coercive. The latter encourages desirable behavior.

In dealing with controlling the performance of health providers, there is an important distinction between regulation by incentive and regulation by directive. (Rutten ,1996:215-299) To apply incentive regulations, innovative measures should be invented to stimulate health workers acting efficiently with social accountability. On the contrary, directive regulation involves setting up of the procedures that health providers have to follow.

It can be concluded that these two types of regulations-regulation by incentive and regulation by

directive or coercion have different effects on health service deliveries. Both kinds of regulation are necessary and complementary. They should be put together to ensure efficient medical care. Because people and organizations are complex and information is not always available, then, no set of incentive structures would change undesirable behavior. Thus, incentive measures need the supplement of directive regulations at the beginning. As the consequence, enforcing regulations would be much easier and much more successful.

2.5 Chapter Conclusion

This chapter highlights the empirical analyses of national health expenditure and its distribution among public and private sector, particularly, households medical expenses. Although several health innovations have been implemented, there are many fallacies exist. Actually, it is not only insufficient funding for the social welfare plans but also the wrong targeting of population. More than that, public subsidy for the government employees lacks the effective management of payment system. Among diverse health plans, only two health insurance systems are prominent. They are the social welfare, and the fringe benefits plan of government employees. Appropriate financing regulations should be set up to induce desirable provider behaviors.

CHAPTER 3

THEORETICAL FRAMEWORK AND A PROPOSED MODEL FOR ANALYSIS

3.1 Theoretical Framework: Review of Literature

3.1.1 Health Care Financing Model

All developing countries face three major policy questions. One is how to get sufficient funds to finance healthcare; second, how to allocate the funds and organize their healthcare delivery systems to produce the most health benefits; and third, how to control their health expenditure. To establish an appropriate financing mechanism for a country, where to place the locus of decision making identify each national health financing model. It may lie with customers, providers, the government, insurance plans, other financiers, or mix of them.

Willam C. Hsiao introduces a framework for assessing healthcare financing models. The framework classifies financing institutions by locus of decision making. (Hsiao, 1995) The locus of power determines who will receive health services, how resources will be allocated, and how healthcare will be organized and delivered. His framework contends that national financial power can be retained in either public institutions or third-party payers or citizens.

If the locus of decision making locates in the government, it is general tax financing. If a nominated organizational unit has been assigned to administer the health funds, it is social insurance. And if free choice is available for citizens, it is pluralistic health insurance. General tax financing and social insurance are compulsory financing whereas pluralistic health insurance, voluntary financing. All of these systems are graphically displayed in Figure 3.1

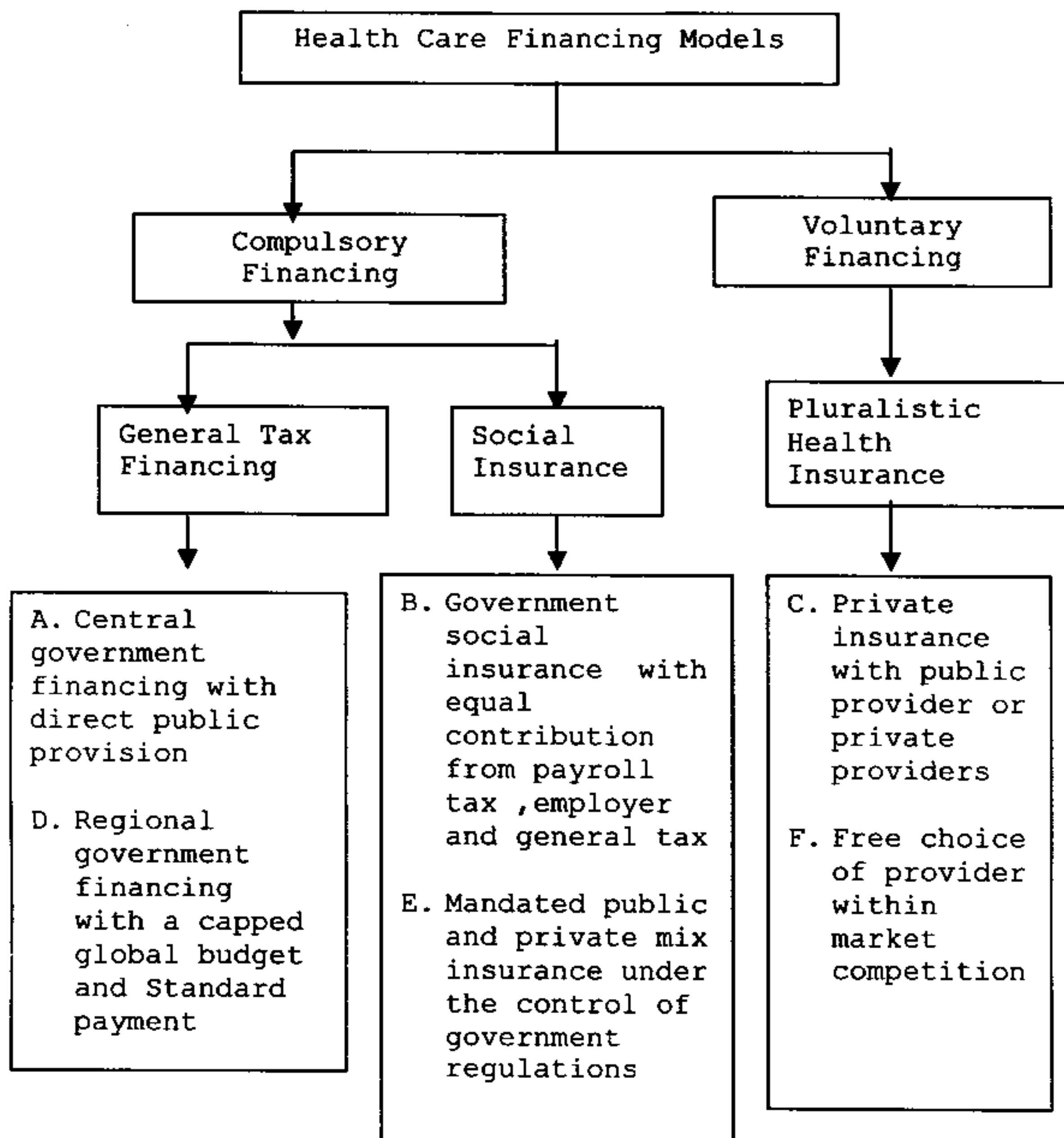


Figure 3.1 Health Care Financing Models

Source: Hsiao, William C. 1995. A Framework for Assessing Health Financing Strategies and the Role of Health Insurance. in **An International Assessment of Health Care Financing: Lessons for Developing Countries**. David W. Dunlop and Jo M. Martins, eds. Washington, D.C.: The World Bank.

Health financing in developed countries usually comprises of sub-systems A,B,C (classical models) and/ or D,E,F (radical models) in figure 3.1. A new purchasing-provision dichotomy implies that governments need not provide healthcare by using their own facilities but contract to private or autonomous public health units. For instance in model D, regional government may finance local healthcare with providing a capped-budget and standard payment to public or private hospitals. They may purchase healthcare for the eligible by contracting all health services to both public and private providers under negotiated agreements.

Regional health financing with indirect provision and a single-channel payment within a global budget has been proved satisfied to the above needs in most developing countries. The indirect healthcare provision encourages competition between both public and private health entities. As the consequence, the governments' health finance would reach its efficiency. Health equity, quality of health care, and responsiveness to local need can also be achieved by decentralizing the allocation of resources to local authorities and health units.

In model B or E, social insurance are viewed as collective financing which can draw more money from individuals, private entities and the government. These types of health financing help freeing public resources and make them for the under-funded health programs. However, the governing body should be independent from political pressure and should not be bureaucratic organization. Finally, the last types of health financing in model C or F are pluralistic health insurance, which provide more wider choices for citizens.

3.1.1.1 Health financing models in developed countries

Developed countries have different health objectives from developing countries. A health financing system may be comprised of one or some of the models. There are distinctive examples of healthcare financing models in some developed countries. For instance, Canada, Sweden and United Kingdom provide universal coverage of healthcare by decentralizing health service delivery to regional level and controlling public health expenditure with a global budget and standard payment. Some countries organize the

financing in specific ways. They may introduce a national healthcare financing to pool financial risks. The new established health insurance scheme specifies particular payment criterion and expected used rate. Logically if higher rates are paid for primary healthcare and prevention, the incentive structure attracts medical professionals and capital investments to proactive services. Therefore the payment rates and its mechanisms determine resource allocation and healthcare utilization.

To achieve universal and equal access to health care; to control health expenditures; and to ensure efficient use of resources, developed countries have applied their health financing strategies and policy processes within their contexts. The sources for finance may be either from general taxes and/or social insurance. The budgeting process, capped by a global budget, encourage efficient organizations. The negotiating process between providers and payers provides political justification of the single payment method. However, alternative payment methods have to be appropriately designed according to each country's cultural and political contexts. (Haiso, 1995)

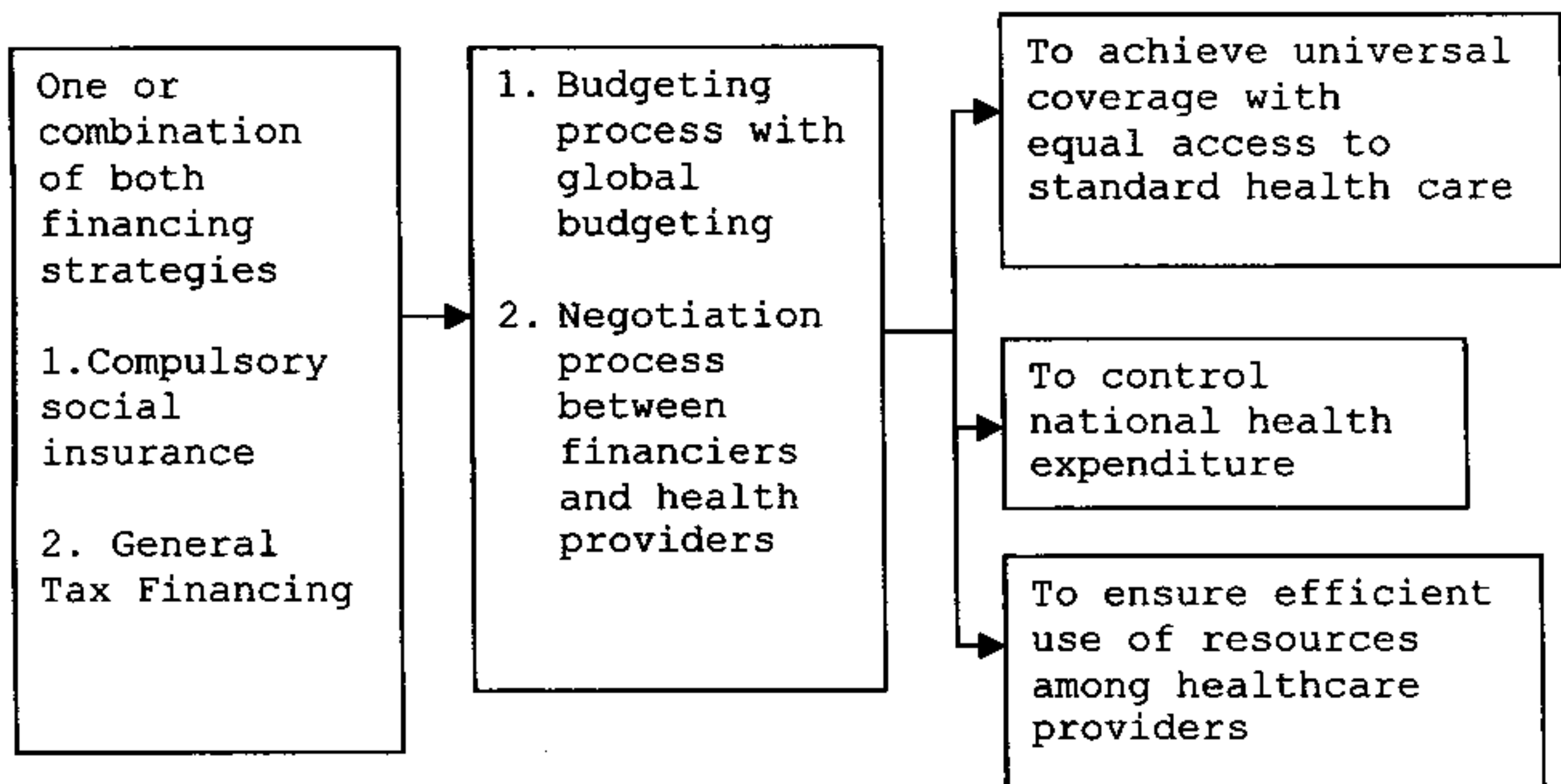


Figure 3.2 A Graphical Display of Universal Coverage Financing in Developed Countries

However, crucial concern of the rich nations over the past twenty years were not how to finance healthcare, but how to control the costs of those cares. For instance, the United States has introduced the DRGs payment since 1980s. Unexpectedly the managed care has increased the economic constraints on both patients and providers, thus allowed national health expenditures to escalate rapidly.

Although most European countries have either a compulsory universal health insurance or financed through social insurance schemes or general taxes, they are now searching for more cost-effectiveness health programs . On the contrary, developing countries have confronted with other problems, entirely different from the developed countries. Healthcare financing is not only one objective of health system development. Policy makers in developing countries are going to create an integrative system of financing, payment, and delivery that can achieve their society goals. (Hsiao,1995)

3.1.1.2 Public health financing in developing countries

Public health financing refers to a government's effort to finance healthcare from public revenue. Most developing countries concern more on public health financing because of insufficient treasury. There are three important problems regarding the health financing: insufficient funding for universal coverage healthcare, internal inefficiency of public health programs and inequity in the distribution of benefits from health services. (Akin and Birdsall,1988)

Health financing in developing countries was not sufficient to meet critical health needs. Akin and Birdsall cited that

...In most developing countries, public spending in all sectors grew rapidly in the 1960s and 1970s. But slow economic growth and recorded budget deficits in the 1980s had forced reductions in public spending... Public and private spending together in developing countries was on the average less than 5% of that spent in developed countries. Even if this money was spent as cost effectively as possible, it would probably be insufficient to meet critical health

needs... For the foreseeable future, government efforts to improve healthcare are unlikely to rely on the increase in public spending financed by taxes or debt or on the reallocation of public expenditures from other sectors, even though such increases or reallocation would be economically as well as socially justified...

The problem is how to get more health resources. Whether a government can increase public health care financed by alternative approaches? Major causes of problems are the increasing demand for healthcare and decreasing of public budgets due to economic recession. The decreased public budgets imposed financial pressure on the supply-side healthcare-hospitals and physicians-which, in turn, undermined health outcomes. (Horowitz,1989)

Theoretically, whatever can be done should be socially justified which are based on two principles. First, the government should pay for services that provide basic health benefits to the society as a whole. And the second, government should reduce resources for the rich and spend more for the poor. Simply stated, normative approach should reduce the government's responsibility to pay for the kinds of health services that provide few society benefits. Then more public resources would be available to pay for urgently health programs.

Naturally, individuals are generally willing to pay for direct, largely curative care with obvious benefits to themselves and their families. Both financing and provision of these private types of health services should be shifted to self-sufficient entities. They may be either private hospitals or autonomous public hospitals.

3.1.1.3 Designing normative health care financing model

First of all, to design any alternative model for healthcare financing, we should consider relevant type of health goods and services delivered in the industry. The goods and services provided by a health system can usefully be classified with respect to who receive the benefits from them. (Akin and Birdsall,1988: 3) At one extreme it is the purely private goods, for which all benefits of use are captured by the person who consumes the health services, and the other extreme is purely public goods, for which

have positive externality to all members of the society .(Horowitz, 1989)

Healthcare is comprised of multitude of services and programs, ranging from maintaining clean water and sanitation habitat to cosmetic surgery and organ transplants. Using economic principles, we can subdivide health care into three major categories: public, merit and private goods and services. According to the Pure Theory of Public Expenditure, it is socially responsible for governments to finance and provide the first two types of services while it may be more efficient for the free market to finance and provide the third. (Samuelson, 1954)

Public goods are non-exclusive and/or non-rival in consumption. (Hsiao, 1995) Non-rival good implies that the consumption by one person of a public good does not lessen the quantity of that good available to others. Non-exclusive good infers that it is impossible or costly to make the consumption of public goods exclusive to those who demand to pay. In healthcare, most of public health and preventive programs provide public goods. Examples are programs to provide clean water, sanitation, vector control, road safety, air and water pollution control, and fluoridation of water and health education.

In addition, there are four major types of merit goods. The first type refers to services of which the consumption produces greater social benefits than private benefits, such as family planning and certain primary healthcare. The second type produces positive externalities such as vaccination and control of sexually transmitted diseases. The third type of merit goods includes services possessing significant interpersonal utility values such as emergency services for traumatized patients, medical services to relieve acute pain and basic health services for vulnerable people. Every society has a vulnerable population such as children and possibly women and minorities who may be powerless to make consumption choices. And the fourth merit good includes services where individuals lack sufficient education or rationality to make rational consumption decision such as preventive services.

Private goods are those services that exclusively benefit persons who consume them. If a person consumes it, it has no benefit to the others. Because of their exclusivity, markets can produce and distribute them efficiently. Most curative services and sale of drugs fall

into this category. Figure 3.3 demonstrate the logical relationship between alternative health care financing and willingness to pay of healthcare.

The following diagram demonstrates distinct types of services and the relative extent of individual's willingness to pay for them. While consumers are almost always willing to pay directly for health services with largely curative care, they are generally reluctant to pay directly for programs and services, which benefit society or communities as a whole. Consumers tend to wait and hope that others would provide related funds for the provision of public goods. General tax rather than user charges should fund public good health services.

The typology of health goods in the above framework relates individual willingness to pay and alternative health financing. Since individuals are willing to pay for curative care rather than merit goods or other public goods. Curative charge policy is recommended for hospital services. On the other hand, government spending should emphasize on social insurance policy and the other alternatives.

There are three alternatives for public financing. The first alternative is a social insurance policy. In general, it may be either government-sponsored social insurance plans or compulsory social insurance from payroll taxes. For example, low-income countries in Africa and South Asia as well as middle income countries in Latin America and Asia invested in the government-sponsored social insurance programs. The advantage of the social insurance plans is to mobilize resources in the short run, reduce curative care expenditure in the long run and protect households from large financial loss from catastrophic illness.

The second alternative is community-run and privately managed cooperative health plans. This option encourage reduce the government's direct provision and provide opportunity to private or non-governmental providers. The governments should shift their roles to only supervision, training, licensing or standard setting, monitoring, sanctions by regulation. Providers should be not-for-profit providers, private clinics and hospitals, private pharmacies and other health practitioners. The MOPH, on behalf of the government should have the following roles and left the rests to private sector and non-government entities.

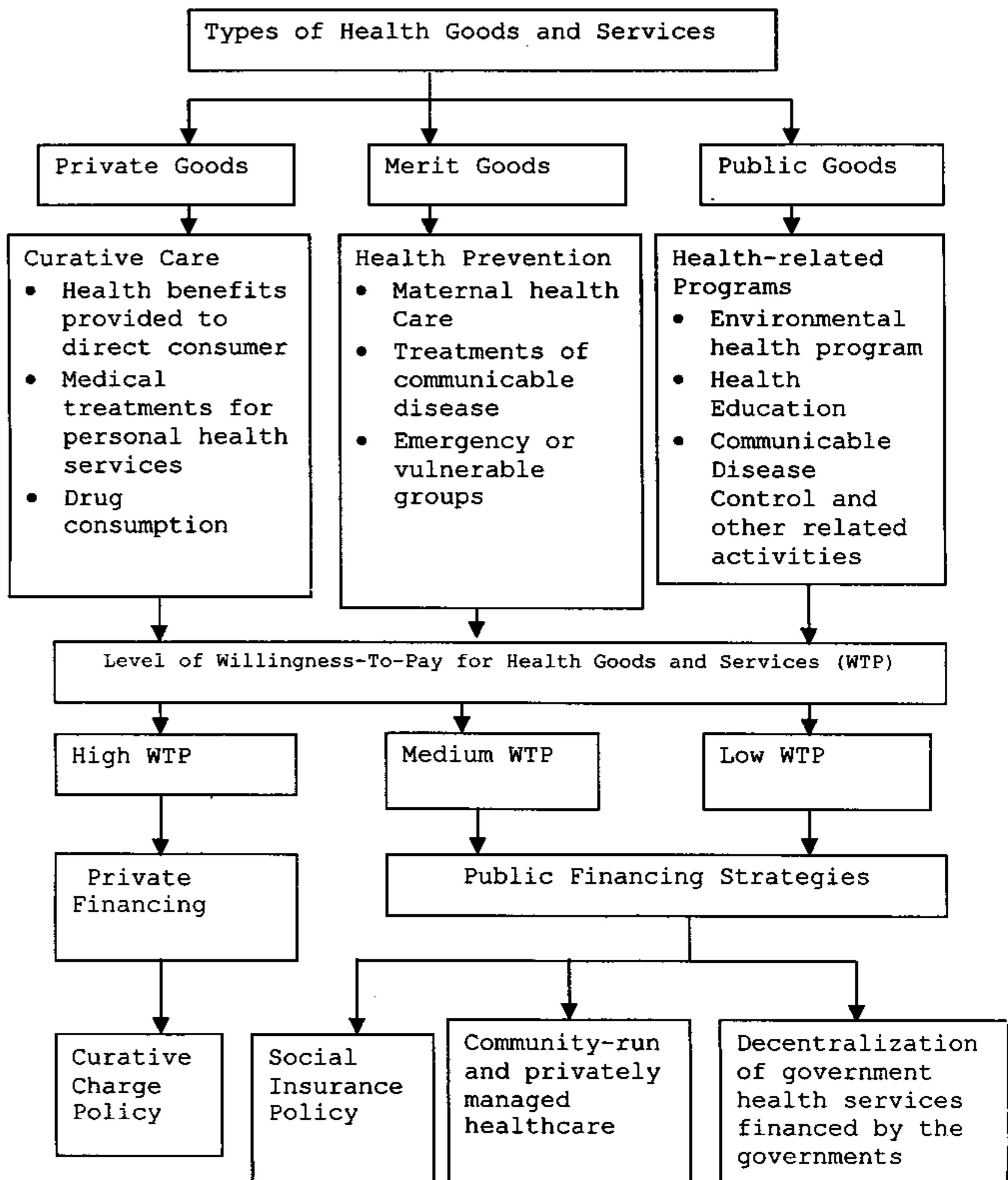


Figure 3.3 Type of Health Goods and Services, Willingness-To-Pay and Health Financing

1. To support healthcare providers
2. To oversee and guide health activities in communities
3. To conduct prohibition and restriction reviews of health service delivery system
4. To train health workers and check their competency
5. To licensing not-for-profit organizations to be health providers
6. To set standards and regulations to protect the populace from untrained and unethical providers
7. To develop a legal framework for the prepaid health services
8. To disseminate information of health insurance , health services, consumer protection and health education.
9. To conduct research and development in healthcare

The third alternative is the decentralization of government health services, which are financed by general revenue to local authority. Public hospitals are going to be decentralized to be autonomous organizations. They can serve the purchaser of local health committee.

For curative care or direct health benefits to customer goods and services, physician practitioners with medical facilities would provide the care and charge for their cost recovery. It is the market incentive that motivates staffs, collection of user fee at the service point, allocating internal market and purchasing other services. However, curative pricing or rate of charge should be subject to the government's mandates to protect over charged services.

In sum, it is very important to consider type of goods that health organizations should provide. They are three types of health goods including public goods, merit goods and private goods. Because public goods and merit goods contribute to social benefits more than private benefits, it is efficient to consider three public financing models. They are (1) social insurance policy; (2) Community-run and privately managed cooperative health plans; and (3) the decentralization of government health services financed by general revenue. For social insurance, financial sources are both public and private responsibilities. Governing body should not subject to both political and bureaucratic pressure. Regarding community financing, governments should provide public subsidy to non-governmental entities and

change the government roles to supervise and assure quality of care. The last strategy, decentralization of the government's health services should promote public providers to be autonomous, not-for-profit provider organizations.

Policy implication of health financing strategies above contends that the government should have the obligations for provision of only public goods and the four groups of merit goods, while the private goods are left for the private and not-for-profit providers under free market competition. This implies that curative care is personal responsibility. Curative charge policy should be intervened by the government to control both public and private hospital pricing.

3.1.2 Payment Mechanism

3.1.2.1 Payment types and their mechanisms

Payment method is a very important mechanism because it serves as a major instrument of cost containment. There are many different methods for paying providers. Several types of hospital payments are a global budget, fee-for-service, per diem payment, per case payment etc. Each has different effects on management of health service system, cost, and quality. However, several questions can be raised, relevant to healthcare payments. Why does so much attention contribute to devising provider payment systems? Whether a well-designed payment mechanism can prevent unnecessary service provision?. The follow descriptions for each type of payment might provide more understanding to their answers.

First, a global budget refers to any hospital payment system in which the hospital is allocated a fixed amount of funds to operate over a fixed period of time, usually a year.(Peabody, et al. 1997:332) This form of payment, with its focus on inputs rather than outputs, provides no incentive for efficiency. Hence the global budget actually inhibit efficient use of resources. However, governments have complete financial control because it determines exactly what will be spent.

Second, a fee-for-service payment (FFS) refers to the payment by a fee schedule for specific services and price per item for drug or appliances.(Normand and Weber, n.d.:60)

It is based on the cost of service. For instance, a provider gets paid for consultation or examination, a pharmacist gets paid for pack of drugs or a certain amount of quality pill, liquid, or powder, or a hospital gets paid for specific treatments provided by its physicians and for inpatient accommodation. According to the cost-based payment each provider can charge patient freely.

Fee-for-service payment delivered in hospitals provides no incentives for efficiency and lacks even the value of cost containment. In South Korea, for example, hospitals and physicians are reimbursed on FFS basis. This fee system provides little incentive for efficiency, and as a result, costs have been rising over time. In 1990, health care spending reached 6.6 percent of the GDP. (De Geyndt, 1992 as quoted in Peabody, et al., 1997:332).

Third, a fee schedule is perceived as a guideline for hospital pricing. It may represent either an upper or lower limit of the prices being charged. In Germany, for example, physicians who wish to treat social health insurance patients must adhere to a schedule. They are not allowed to charge higher or lower than the schedule limit.

In France and Belgium, a fee schedule represents only a recommended set of prices. Physicians can charge fees higher than the fees listed in the schedule. In many other countries including Thailand's public hospitals, physicians are not allowed to charge more, but may charge less than the schedule fee.

In general, a fee schedule has two functions. One is to inform people about the treatments and services that may be charged to their health insurance organizations. Prices may also be adjusted for inflation or to take account of developments in techniques or treatment. The list must be updated frequently to stay abreast of new methods and techniques in medicine or to react to developments in consumption, prescription and epidemiology. The other function of a fee schedule is to inform people of the price of services, he or she is responsible to pay.

Fourth, on the contrary to FFS, case payment is based on a single case rather than a single treatment. Each patient a physician treats leads to the payment. Two different systems can be distinguished. One is a case payment based on a single flat rate per case, regardless of diagnosis. The second is a case payment based on diagnosis.

Either a single-rate case payment or DRG-payment provides financial risk to provider. Then the risk induces

efficient use of resources. If the treatment is more expensive than the payment, the provider takes a loss. If the treatment is less expensive than the payment, the provider makes a profit. Providers take more financial risk on the case payment than fee-for-service payment.

Fifth, in this study we concern the case payment by diagnosis, which is based on a system of patient classification according to types of disease and the amount of used resources. The most widely known classification approach is the HCFA's DRGs system which is currently used in the Medicare program of the United States. (HCFA is abbreviated from Health Care Financing Administration Agency, The DRG system is commonly used to pay hospitals for the treatment of inpatients in the United States since 1980s.) It identifies around 470 diagnosis groups. A provider is paid according to relative weight multiplied by the unit cost of the DRG into which a patient's diagnosis falls. This system allows a higher degree of differentiation than the flat rate.

Sixth, totally relied on length of stay, daily charge or per diem payment is used to pay providers who treat patients for lengthy periods. Per-diem fees cover all services and expenses per patient per day including medical treatment, drugs and bandages, prostheses, accommodation, etc. The fee is always the same, no matter what treatment is required. They are not only found in hospital payment systems. It would also be possible to use them in other situations such as to pay nurses providing long-term care in a patient's home. The fees may differ among providers. Per-diem fees would naturally be higher for a university hospital than for a hospital in a rural area. Per-diem fees may be negotiated between the providers and health funds.

Seventh, a distinguish cost containment method is capitation payment. Payment by capitation basis refers to a negotiated, prospective fee, paid to a nominated provider who must has the responsibility to provide healthcare for a registered patient during a covered period. A capitation fee covers services for one member and one year.

The capitation shifts financial risk totally from third-party payers to nominated providers. However, it works because not all insured members use health services during the covered period, thus it allows the providers to earn the surplus. Otherwise, it might make a loss because some patients might have chronic illness or catastrophic diseases which needs multiple visits or long inpatient

stays. The method might induce unqualified medical care. However, if the insured person chooses providers, it will encourage competition and high quality of service. This type of payment needs quality assurance and random spot checks from the payers. In short there are seven types of payment mechanism including global budget, fee-for-service, a fee schedule, a flat rate case payment, DRGs payment, per diem payment and capitation. In medical care, combination of these payments characterize hospital financing.

3.1.2.2 Effects of alternative payment mechanism on hospital efficiency

Alternative hospital payment systems do provide some incentives for efficiency. Whenever hospitals are paid by either case payment or per-diem payment, managers are allowed to retain the difference between payment and costs, they have substantial incentives to control costs. Comparing among them, the per-diem payment may encourage longer hospital stays than the case payment. The incentives to increase the length of stay (LOS) found in a per-diem payment system are quite strong. Its effect overwhelms the incentive force in the system. Hence the case payment is likely to be more efficient mechanism than the per-diem one.

Capitation is a case payment and suitable mechanism for primary care providers and for hospitals. The capitation fee would cover any or all services required at primary or secondary levels. Sometimes when a hospital is paid a capitation fee, it is then held responsible for both primary and secondary care for the insured person. In this instance, the primary care practitioner plays the role of gatekeeper to secondary services.

However, it is possible to have a dual capitation, where the primary care practitioner chosen by the insured person is paid one capitation fee, and a hospital perhaps chosen by the insured person, is paid a separate capitation fee to cover secondary care needs. Regarding compulsory social insurance, hospitals are paid by capitation and /or DRG payment. A particular payment provides financial incentive for hospital administrators to control patient costs. Comparing between the cost-based payment such as fee-for-service, per-diem and fee schedule and the case-based payment such as capitation and DRGs payment, the latter have been believed to reduce third-party burdens on

rising expenditure of hospital reimbursement and induce efficient patient care.

3.1.3 Theory of Hospital Inflation

3.1.3.1 Wage-push hypotheses

There are two hypotheses explaining hospital cost inflation. One is the Wage-Push Hypotheses and the other is the Demand-pull Hypotheses of Hospital Cost Inflation. (Feldstein, 1988:220-235) The Wage-Push Hypotheses postulates that the upward push of wage was an important force behind the overall increase in costs. The findings by both Feinstein and Fuchs revealed that hospital workers were generally paid less in the past than workers in other industries with similar functions or apparently similar qualification. They made substantial relative gains in the 1960s. (Feldstein, 1998:221). Certainly, the increased wage was related to higher hospital costs.

In addition to increasing labor wages affecting increasing hospital costs, the increased inputs also contribute to high hospital costs. It is the result of demand of medical care. For example, an increase in the number of older people in population would require more intensive type of hospital cares than that are not required by younger patients.

The rapid adoption of medical technology has frequently been claimed as a cause of rising hospital costs. It has provided new and presumably higher-quality treatments, however, often at much higher costs than the methods it replaced. Hence, labor cost, demands and technology were claimed to raise hospital costs.

Contrary to the above views, Paul J. Feldstein contends that instead of high technology, the cost increases can be explained by increase in more intensive use of basic ancillary services-laboratory tests, x-rays etc. ((Feldstein, 1988:222) It also appeared that the increase in input use was not simply the result of entirely new technologies, but the result of more hospitals adopting conventional technologies and using them more intensively. In short, the increase in hospital costs may be attributed to the increases in hospital wage, input used because of elderly demand and new medical technology.

3.1.3.2 Demand-pull hypothesis

The other factor affecting high hospital cost is a demand-pull hypothesis—a phenomenon of rapid increases in the price of a product, coupled with small increase in the available quantity. In the other word, the combination of rapidly increasing costs per patient day and per admission and slight increase in hospital utilization. It is the result of demand increasing more rapidly than supply.

Economists have generally rejected the notion that high costs can be explained by exogenous increase in input prices, change in the population distribution and increases in medical technology as mention above. On the contrary, they proposed that the growth of third-party payment of hospital care has enormously reduced the financial constraints under which with hospital operate. (Feldstein, 1988:223)

The experience after Medicare in mid-1966 was consistent with the demand-pull hypothesis rather than the wage-push hypotheses. John Rafferty illustrated the demand effects of Medicare on hospital use. (Rafferty, 1975:51-62 as quoted in Feldstein, 1988:223) He examined changes in case mix and length of stay for the 65-and-over and the under-65 patients of Medicare. He found that while severity of illness (case mix) apparently did not change much for the elderly, stay for the given cases were lengthened. Since admitted patients did not bear the costs, it was consistent that the demand for hospital care increases as the perceived price falls. It can be concluded that one ultimate cause of hospital cost inflation was increasing demand, as the result of third-party payment and increasing proportion of the elderly.

In sum, according to both wage-push hypotheses and demand-pull hypotheses, there are six factors contributing to hospital cost inflation. They are increase wage, increase input, increase demand as the result of third-party payment and changed structure of population. Because the indirect payment distorts the price structure of healthcare, insured patients perceives lesser financial burden and try to use unnecessary medical care. The other two factors that relatively less affect on hospital costs were the adoption of new technology and change in severity of illness. (Feldstein, 1988:224)

3.1.4 Theories of Hospital Behavior

The following section provides concepts of hospital and physician behavior, which relate to profit making, compensation, pricing, and patient demand. Hospital behavior appears to be a general culture in this profession that shapes compensation pattern, utilization of medical supplies, drugs and equipment in hospital setting. It might answer the previous section that why third-party payment cause unnecessary medical care.

3.1.4.1 Profit-maximizing model

Two theories explain hospital behavior-Profit-Maximizing Model and Physician-Control Model.

(Feldstein, 1988:226-235) The former model is used to explain administrative decision-making and relevant factors which affect hospital activities. The latter model explains how a physician obtains his stake in hospitals.

Since a hospital produces multi products and services for serving different payers, it obtains cost recovery by charging patients for services and might increase more revenue by price discrimination among different payers. Hospital administrator may decide on a scale of hospital pricing according to the price elasticity of demand. For example, rates of private room and accommodations, which are more price elastic than ancillary services and drugs. Therefore, the price of private room and board should be comparable to competitive hospitals.

On the contrary, once a patient has been hospitalized, ancillary services are complemented to the use of the private room, and fewer substitutes are available. The demand for ancillary services is believed to be relatively less price elastic than the room charge. If the hospital is interested in maximizing its profit, it will charge higher prices relative to costs for those services. Alike, it would charge higher price for the class of patients whose demands is less price elastic.

The model of profit-maximizing behavior predicts that hospitals will increase their prices if the demand either increases or becomes less elastic, or if the prices of their inputs increase. For instance, hospitals will attempt to minimize their costs of operation, and then they will

reinvest those profits on the basis of which investments offer the highest rate of return.

Types of investments should be additions to bed capacity. For instance their occupancy rates will rise if they have additional facilities and services. In addition, the new facilities could serve to attract a greater number of physicians to be the hospital's staff, thereby indirectly increasing demand for the hospital's beds. In short, the hospital would determine its prices to maximize profits, minimize operating costs (since higher costs represent foregone profits), and invest only in items that offer a profitable return.

With regard to hospital pricing, hospitals set their prices according to the price elasticity of demand. (Danzon, 1982:46) Hospital pricing is distorted by administrative decision making. Room and ancillary charge, drug and other medical services are tied to the decision based on both their real costs and discriminated prices. According to this model hospitals maximize profit by price discrimination.

Regarding public hospitals, which have no incentives to maximize financial profits because their hospital administrators have not their own stakes in the organizations' financial surplus. Another contention is more plausible. It is the physician-control model of hospital behavior as follow.

3.1.4.2 Physician-control model of hospital behavior

As the profit-maximizing model mentioned earlier attributes a passive role of physicians in public hospitals. In reality physicians have a great deal of control over hospitals, pricing policies and investment areas. A physician in this model is perceived as a manager of the patient's hospitalization, with responsibility for deciding upon the components to be used in providing treatments. (Feldstein, 1988:231) Since someone may have a stake in what inputs are used, the physician might also be expected to combine the inputs in such a manner so as to increase his or her own income and /or productivity.

The model can be used to explain a number of apparent anomalies in general health fields. The medical staffs of a hospital are assumed to control the hospital under this model. (Donalson and Gerard, 1993:101-106) It is furthering

assumed that the decision undertaken by the hospital administrator represents the objectives of the staff physicians. Since higher a physician's productivity, the greater will be his or her income. This model suggests that physicians would favor increases in the hospital privileges to enable them to economize their own time and then gain more productivity. The services such as excess of operating rooms and obstetric facilities so that physicians do not have to wait for or to be inconvenienced.

Two hypotheses of hospital cost inflation and two theories of hospital behavior can be synthesized. The factors contributing to variation in hospital costs are induced demand by indirect payment, hospital workers' wage and privileges, investment in medical input and other hospital facilities, intensity of input used, administrative decision of pricing strategy, physician stake as well as demographic pattern of patients. In order to emphasize administrative roles in decision making of hospital pricing, in the next section, hospital functions and administrative strategies were presented.

3.1.5 Hospital Functions

Functional dimensions of a hospital influence performance. (Murray and Frenk, 2001) Health organizations should have to perform at least four basic functions: financing, provision, stewardship and resource development (human, physical and knowledge) as illustrated in figure 3.4

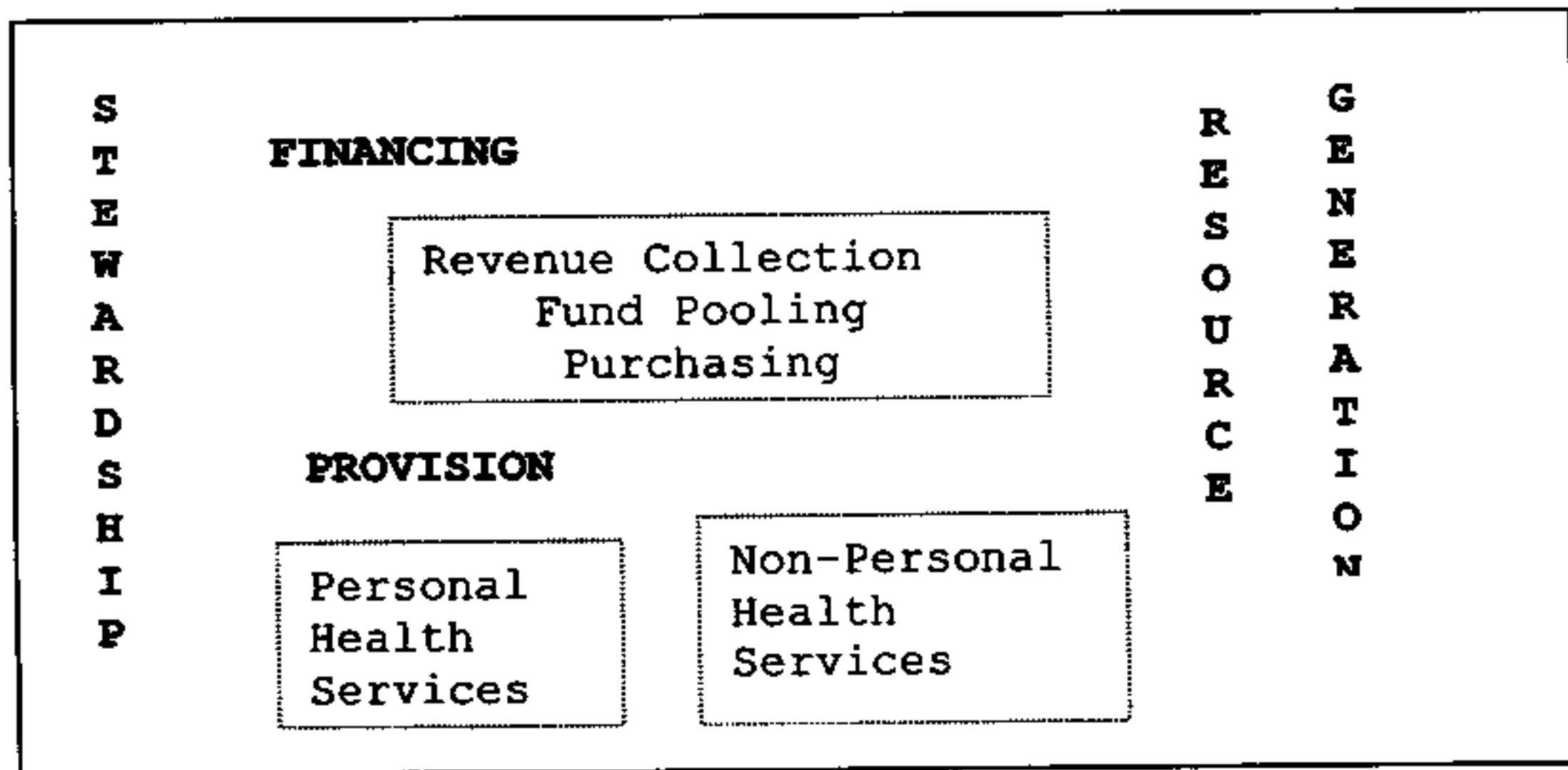


Figure 3.4 Conceptual Framework for Performance Assessment
Source: Murray, Christopher JL. and Frenk, Julio. 2001.
 A WHO framework for Health System Performance
 Assessment. Global Program on Evidence of Health
 Policy (GPE), discussion paper 6.
 (online).URL:<http://www-nt.who.int/whosis>.

3.1.5.1 Health system financing

Health system financing is a process, by which revenues are collected from primary and secondary sources, then, accumulated in a pool of funds and allocated to particular providers for conducting specific activities. Hospital functions can be categorized into three sub-functions including revenue collection, fund pooling, and purchasing.

First, revenue collection is the mobilization of money from primary sources (households and firms) and secondary sources (governments and donor agencies). The funds can be mobilized through eight basic mechanisms: out-of-pocket payments, voluntary insurance rated by income, voluntary insurance rated by risk, compulsory insurance, general taxes, earmarked taxes, and donations from non-governmental organizations and transfers from donor agencies.

Second, fund pooling is the accumulation of revenues in order to serve common benefits of contributors. For health insurance, pooling means that the participants share financial risk. Then financial resources in the pool are no longer tied to any particular contributor. Pooling is

distinct from revenue collection because some kinds of revenue collection do not share financial risk across contributors.

Third, purchasing is the process through which revenues that have been collected and placed in the fund pools are allocated to institutional or individual providers in order to deliver a specified set of medical care or health interventions. Purchasing can range from simple budgeting exercises in highly integrated public systems, where the government collects revenue through general taxation, and then allocates it to public health programs or to more complicated strategies which specify that units of inputs, outputs or outcomes are purchased.

In short, the financing functions of a hospital identify sources of fund and mechanisms of allocating its revenue to other related organizations. In Thailand, for instance, the MOPH hospitals collect funds from out-of-pocket payment, subsidized budgets from the government, third-party payments and retrospective reimbursements from the CSMBS, public enterprises, the Workmen Compensation Fund and other private insurance companies. The revenues are then grouped into two types of budget-public budget and hospital support budget. The former can be used according to the tight financial regulations of the Ministry of Finance and the Ministry of Public Health while the latter can be used according to the hospitals' administrative needs to cover all operating costs during subsequent fiscal years.

3.1.5.2 Provision of health services

This hospital function is conceived as the combining of inputs into a production process that takes place in a particular organizational setting and that leads to the delivery of a series of outputs. Two distinct types of health services are personal and non-personal healthcare. The personal healthcare appears to be services that are consumed directly by an individual, whether they are preventive, diagnostic, therapeutic, rehabilitative services and others.

Non-personal health services cover actions that are applied either to human collectivities (e.g. mass health education) or to the non-human components of the environment (e.g. basic sanitation) and generate positive externalities. Since the services contribute to positive

externalities to the community. In most countries the public sector, often the Ministry of Public Health, takes dominant role in the provision of non-personal health services. Examples of the services are health education, occupational safety, family planning, consumer and environmental protection, etc.

3.1.5.3 Resource generation

There are diverse groups of organization that produce inputs to any health system, particularly, human resources, technical knowledge and physical resources- facilities and equipment. (Roemer, 1991) This set of organizations encompasses universities and other educational institutions, research centers, consultant firms and the vast array of organizations producing specific technologies, such as pharmaceutical products, devices and equipment.

Some organizations such as the MOPH's regional hospitals, university hospitals, nursing colleges, public health education centers, etc., serve as physician and other professional training centers as well as medical research centers. It provides both human resource and medical knowledge to hospital care.

3.1.5.4. Stewardship

There are three factors influencing health system performance including health system financing, health service provisions and resource generation. Stewardship is the last and most important factor, which serve as a "meta-function". Stewardship involves three key aspects of administrative functions: first, setting and implementing and monitoring rules of the game for the health system players; second, assuring a level playing field among all actors in the system, particularly purchasers, providers and patients; and third, defining strategic directions for the health system as a whole. (Londono and Frenk, 1997:1-36)

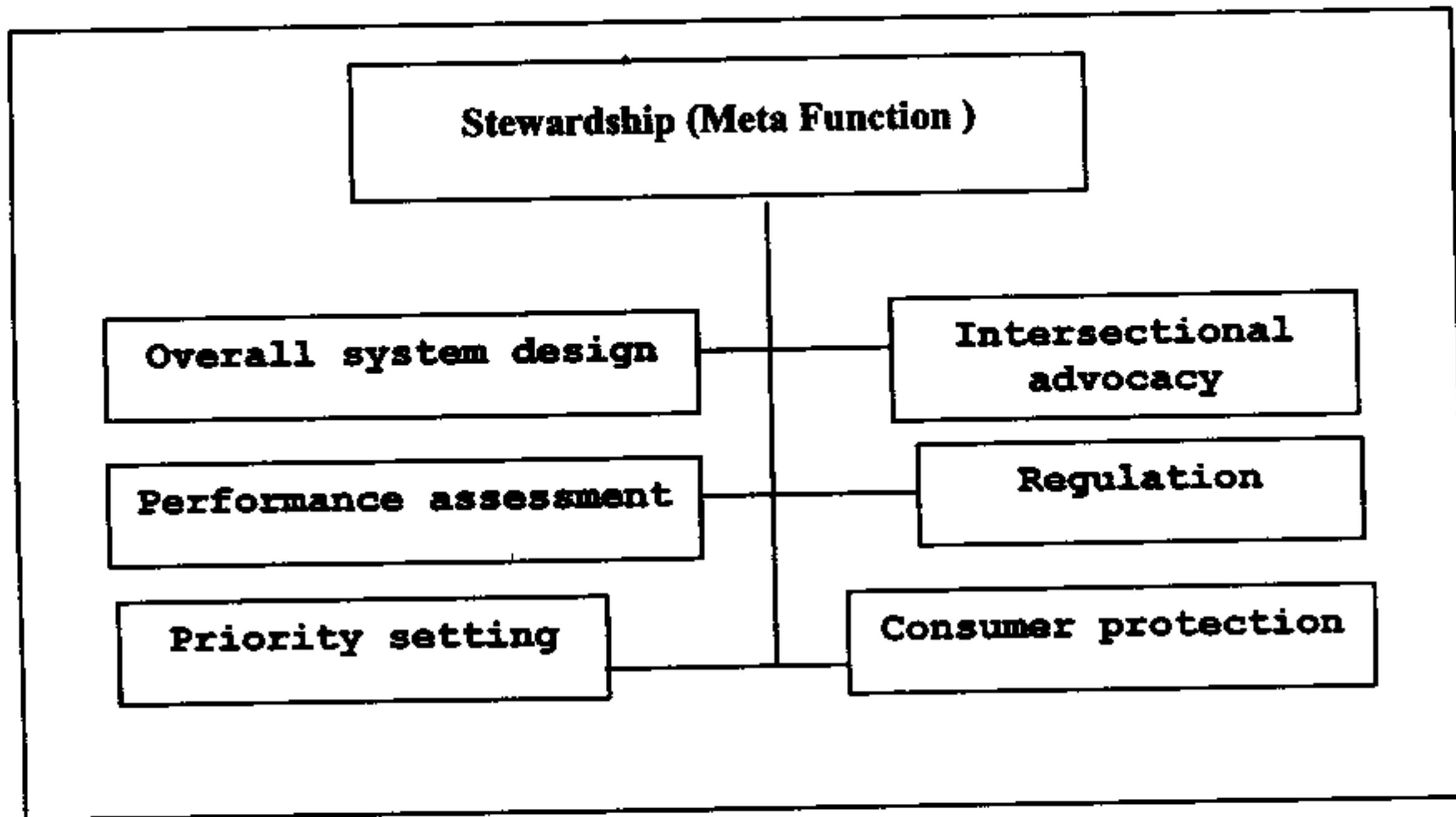


Figure 3.5 Six Sub-functions of Hospital Administrator Stewardship

Source: Murray, Christopher JL. and Frenk, Julio. 2001. A WHO framework for Health System Performance Assessment. Global Program on Evidence of Health Policy (GPE), discussion paper 6. (online).URL:<http://www-nt.who.int/whosis>.

Stewardship is previously an unrecognized function in most health systems. It is a remarkable variation in the extent to which health administrators have responsibility relevant to each sub-function. This meta-function can be subdivided into six sub-functions including overall system design, performance assessment, priority setting, intersectional advocacy, and regulation and consumer protection. The mix of these six sub-functions of stewardship is the key issue regarding its "strategic design".

The first sub-function, "overall system design" implies that stewardship involves policy formation at the broadest level. It involves the ways in which all the other hospital functions are put together. In this respect, stewardship can be thought of as a "meta-function" because it deals with all other functions.

The second sub-function, to "assess the performance" of institutions involves the evaluation of resource collection, purchasing, health care provision and resource development of the hospital.

The third sub-function of stewardship should be designing criteria for setting priorities and conducting a consensus building process around them. This involves both technical and political aspects.

Fourth, any health system should provide intersectional advice in order to advance health goals. By promoting policies in other social systems. Female education, for example, is viewed as social and economic determinants of health status. Female education is not part of the health system but it advocates progress on this determinant and therefore falls within the boundaries of the health system.

Fifth, regulation sets rules of the game. In the health system there are two main types: sanitary regulation of goods and services, and health care regulation. Health care regulation is applied to organizations charged with the financial, provision and resource development functions of the health system.

Sixth, the health system should ensure consumer protection. Since both insurance and health care markets provide information and power asymmetries between customers and providers. Therefore, achieving a level playing field among the participants in the health system requires explicit efforts of consumer protection.

All these sub-functions serve as the administrative links among the other three functional categories regarding health system financing, health service provision and resource generation. To carry out the appropriate stewardship functions, actual skills are not sufficient. Instead, reorientation of most health entities from their traditional functions as provider of services to the new challenges of stewardship, do affect health system performance. In this study of four hospital functions, it can be concluded that there are inter-relationships among them. In order to maintain a hospital's financial viability, the administrators have to know the hospital's source of financing, the types of service provided and how to generate hospital resources.

Among the six sub-functions of administrator stewardship, two of them are very important to hospital pricing. They are performance assessment and regulation.

Administrators should make the assessment of the hospital's performance and review the relevant hospital regulations. To assess the performance of the hospital involves the evaluation of overall process of resource collection, purchasing, health care provision and resource development, and the regulations applied to each of them.

3.1.6 Research On Social Insurance

3.1.6.1 Korean experience

A paper on "Financing Health Care for an Aging Population: A Crisis on Korea's Horizon" demonstrated that if a nation would not change its way of collecting premium, the national health insurance would steadily lose its large asset reserves and become insolvent in less than fifteen years. (Gertler, et al., 1995) The problems of the rapidly aging and health care financing were not only an issue for Korea, but also for the large number of developing countries that have also experienced rapid demographic transitions. The lesson from the Korean experience was when the large group of citizens becomes older, it would also very fast and quickly put financial strains on healthcare systems. Therefore, developing countries' governments should plan today for the implications of treating the elderly tomorrow.

3.1.6.2 Philippines experience

Paul Gertler also conducted research on "Who Benefits From Social Insurance in Developing Countries?" (Paul Gertler and Orville Solon, 2000). The study revealed that the provider vast benefits from social insurance in developing countries. A popular approach to the lack of competitive insurance markets was compulsory social health insurance (SI). The finding showed that SI failed to effectively finance care because private medical care providers captured SI benefits as rent by raising price-cost margins to the insured patients. Study of empirical results from the Philippines indicated that private hospitals extracted 86 percent of SI benefits through price discrimination. Thus, expanding SI actually increased the burden on the public sector rather than relieving it.

3.1.7 Research On DRGs

3.1.7.1 Who get benefits from the DRGs payment

Three Thai scholars conducted research regarding the policy implication of Thai DRG payment. The topic is "Who gains and who loses under the Thai DRG Payment?" (Virasakdi Chongsuviwatwong, Anupong Sujariyakul, Supasit Pannarunothai, n.d.) The result showed that if the DRG system would implement in Thailand's health system, revenue would be reduced for regional hospitals, government hospitals in Bangkok and university hospitals, whereas it would increase for community hospitals and general hospitals. Smaller hospitals would gain the profit from DRG implementation.

There were administrative debates regarding hospital payment by using DRGs. Linda G. Worthman and Shan Cretin reviewed literature regarding DRGs in 1986. Their reviews encompassed journal articles, prepublication drafts, and technical reports, focusing on the years 1982-1985. It revealed that the DRG adjust adequately for case mix was stills an open question.

3.1.7.2 DRG creeping

Whether hospital cost was the result of DRGs creeping, Grace M Carter, Joseph P. Newhouse, and Daniel A. Relles conducted a study in 1990 about DRG creeping. They found that the Medicare Case Mix Index had continually increased since the introduction of the PPS. Since the Medicare case mix index (CMI) was the average DRGs'RW, assigned to all discharges, paid under the Prospective Payment System (PPS). It determined the amount hospitals were paid under PPS, this CMI increase had been the subject of considerable debate.

The researchers analyzed a nationally representative sample of 7,887 Medicare charts to determine how much of the change in Medicare's CMI between 1986 and 1987 was due to up-coding or DRG creep. The finding was that about two-thirds of the actual change was true. Most of the remaining third was attributable to a general change in the completeness of coding. Some was attributable to changes in the Grouper program that assigned DRGs to cases using

diagnosis and procedural information. Thus, most of the additional money that Medicare paid to hospitals because of the change in the CMI appeared justified by the additional complexity of the cases of the patients being hospitalized.

Another study was conducted by Thomas B. Bradley and Gerald F. Kominski. The topic is "Contribution of Case Mix, Intensity and Technology to Hospital Cost Increases Under Medicare's Prospective Payment System". The researchers examined why the average cost of Medicare continued to increase much more rapidly than the inflation rate after implementation of the PPS. They found that the cost per case increased because the hospital product changed. (Bradley and Kominsky,1992.) The average hospital stay in 1987 was more complex and more resource intensive than in 1984.

The real increase in cost per case was 15.7 percent. When the increase was decomposed into two components--change across diagnosis related groups (case mix change) and changes within each DRG (intensity change). This study found that changes in case mix accounts for 11.2 percent while the remaining 4.5 percent increase was due to higher cost per case within DRGs. It meant that by 1987, a large proportion of Medicare patients were being treated in relatively expensive DRGs. It was likely that DRGs creeping was responsible for hospital cost inflation.

3.1.7.3 Hospital increasing resources used and the day of stay

Grace M. Carter and Glenn A. Melnick investigated relationship between pattern of the hospital cost increasing and day of stay. They conducted research regarding patient and hospital characteristics with the cost of a patient day. (Prospective Payment Assessment Commission ,1990) The most significant and consistent finding concerned the shape of the incremental cost function, which declined rapidly during the first part of the stay and then remained approximately constant. This L-shaped pattern of incremental costs implied that third-party organizations might pay substantially less for day early in the stay and pay more than costs for days late in the stay.

3.1.7.4 Hospital efficiency by DRGs payment

Glenn Melnick, Joyce Mann, and Carl Serrto conducted research on " Hospital Costs and Patient Access under the New Jersey Hospital Rate-Setting System in 1988. (Melnick, Mann and Serrto, 1988) The finding showed that the New Jersey all-payer DRG rate-setting system had been successful for improving hospital efficiency but unsuccessful in controlling hospital cost inflation, measured in terms of either total hospital expense or net revenues.

3.1.7.5 DRGs payment among non-Medicare payers

Regarding non-Medicare patients, a research conducted by Grace M. Carter, Peter D. Jacobson, Gerald F. Kominski, and Mark Perry in 1994 demonstrated how each of the Non-Medicare payers used DRGs. No single approach was dominant. (Carter, et al., 1994: 127-158) What had emerged appeared to be a very flexible payment system in which the only constant was the use of DRGs as a measure of output.

A wide variety of other third-party payers for hospital care had adapted elements of this system for their own use. The extent of DRG use varied considerably in both types of payer and geographical area. DRG's users include: 21 State Medicaid programs, 3 workers' compensation systems, the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), more than one half of the Blue Cross and Blue Shield Association (BCBSA) member plans, several self-insured employers and a few employer coalitions.

It can be concluded that DRGs payment was not totally accepted as a universal case payment. Most third-party payers in the U.S. have applied it. Advantage of the payment was hospital efficiency, medical review and case management, valid disease coding and development of clinical practices. However, disadvantage of the payment was the remain increasing hospital costs. It might be the result of DRGs creeping or the reports of high complex treatments of more severity patients.

3.1.7.6 Hospital cost information

A study in Tanzania revealed the finding regarding hospital costs. The existing accounting systems of most hospitals in developing countries did not provide decision-makers on the costs of health care services. Costs were generally underestimated. (Flessa, 1998:397-407) Administrators of 16 hospitals of the Evangelical Lutheran Church in Tanzania were currently analyzing how the existing health care services should be restructured. They required reliable estimates of the costs of hospital services. Seven-month field investigations in Lutheran hospitals revealed the cost of health services. The actual cost for adequate services was much higher than expected. The most important factors that determined hospital cost were administrative efficiency and the scope of offered services.

3.1.7.7 Cost recovery

Martine Audibert and Jacky Mathonnat conducted research in " Cost Recovery in Mauritania: Initial lessons". The finding was that the Mauritania experience provided a number of key points to the discussion surrounding the contribution of user fees to health care systems. Cost recovery was introduced in Mauritania in 1993. The initial results appeared to be largely positive regarding the improvement of the quality of health care and the overall level of utilization of basic health establishments.

The study suggested that users were globally willing to pay when the quality of health care improved. (Audibert and Mathonnat,2000:66-75) The cost recovery accompanied by a fair supply of essential drugs and by a better-motivated staff had contributed to improve the efficiency of the health system. But a coherent price structure was needed to guide patients more efficiently to the different levels of the health pyramid. It was therefore vital that user fees were extended, as the government intended, to the second and third levels of the health system.

3.1.7.8 DRGs as hospital outputs

In order to determine hospital output, studies regarding case mix and rate setting by DRGs were conducted and disclosed their measurement methods. Hospital costs varied positively with the number of patients treated and their medical needs. Needs are evident in the complexity and intensity of services received. Complexity relates to the types of services while intensity, to the number of services per patient day or hospital stay. (Grimaldi and Micheletti ,1983)

Both complexity and intensity form the underpinning of case mix, historically measured by the proportions of patients who received specific clinical services (medical, surgical, pediatrics, obstetric, etc) or had various medical problems (infections, diabetes, heart trouble, fracture, etc). Quite clearly, two hospitals might discharge the same number of patients but had widely disparate costs due to differences in case mix (complexity and intensity). Numerous studies shown that case mix influences hospital costs.

Primarily, may be because of the absence of widely accepted measures of case mix, some studies assumed that patient and hospital characteristics were reliable proxies for case mix. Among the more popular variables were bed size, accreditation status, the number of available facilities or departments, physician specialties, and the demographic characteristics of the patients. Other studies emphasized the diagnostic mix of the patient population. All findings concluded that a significant proportion of the variation in inter-hospital costs was explained by differences in case mix.

Hospital output and cost functions had been theoretically and empirically investigated in a variety of research settings (Feinstein, 1965: 95-103 ; Lave, 1966: 57-81 ; Lave and Lave, 1970: 3-14 ; Lave and Lave, 1970: 379-395 ; Berry, 1970: 67-75 ; Lave and Lave, 1971: 15-38 ; Lee and Wallace, 1973: 350-363 ; Berry, 1994: 291-313 ; Ruclin and Levenson, 1974: 308-323) There was only the consensus that

...a hospital produces an extensive variety of treated patients and that differences in " product-line" play an important role in understanding cost variation among institutions and among patients within an institution.

As noted above, hospitals have a product line that in theory is as extensive as its number of patients. Although each patient is unique, he has certain diagnostic and therapeutic attributes in common with other patients that determine the type and level of services he receives. We further need a system for describing hospital products based on the characteristics of patients receiving similar sets of services, which has been developed and referred to as Diagnosis-Related Groups (DRGs). The products have the special sets of services such as laboratory tests, hours of nursing care, x-rays, etc. In short, DRG is a patient classification scheme that perceives hospitals to be multi-product firms, whose inpatient product lines or outputs are the numbers and types of patient treated. The scheme is patient-based rather than dependent on the characteristics of the hospital or its medical staff, i.e. the DRGs revolve around patient attributes and treatment processes rather than the bed size, occupancy rate, and service capacity of a hospital or its medical staff specialists...

It can be concluded that the amount of provide services or hospital outputs are represented by DRGs . DRGs represents validly a hospital's case mix. Inter-hospital comparison can use DRGs to measure difference in hospital outputs. To attain a specific DRG code for patient group, medical records and DRGs grouper are needed. The classification has very complicate methodologies to assign the code and complex clinical interpretability. It is very complicate to elaborate all detail of them.

3.1.8 Research On Health Care Financing

3.1.8.1 National health account

The only one formal channel of Thailand's health care financing was National Health Account (NHA). A NHA typology was applied to analyze national data. Health care financing was divided into the flow of funds from ultimate sources and the use of the funds by financing agencies. (Viroj Tangchareonsathien, et al., 1999: 324-353) Five ultimate sources and twelve financing agencies-seven public and five private-were identified. The use of consumption

expenditures was listed under four main categories and thirty-two sub-categories.

Using 1994 figures, the researchers estimated a total health expenditure of 128,305.11 million Baht with 84.07 % as consumption and 15.93 % as capital formation. Of the consumption part, 36.14 % was spent on purchasing care from public providers, with 32.35 % on private providers, 5.93 % on administration and 9.65 % on other public health programs. Total health expenditure account for 3.56 % of GDP with 3.0% for consumption. Unlike this study, the NESDB estimated the consumption expenditure in the same year as 5.01 % of GDP or 180,516 million Baht. This large difference in consumption expense led to revising the NHA. From the above evidence for source of finance, a large amount of money in health market has been spent on healthcare consumption through both public and private providers. Only a few proportion allocates to public health program and administration budget.

3.1.8.2 Health card evolving fund

Not only a hospital received a global budget and program subsidizes from the MOPH and other ministries, the hospital served as a funding pool for indigents' voluntary health insurance. The Health Card Program was initiated by the MOPH.

A study of the future prospect of the Health Card Scheme in Khon Kaen province found that employment, education level and presence of illness are significant factors influencing enrollee participation. (Siripen Supakankunti, 2000:85-94) Families with symptoms of sickness were more likely to buy the health card. Adverse selection of the enrollee had resulted in the greater use of health services. Although the expansion of this Health Card Scheme increased accessibility to health care, the program's sustainability and efficient use of resources came to be a policy question. The study recommended a reform by changing the health card program to a community based compulsory health insurance plan for the rural area.

3.1.8.3 Out-of-pocket payment

Public hospitals in the MOPH get paid about 50% of its revenue from the out-of-pocket payment. Self-payment was

not only important for the hospitals, it was viewed as increasing financial burden for indigents. For instance, D Hotchkiss, Karmacharya and Sangraula studied a household survey in Nepal. (D Hotchkiss, Karmacharya and Sangraula, 1998:371-383) This study investigated a part of households in healthcare financing. The researchers used the Nepal Living Standard Survey to investigate level and distribution of household out-of-pocket health expenditures. The results indicated that households spent about 5.5 % of total household expenditures on health care, which accounted for 74 percent of the total fund used to finance health care. Rural households spent more than urban ones. Both the wealthy and the poor rely heavily on services provided by the public sector.

3.2 A Proposed Model for Analysis

3.2.1 Source of the model

A framework for determination of inpatient charge was resulted from the syntheses of all factors contributing to hospital administration's decision-making of hospital pricing and physician decision-making of used resource for admission. Hence, there were two exclusively dependent variables in our framework. One was hospital pricing and the other was inpatient charge. Since hospital pricing was resulted from hospital administrative decision, the influencing factors were financial burden, source of financing, criteria of third-party payment and hospital regulation.

Because both hospital price of each service and quantity of used services explicitly affected total inpatient charge. According to the Hospital Maximizing Model, it was likely that a hospital administrator would set hospital price according to type of services and type of patients. Then it was implicitly that individual hospital's guideline for charging medical services might reflect the price discrimination, decided by the hospitals' administrators.

In addition, used resource per admission could be represented quantitatively by DRG's relative weight of each patient. The DRG's relative weight was used as each patient's admission cost. DRG's relative weight was assigned by DRGs grouper which was according to age of patient, severity of illness and intensity of treatments.

A physician as patient manager decided for used resource, length of patient stay and discharge status. He synthesized all previous practices, perception of patient's insurance benefits and patient's clinical characteristics to determine the used resource per admission. Therefore he indirectly influenced the quantity of inpatient charge.

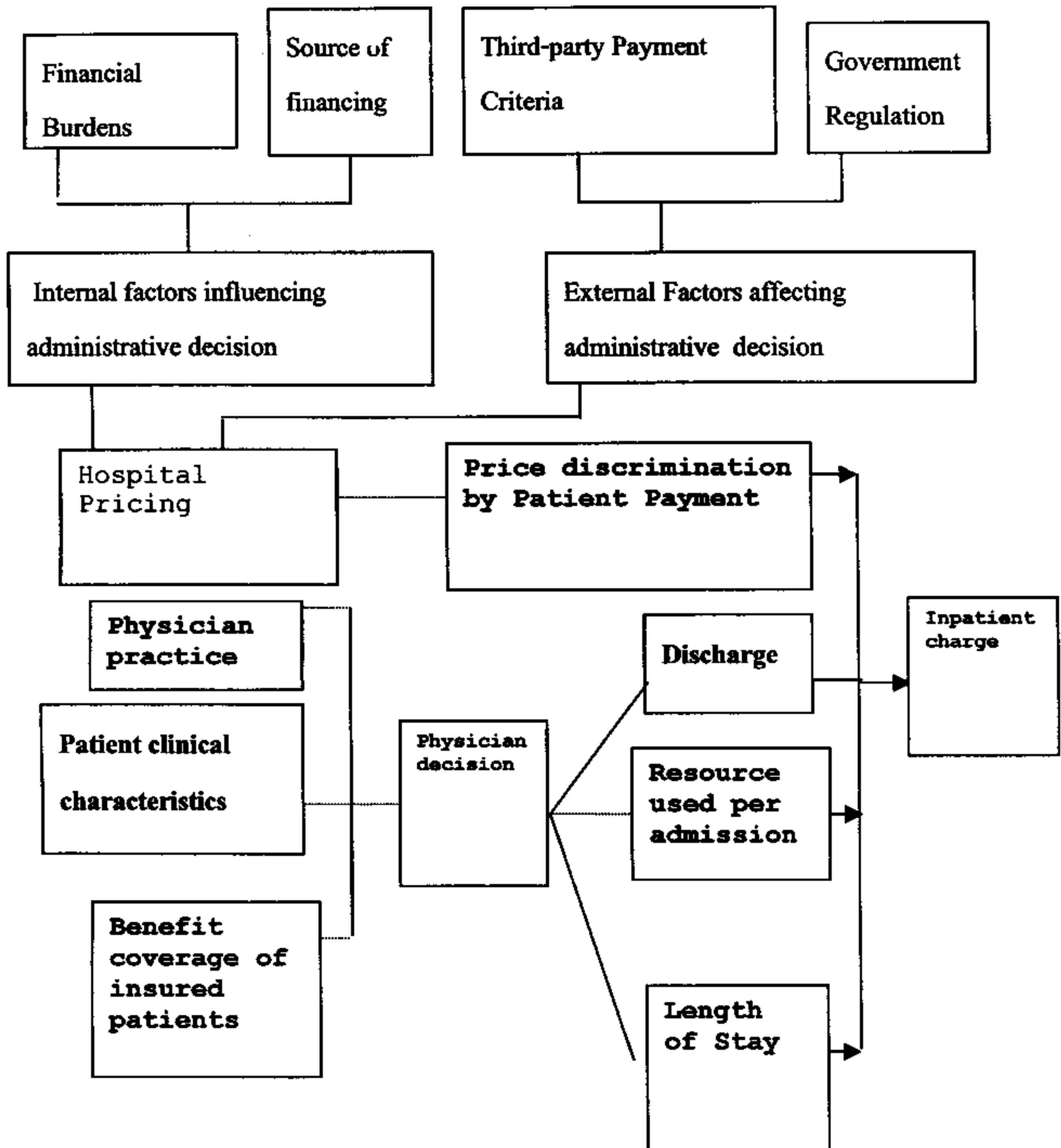


Figure 3.6 A proposed Framework for Determining Hospital Charge

3.2.2 Logical relationship between the independent and dependent variables

The proposed framework in figure 3.6 comprises of two sets of relationships: (1) relationship between patient characteristics and inpatient charge; and (2) relationship between administrative factors and hospital pricing as follow. Inpatient charge framework was separately displayed in Figure 3.2 , they were eight independent variables affecting inpatient charge.

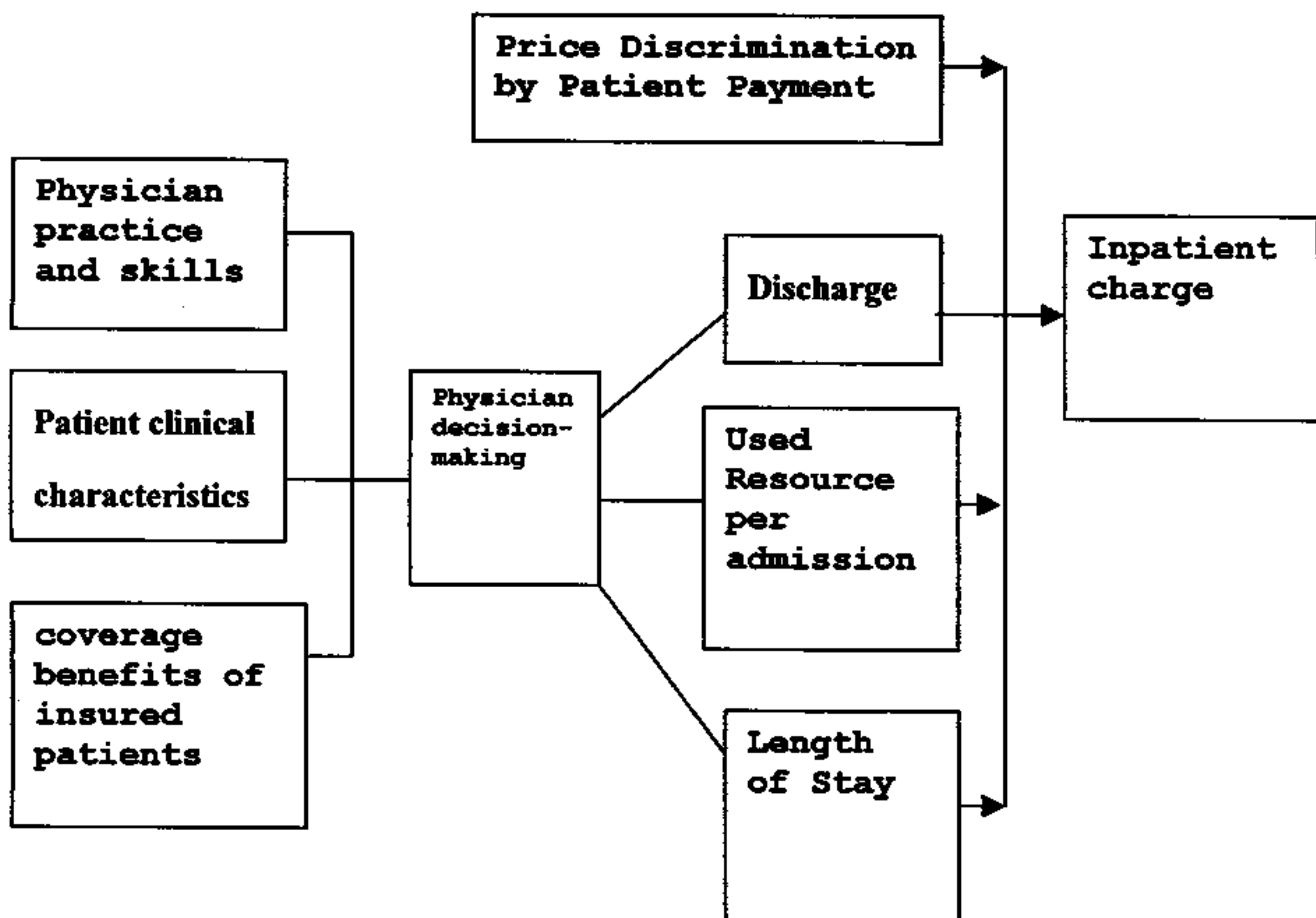


Figure 3.7. Relationship Between Patient Characteristics, Physician Characteristics, Price Discrimination and Inpatient Charge

First, physician decision implicitly affected three independent variables of inpatient charge and administrative decision making about hospital pricing affected price discrimination. Then, four independent variables, which had direct effect on inpatient charge, were Price Discrimination by Patient Type, Used Resource Per Admission, Length of Stay and Discharge type.

Second, because the used resources for each patient were logically affected by a physician practice, patient's clinical characteristics and the perception of physicians regarding the coverage benefits of the insured patient. Then, there were three independent variables had indirect affect on inpatient charge. Unfortunately, two indirect independent variables are excluded from the framework because they are very difficult to quantify. Since physician perception regarding patient insured benefits and his or her degree of clinical skills were very difficult to quantify. They were very important factors that should be investigated later.

Not only physician perception and practice skill would affect patient resources, patient clinical characteristics do. According to the review literature of factors affecting inpatient charge, patient age, and severity of illness and intensity of treatment are predominant factors, which might affect inpatient charge.

Then we have seven independent variables, which may affect directly and indirectly to Inpatient Charge. These include (1) Price Discrimination by Patient Payment, (2) Discharge Type (3) Length of Stay (4) Used Resource Per Admission or DRG's RW (5) Patient Age (6) Severity of Illness and (7) Intensity of Treatment. We can derive a quantitative framework for analyzing inpatient charge as follows:

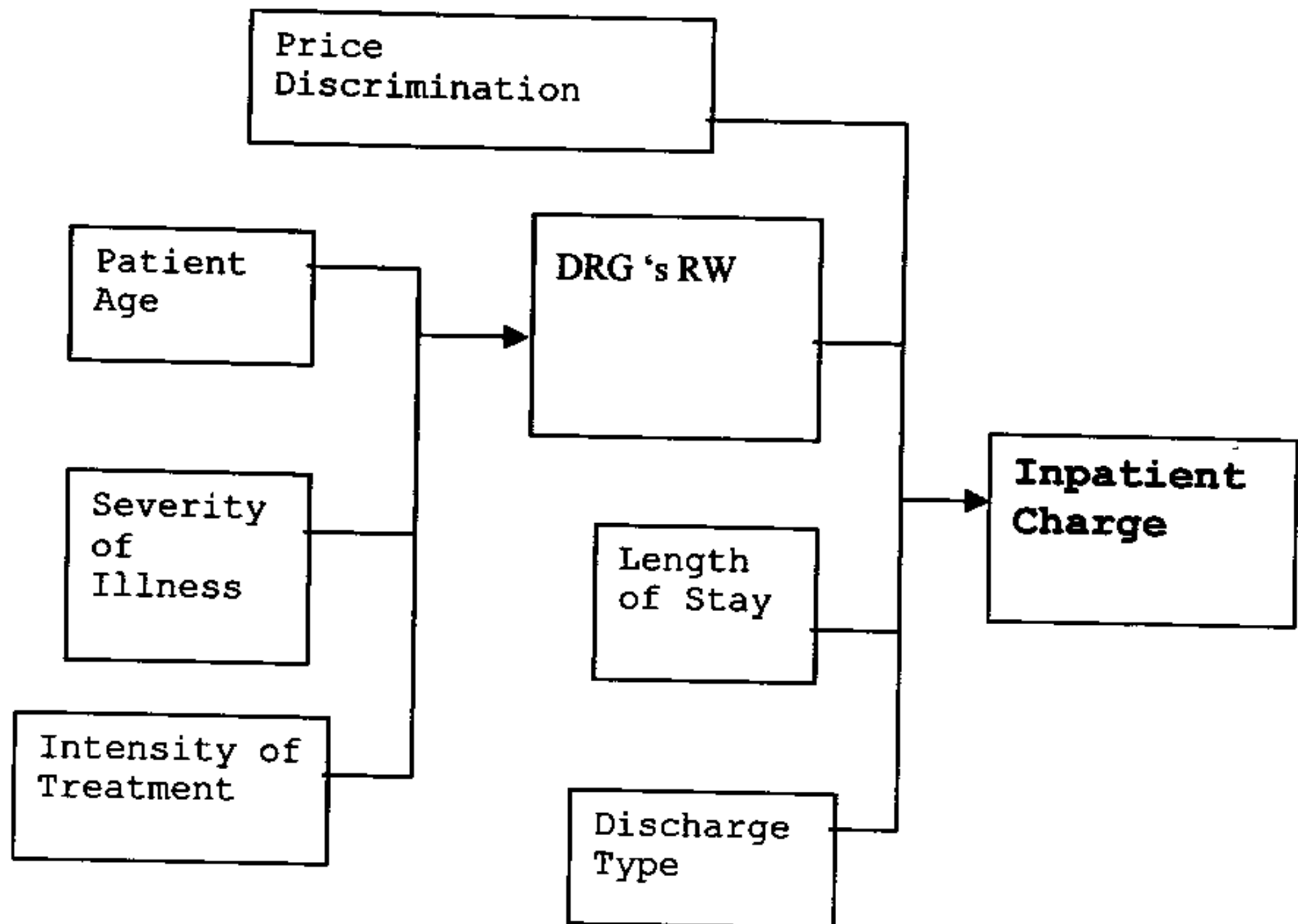


Figure 3.8 A Quantitative Framework for Analyzing Inpatient Charge

This working framework represents factors affecting inpatient charge. Inpatient charge depended on seven independent variables. Direct variables were DRGs'RW, Length of Stay, Price Discrimination and Discharge Type. Indirect effect variables were patient age, severity of illness and intensity of treatment. Another relationship between environmental factors affecting hospital administrative decision regarding hospital pricing was graphically displayed in the Figure 3.9

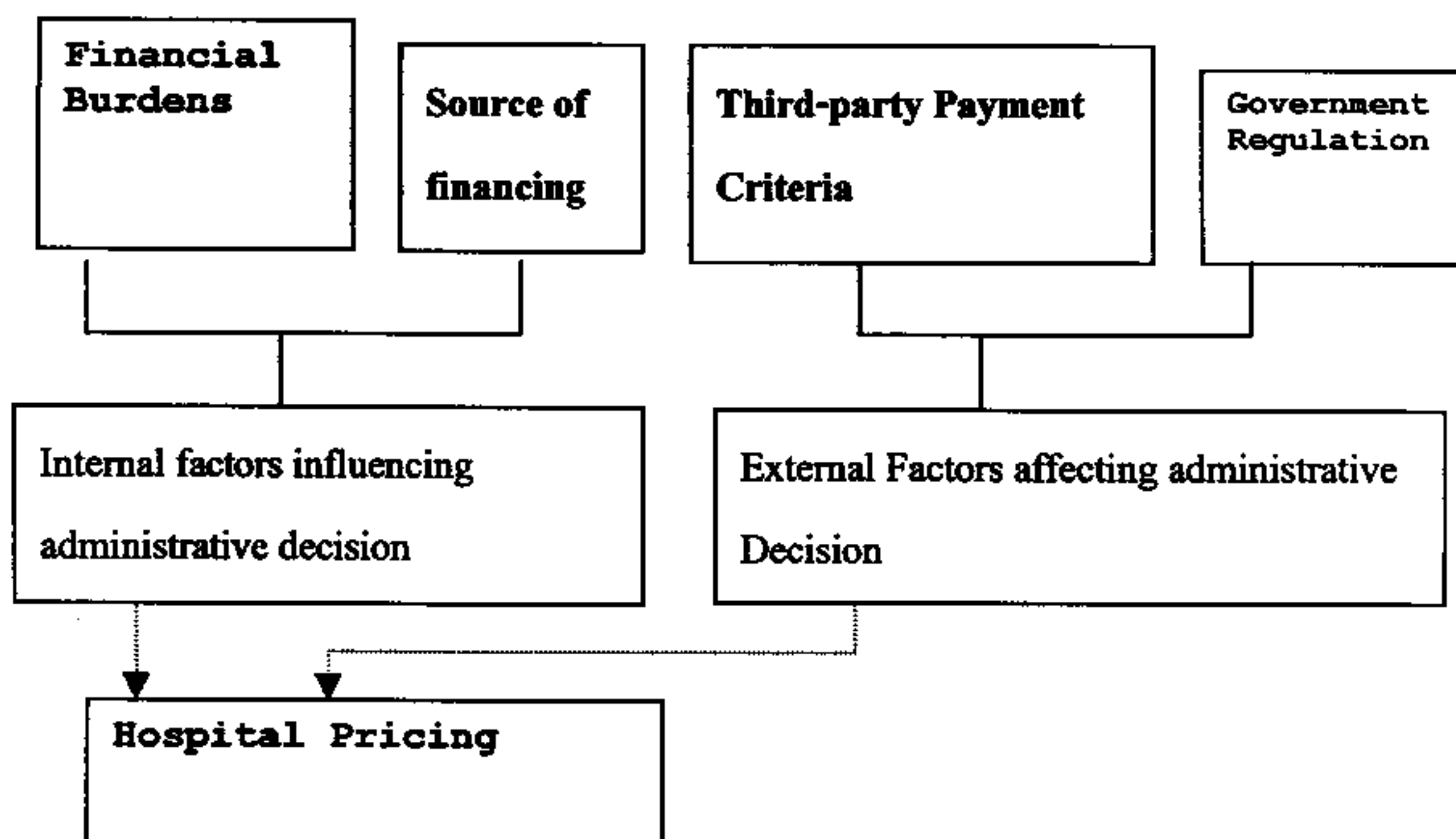


Figure 3.9 Relationship Between Environmental Factors and Hospital Pricing

This framework showed variables explaining each hospital's policy that affecting service charge. Hospital administers might consider both internal factors and external factors which were possible influences on hospital cost recovery. The internal factors were financial burdens and potential sources of revenue of each hospital. The external factors were criteria of a third-party organization regarding payment and relevant regulations regarding hospital finance.

3.2.3 Hypotheses of the study

Nine research hypotheses were proposed according to the both frameworks in figure 3.8 and 3.9 as above.

- (1) Criteria of Third-Party Payment influences hospital administration to cost shifting among major third-party payers
- (2) The MOPH regulation of public subsidization causes hospital financial burden to public hospitals.
- (3) The MOPH regulation of public hospital pricing provides hospital administration to price discriminate patients according to payment groups.
- (4) The MOPH regulation of profession compensation increases financial burden to public hospitals.
- (5) Retrospective and fee-for-service payment of the Civil Servant Medical Benefit Scheme appears to be major source of hospital's patient revenue.
- (6) Price Discrimination is resulted from Hospital Pricing, which is influenced by the hospital's Financial Burdens, Potential Sources of Revenue, Criteria of Third-Party Payment and Government Regulation of Pricing.
- (7) DRGs's relative weight can be a proxy measure for admission cost.
- (8) Patient characteristics including age of patient, severity of illness and intensity of treatment significantly affect DRGs' relative weight.
- (9) Variation in Inpatient Charge is affected by patient type , DRGs' Relative Weight, Length of Stay and Dead discharge, age of patient, severity of illness, and intensity of treatment.

3.3 Chapter Conclusion

This chapter provided health care financing models of developed and developing countries and suggestion for a normative model for national health financing strategy by type of public, merit and private health goods. It described major payment mechanisms and their affects on cost containment and hospital efficiency.

In order to investigate factors relevant to decision making within hospital arena, two hypotheses of hospital cost inflation and two theories of hospital behavior were reviewed. Major factors of hospital costs might be labor costs, intensity of input resources, induced demand among third-party patients and others. Physicians as a professional capture retained their self-interests in the conduct of hospitals.

Regarding administrator role to maintain the viability of a hospital, two sub-functions of stewardship were the assessment of hospital performance through financing, provision and resource generation and the relevant regulation. Three related functions of a hospital including health financing, provision of personal services and professional training should be evaluated to get the whole picture of hospital behavior and participants' roles.

A proposed model of this study constitutes of two related frameworks for hospital pricing and inpatient charge. The linkage was the logical relationship of price discrimination, resulted from hospital pricing according to different payers. Hospital pricing can be determined by four interrelated factors. They are hospital potential revenue, financial burdens, and criterion of third-party payment and hospital regulation. Inpatient charge is determined by seven independent factors. They are age of patient, severity of illness, intensity of treatment, DRG's relative weight, dead discharge, patient type by payment and length of stay. Then nine hypotheses were derived from the frameworks and the following chapters proved them.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Research Hypotheses and Questions

In chapter two, it highlighted national health expenditure's distribution between public and private sectors and suggested that appropriate financing regulations should be set up to induce desirable provider behavior. In chapter three, a framework for studying inpatient charge and hospital pricing was proposed. The following section described research hypotheses and methodologies use to verify the hypotheses.

4.1.1 The hypotheses relevant to factors influencing administrative decision of hospital pricing :

- (1) Criteria of third-party payment influences hospital administration to cost shifting among major third-party payers
- (2) The MOPH regulation of public subsidization causes financial burden to public hospitals.
- (3) The MOPH regulation of hospital pricing provides opportunity for hospital administration to price discriminate patients according to payment groups.
- (4) The MOPH regulation of profession compensation increases financial burden to public hospitals.
- (5) Retrospective and fee-for-service payment of the Civil Servant Medical Benefit Scheme appears to be major source of public hospital's patient revenue.
- (6) Price Discrimination is resulted from Hospital Pricing, which is influenced by the hospital's

Financial Burdens, Potential Sources of Revenue, Criteria of Third-Party Payment and Government Regulation of Pricing in Regional Hospitals.

4.1.2 Factors contributing to inpatient charge

There are three hypotheses as the following;

- (1) DRGs's relative weight can be a proxy measure for admission cost.
- (2) Patient characteristics including age of patient severity of illness and intensity of treatment significantly affect DRGs' relative weight.
- (3) Variation in Inpatient Charge is affected by Patient Type by Payment , DRGs' Relative Weight, Length of Stay and Dead Discharge, Patient Age, Severity of Illness, and Intensity of Treatment.

4.2 Operationalization of Variables

1. Financial Burden

Financial burden is operationalized as all other expenses which are not allocated from the Ministry of Public Health and other public organizations. Examples of these fixed expenses are temporary employee salary, special payments to hospital workers during non-official hours, the mandated payments to physicians and other professionals ,who do not work in private entities, etc. In addition, public hospitals have to provide free medical care to the government's mandated groups of citizens. The allocated subsidized budgets were not cover the operating expenses. The money difference between the subsidized budgets and the operating expenses becomes financial burdens to public hospitals.

2. Potential Sources of Revenue

Potential sources of revenue are the source of major parts of patient-service revenue among diverse source of patient revenue. The sources are patients' self-payment at the point of hospital services, the Ministry of Public

Health's subsidization of low-income and underprivileged groups, student insurance budget and health card fund, reimbursed payments from CSMBS, the Social Security Office's contractual payment, and any other third-party payments.

3. Criteria for Third-party payments

Third-party payment's criterion are specific conditions of payment system, imposed on contracted hospitals, for the provision of services. They are retrospective reimbursement by fee-for-service in case of the CSMBS ; the capitated allocation of subsidized budgets , catastrophic payments of above DRG 2.5 patients and payments for special diseases from the Health Insurance Office, MOPH; and the prospective, capitated, performance-related ,emergency, physician specialty and other high-cost payments for provision of services from the Social Security Office.

4. Government Regulation

Government regulation is operationalized as financial and compensation and other regulations, imposed on the MOPH's public hospitals. They are regulations of using hospital revenue, hospital worker compensation, public subsidy to some particular groups of citizens, service pricing regulations with which the MOPH hospitals have to comply.

5. Hospital Pricing

Hospital Pricing is each hospital 's list of prices for goods and services, which will be charged to out-of-pocket patients at the point of services.

6. Price Discrimination

Price Discrimination is operationalized as hospital pricing behavior which aims to discriminate patients according to payment groups. They are four type of patients including out-of-pocket payment, the CSMBS payment, the MOPH subsidized patient groups and the Social security Office's members.

7. Patient Clinical Characteristics

Patient Clinical Characteristics are age of patient, principle and secondary diagnoses according to ICD-10 codes in patient discharge summary and ICD-9CM codes for operative procedures, discharge status, and length of stay.

8. DRGs' Relative Weight

DRGs' Relative weight is a specific number of particular category of patients, corresponding to its DRG code. In this study, Resource Used Per Admission is measured by DRG's relative weight.

9. Inpatient Charge

Inpatient Charge refers to the amount of money a hospital intends to charge each inpatient, which may not be fully collected. It can be calculated from a summation of all expenses during each hospitalization.

10. Length of Stay

Length of Stay refers to number of day of patient stay in the hospital for each hospitalization

11. Discharge type

There are several discharge types but a very important discharge is a death discharge. In this study a patient who was discharged with death status is Discharge type.

12. Severity of Illness

Severity of Illness is defined as relative complexity of diagnostic conditions that requires different levels of medical prescriptions, operative procedures and treatments. In this study severity of illness is measured by a scale variable which ranged from severity level 0, 1, 2 and 3. Severity level zero refer to patient without secondary diagnosis. Severity level one refers to patients being assigned at least one secondary diagnosis. Severity level two refers to patients being assigned two both co-morbidity and complication diagnosis and the highest level refers to patients have all four diagnosis.

13. Intensity of Operative Procedure

Intensity of Operative Procedure is the number of surgical procedures, a patient receives during admission. It reflects the intensity of treatments for the patient. It range from 0,1,2,3, and 4 according to the number of procedures a patient being treated during admission. Intensity scale zero refers to patient without operative or other treatment procedure.

4.3 Description of the Samples

4.3.1 Sampling Frame

The population of the study consisted of inpatients admitted in three regional hospitals under the jurisdiction of the Ministry of Public Health. The sampled hospitals were selected from regional hospitals by the researcher's criteria . Secondary data was obtained from 1996-1997 Annual Report of Rural Hospital Division. The regional hospitals' characteristics were presented in Table 4.1 (Appendix D: METHODOLOGY) According to the table, regional hospitals were classified by location, number of hospital beds, average outpatient visits per day, total inpatient days in a year, average length of stay and percent of occupancy. There were 25 regional hospitals located in 12 regions, according to the MOPH's geographical classification.

Regarding to hospital size, the number of hospital bed ranged from 370 to 1,039 beds. Only two hospitals had less than 500 hospital beds. They were Pranakorn-Sri-Ayutaya Hospital and Tang Hospital.

Concerning about hospital outputs, the average length of stay also varied from 4-7 days. Percentages of occupancy were that from those nearly 100 % to the others with exceed 110 %. The most variation figures were the average of outpatient visits per day and the total number of inpatient days per year. Outpatient visits per day varied from 577 days of the Chaopraya Apaipubet Hospital, to 1,427 days of the Sumprasitiprasong Ubonrajchatani Hospital. In addition, the number of inpatient days in a fiscal year ranged from 144,316 days at the Tang Hospital to 363,754 days of the Maharaj Nakornrajchasima Hospital. The variation of

hospitals' outputs might be due to variations in size, location, and the type of hospital products.

The sampling frame of patient-records of this study was composed of the selected hospitals. The selection criteria were described as follows:

1. The selected hospitals should have different size and located in different region.
2. The selected hospitals should have clinical and financial data of each patient admission during the fiscal year 1999.
3. The selected hospitals should have aggregated financial information of four years before this study.

According to the above criteria, three hospitals were selected. They were Buddhachinaraj Hospital in the ninth region, Chiangrai Prachanukok Hospital in the tenth region and Hatyai Hospital in the twelfth region. Table 4.2 (APPENDIX D: METHODOLOGY) provided characteristics of the selected hospitals by number of physicians and temporary employees, number of ordinary and special beds, and number of inpatient beds in six specialty wards, the ratio of physician to temporary employee, the ratio of ordinary beds to special beds and the percentage of major specialty beds to the total of inpatient beds. (Appendix D: Methodology)

According to Table 4.2, the selected hospitals had different size and number of inpatient beds in six specialty wards. By computing the data, the ratio of physician employee to temporary employee, the ratio of special beds to ordinary beds and the percentage of major specialty-ward beds to the total number of hospital beds were the indicators of the selected hospitals.

For instance, the Chiangrai Hospital, the major specialty beds were accounted for more than 95 % of the total beds ,compared to the Hatyai Hospital, less than 65 %. It was likely that the Hatyai Hospital had relatively more inpatient beds in the other specialty wards such as psychiatry and communicable diseases than the Chiangrai Hospital. In addition, the Hatyai Hospital provided surgical beds which were much more than the Buddhachinaraj. It was likely that the former hospital performed more surgeries than the latter. It can be concluded that all three hospitals met the criterion set by the author.

4.3.2 Sampling Designs

The patient-record sample was obtained from the integration of patient records from the sampled hospitals' medical abstracts. Then the study unit had a large range of inpatient charges and length of stays. For instance, the length of stay varied from less than one day to more than 300 days. The inpatient charge ranged from less than 10 Baht to more than 500,000 Baht.

Because there were too much variation of patient characteristics, this study applied four criterion to select only one part of them. The characteristics were age of patient, discharge type, DRG's relative weight, and length of stay. After we limited the value of these four variables, the patient-record file were then selected for DRGs by frequency ranks and the common DRGs.

In this patient-record file, patients were classified into various DRG codes. Patients with the same DRG code theoretically had similar medical diagnoses and were likely to use the same amount of hospital resources. Since there were variety of classified diseases, it was necessary to use stratified sampling to choose the proportional patient records.

In this study only patients in specific DRGs which each group had more than one percent of patient records in the analysis file and not less than 200 cases, were picked up. The analysis file was composed of the proportional patients of higher frequencies. Stages of stratified sampling followed. (1) To identify patient records of common DRGs (2) to select only common DRGs's patient records and (3) to random sampling of patients in each selected DRGs. As the result, the analysis file of this study was composed of the 1999 patient records of the Buddhachinaraj Hospital, Chiangrai Hospital, and Hatyai Hospital. Patients were those patients which could be grouped by the DRG-grouper Thai version 1.0 or DRG RW >0, approved discharge, age ranged from 0-99 years, and length of stay was not exceeding 30 days. The Table 4.3 to Table 4.5 provided descriptive statistics of each patient-record file.

Table 4.3 Descriptive Statistics of Patient-record
File, Selected DRGs, Chiangrai Hospital, 1998

Descriptive statistics	N	Min	Max	Mean	S.D.
Inpatient Charge	12682	45	35676	4981.41	5413.36
Age (year)	12816	1	96	34.45	21.30
LOS (day)	11919	1	30	5.07	4.81
RW	12816	.22	3.39	1.2009	.9021
MOPH	12816	0	1	.57	.49
Selfpay	12816	0	1	.29	.45
Reimburse	12816	0	1	.12	.33
SSO	12816	0	1	1.94E-02	.14

Note: SSO = social security patient, Reimburse = CSMBS patient, MOPH = low-income cardholder, health card holders underprivileged patients, and other MOPH's subsidized patients, Selfpay = out-of-pocket payment patient, RW = DRG's relative weight, LOS- Length of Stay

Table 4.4 Descriptive Statistics of Patient-record
file, Selected DRGs, Buddhachinaraj Hospital, 1998

Descriptive statistics	N	Min	Max	Mean	S.D.
Inpatient charge	10312	1	35939	5777.56	5645.06
age (year)	10443	1	102	37.56	22.06
Los (day)	10125	1	30	4.54	4.16
RW	10443	.30	3.39	1.1345	.8650
Selfpay	10442	0	1	.46	.50
MOPH	10443	0	1	.37	.48
Reimburse	10443	0	1	.16	.37
SSO	10443	0	1	1.11E-02	.10

Note: SSO = social security patient, Reimburse = CSMBS patient, MOPH = low-income cardholder, health card holders underprivileged patients, and other MOPH's subsidized patients, Selfpay = out-of-pocket payment

patient, RW = DRG's relative weight, LOS-Length of Stay

Table 4.5 Descriptive Statistics of Patient-record File,
Selected DRGs, Hatyai Hospital ,1998

Descriptive statistics	N	Min	Max	Mean	S.D.
Inpatient Charge	10747	6	35,998	4846.14	5497.01
Age (year)	10330	1	98	31.84	18.74
Los (day)	10615	1	30	3.82	3.37
RW	10921	.22	1.99	.5421	.3904
Selfpay	10921	0	1	.39	.49
MOPH	6594	0	1	.23	.42
Reimburse	6594	0	1	7.61E-02	.27
SSO	6594	0	1	4.49E-02	.21

Note: SSO = social security patient, Reimburse = CSMBS patient, MOPH = low-income cardholder, health card holders underprivileged patients, and other MOPH's subsidized patients, Selfpay = out-of-pocket payment patient, RW = DRG's relative weight, LOS-Length of Stay

The common DRGs of each hospital were randomly selected.. Each common DRG contained not less than 200 patient cases. Table 4.6 provided each hospital's common DRGs and total cases.

Table 4.6 Common DRGs of Each hospital' Patient-record File, Chiangrai Hospital, Buddhachinaraj Hospital and Hatyai Hospital, FY. 1999

Chiangrai Hospital (12,816)		Buddhachinaraj Hospital (10,443)		Hatyai Hospital (109,21)	
DRG	Case	DRG	Case	DRG	Case
373	1873	373	2522	373	3860
490	1283	371	1512	47	823
371	1208	39	1320	371	808
489	916	183	723	189	672
396	897	468	718	369	543
486	806	486	626	184	542
88	684	487	533	422	531
184	611	14	523	14	376
468	608	167	447	380	375
39	562	305	281	489	340
316	525	82	276	183	314
183	507	357	276	70	267
167	496	30	242	445	262
243	444	416	224	243	252
423	416	89	220	190	251
305	347	-	-	384	246
485	346	-	-	29	230
14	287	-	-	254	229
18 DRGs	12816	15 DRGs	10443	18DRGs	10921

4.4 Data-Collection Procedures

There were two sources of data. First was the patient data sets and second were two sources of the hospital's financial informations. The former was the sample hospitals' patient records in the fiscal year 1999, provided by the Center for Health Equity and Monitor Office. The files were obtained by integration of twelve standard sets of patient records. The patient information were computerized and programmatically extracted for only some relevant fields of data for analysis. The hospital financial informations were obtained from the Division of Rural Hospitals of the Ministry of Public Health and each hospital's annual report.

The program used in the center were exhaustively developed by the Health Insurance Office, namely, DRGs

Grouper. The acquired data was composed of patient cases belonging to different Diagnosis-related groups. It was based on the assumption that the inpatients in each DRG group used equal medical resources. The DRG's relative weight served as an index for comparing the relative amount of used resources in this study.

4.4.1 Hospital Financial Data

There were two sources of financial data. They were all secondary data already collected in separate organizations. The first set was obtained from the expenditure reports of the Hospital Division, MOPH. The abstract files constituted of all public hospitals' expenditure during 1995-1998. Khun Matana at the division was very kindly to provide the data. The second set were the annual reports of each sample hospital. The financial information of annual reports were during FY 1996-1999.

4.4.2 Patient-record Data

The patient sample comprised of three data sets of medical abstracts from the selected hospitals. The hospitals were the Buddhachinaraj Hospital, the Chiangrai Hospital and the Hatyai Hospital. The patients were admitted as inpatients during fiscal year 1999. The admission date ranged from October 1 1998, to September 30, 1999.

4.5 Validation of the Patient-record File

4.5.1 Validation of Patient Records

We tested normality distribution and content validity of the patient-record files by using SPSS explore procedures. Descriptive statistics and normal distribution of major independent variables were compared and verified. In this study, four independent variables including severity of illness, intensity of treatment, length of stay and patient type by payment were independent variables. Descriptive Statistics of each variable were presented in Table 4.7.

Table 4.7 Inpatient Charge of 5% Trimmed Mean, S.D, Skewness, Kurtosis by Level of Severity of Illness and Intensity of Treatment in Patient-record Files

Variable	Scale	5% trimmed Mean	S.D.	Skewness		Kurtosis	
				stat	Std error	stat	Std error
Severity of illness	0	3782.61	4837.25	2.253	.019	6.760	.037
	1	4954.11	5609.52	1.745	.022	3.628	.044
	2	5774.54	6610.53	1.749	.045	3.053	.090
	3	8089.20	7655.49	1.227	.086	.887	.171
Intensity of Treatment	0	3302.95	5146.68	2.712	.018	8.729	.036
	1	4971.95	5123.06	1.763	.024	4.421	.049
	2	7471.30	5791.25	1.153	.037	1.583	.073
	3	10,897	6852.72	1.066	.100	1.166	.200
	4	15614	7921.57	.224	.240	.621	.476

- Note : 1. Test of Normality of the above independent variables by Lilliefors Significance
Correction: sig=.000
2. Test of Homogeneity of Variance based on mean, based on median, based on median with adjusted df and based on trimmed mean: sig = .000

Table 4.8 Test of Normality, Test of Homogeneity of Variance of Length of Stay , and Patient Type

Variable	Scale	Kolmogorov-Smirnow (a)		
		Statistics	df	Sig.
Length of stay	1-22	.246-.117	3255-85	.000
Patient Type	1-4	.194-.176	1606-12575	.000

- Note : 1. Test of Normality of the above independent variables by Lilliefors Significance
Correction: sig=.000
2. Test of Homogeneity of Variance based on mean, based on median, based on median with adjusted df and based on trimmed mean: sig = .000

The statistics presented in Table 4.7 and Table 4.8 pointed out that the more scale severity of illness and intensity of treatment , the higher inpatient charge. All four independent variables had normal distribution. Only LOS beyond 23 days has lower bound of the true significance.

4.5.2 Reliability of Charge Items

Reliability analysis was applied in the patient-record files to evaluate multiple-item-additive scales. The procedure provided the reliability coefficient for multi-item scales. The reliability analysis procedure provided information about the relationship between individual items in the scale. In this study, Alpha (Cronbach) was the model of internal consistency, based on the average inter-item correlation. There were nine items together to be a scale for inpatient charge. They are INVEST, X-RAY, OTHINVEST ,OPERATE, OTHTREAT, MEDTREAT, BED, FOOD, and OTHER. The reliability coefficient Alpha =.5342 ,Standardized item alpha=.7091. Table 4.9 provided comparison of Mean and Standard Deviation of each charge item.

Table 4.9 Reliability Test of Inpatient Charge Items,
Total case =10,443

Variable	Charge for	Mean	S.D.	Sig
INVEST	Investigation	352.63	612.41	N=10443 F= 1531.86 Alpha=.5342 Standardized item alpha=.7091
XRAY	x-ray	355.02	1035.31	
OTHINVES	Other investigation	256.29	879.16	
OPERATE	Operation	2608.79	3820.20	
OTHTREAT	Other treatment	376.63	1021.89	
MEDTREAT	Drug	1497.54	5155.86	
BED	Bed	993.87	2172.19	
FOOD	Food	13.42	236.10	
OTHER	others	107.71	624.51	

From the reliability test, we ensured that the dependent variable(inpatient charge) was reliable according to the composite variables having internal consistency according the standardized reliability item coefficient as 0.7091

4.6 Strategic Methods for Hypotheses Testing

Since two groups of hypotheses were proposed for testing. The first group was verified by descriptive analysis and the second group, by path analysis. The first group was comprised of four factors including: (1) criteria of third-party payment; (2) public regulation; (3) financial burden ; and (4) potential source of revenue. Each factor was described consequently. The first factor was partitioned into three groups of financing method including the prospective payment by capitation, the public subsidization for health insurance (low-income project and health card project) and the reimbursement from the CSMBS.

The second factor was all regulations related to hospital pricing, hospital finance, public subsidy and worker compensation. The regulations were comprised of : (1) Regulation for Health Service Revenue 1995; (2) Regulation of Public Health Subsidy 1994; (3) Regulation of Health Personnel Compensation; and (4) The MOPH Pricing Regulation 1994. Discussion of the regulations and their interrelationships were synchronized.

The third and fourth factor had to be discussed together. The financial statement of revenue and expense in fiscal year 1998 of each hospital were analyzed consequently. It aimed to disclose relative proportion of patient revenue by source and proportion of each indirect payment to the total indirect payments. Then, the utilization patterns of the MOPH's subsidized patients were quantified to derive financial burdens. In addition, the proportion of hospital expenses by compensation group disclosed the disproportion of operating costs by type of hospital worker.

For hypotheses relevant to inpatient charge, SPSS program was used. Firstly, three groups of variables of the integrated file were analyzed separately. It started with the patients' background variables, clinical variables and financial variables. Later on, patients with the common DRGs were selected. The groups contain the number of patients those more than one percent of the total inpatients. Then the selected records were analyzed with multiple regression and then path analysis.

A full model for analysis was proposed with the structural equations. The multiple regression results provided path coefficients for the revision of the proposed model. Then the revised model was tested again by ordinary least square. Finally, the potential variables were selected to get the revised model of inpatient charge.

4.7 Chapter Conclusion

This chapter provided research hypotheses and questions relevant to the proposed framework of inpatient charge. Operational definition of variables were given to 13 variables including Financial Burden, Potential Source of Revenue, Criteria for Third-Party Payments, Government Regulation, Hospital Pricing, Price Discrimination, etc.

The research methodologies started with the selection of sample hospitals. Four criterion for selecting patient records were age of patient, discharge type, length of stay and DRGs' relative weight.

Data collection methods are the acquisition of hospital financial data from two different sources and patient-record data from the Center of Health Equity Monitoring. The data files were then validated by testing normality and validity of four major variables, including

severity of illness, intensity of treatment, length of stay and patient type by payment. Using reliability coefficient Alpha (Conbach) checked the reliability of inpatient charge.

Lastly, strategic methods of testing were provided for testing hypotheses relevant to hospital pricing and inpatient charge. The former explained the influencing factors of hospital pricing. It could be tested by analyzing financial information and described the detail of each regulation. For the latter, multiple regression and path analysis were used to revise the proposed model.

CHAPTER 5

SAMPLE CHARACTERISTICS AND CONSTRUCTION OF COMPOSITE VARIABLES

5.1 Patient Data Collection

I obtained the patient data from three regional hospitals. They were the Chiangrai Hospital, the Buddhachinaraj Hospital and the Hatyai Hospital. The following descriptions showed patient data collection.

Chiangrai-Prachanukao Hospital is a regional hospital, located in Chiangrai Province. The province has its borderlines next to both Lao and Burma. The province covers the area of 11,678 square kilometers with 60.25% being the agricultural land. The population is 1,221,349 people. They live in 344,737 households with approximately equal amount of male and female. The population density is 105 person per square kilometer. Urban people is account for 65,133 persons and as 5.36% of the total in the province.

The hospital provides tertiary medical care. It is also served as a referral hospital for other community hospitals and health centers. Fifteen community hospitals in the province provide totally 680 beds and being surrounded with the 192 health centers and 40-village health centers. The hospital's outputs as number of outpatient visit, inpatient service as number of admission and length of stay, and the five leading causes of death are shown in Table 5.1.

Table 5.1 Hospital Outputs by Patient Service, Chiangrai Hospital, 1998

Significant Outputs	Statistics
1. Outpatient Visit (visit)	407,301
2. Inpatient Admission Not Include Newborn (case)	46,948
3. Dead Inpatient(case)	2,278
4. Informal Time Outpatient(visit)	67,616
5. Admission Stay (day)	267,836
6. Average length of stay (day)	5.7
7. Average Inpatient Per Day (case)	734
8. Average Outpatient Visit Per Day	1,424

Table 5.1 (Continued)

9. Inpatient as Percentage of Outpatient	11.52
10. Occupancy Rate (%)	96.9

Source: Chiangrai Hospital, 1998: 13-14

Note: The formal hospital bed is 757 beds.

The hospital provided more than 1,400 visit per day in 1998. The outpatient was out number the inpatient. The percentage of the inpatient cases of total outpatient visits was 11.52 %. More than 260,000 admission days were provided within one year.

Table 5.2 Outpatient Visit by Department, Chiangrai Hospital, 1998

Rank	Department	Number of Outpatient Visit	% of total OP
1	Medicine	131,046	32.0
2	Paediatrics	56,555	13.8
3	General Surgery	43,784	10.69
4	Orthopedics	33,559	8.2
5	Dentistry	26,807	6.6
6	Emergency Room	24,708	6.0
7	Delivery Room	23,689	5.7
8	ENT, EYE, Rehabilitation	15,990	3.9
9	Gynecology	11,974	2.9
10	Psychology	9,708	2.4

Source: Chiangrai Hospital, 1998: 15

Most of the outpatients went to see visit doctors of the Medicine Department. The Paediatric, General Surgery and Orthopedics provided middle level of outpatient service. Other departments served only 5-6 percent of outpatients. The distribution of outpatient visits reflected the type of demand in this area fading from the General Medicine, Paediatric, General Surgery and Orthopedics respectively. In order to investigate the complexity of diseases the hospital treated, causing death, Table 5.3 displayed the top five diseases.

Table 5.3 Five Leading Diseases, Responsible for Cause Of Death for Inpatient, Chiangrai Hospital, 1998

Rank	Group of Disease	Number of Visit	% of dead case
1	Human Immunodeficiency Virus Disease	2,924	16.8
2	Other Infectious Disease	1,340	8.6
3	Motorcycle Injured in Transport Accident	2,124	57
4	Cerebrovascular Disease	772	5.4
5	Chronic Renal Failure	1,123	5.3

Source: Chiangrai Hospital, 1998: 29

Regarding to inpatients, the five leading cause-of-death diseases were HIV diseases, infectious diseases, accident injuries, cerebrovascular and chronic renal failure respectively.

The second source of patient data was Buddhachinaraj Hospital. The hospital is located in Pitsanulok Province. The province is 377 kilometer far from Bangkok to the North of Thailand. The total geographical area appears to be 10,815.85 square kilometer. It comprises of 9 governing districts; 94 sub-districts, 932 villages and 90 local authorities. Total population is 865,848 persons living in 160,915 households and approximately equal between male and female.

The hospital is the largest one among 282 health providers. It provides 944 inpatient beds out of 2,365 beds of the province. The ratio of bed and population of this province is 1: 360. Infant mortality rate and dead rate are 12.05 and 5.14 person in thousand respectively. (Buddhachinaraj Hospital, 1998:3)

The hospital has been operated since June 1, 1941. The hospital's missions cover seven departments. They are administration department, medical specialty department, nursing department, quality of care department, public health department, general facility department and medical center.

Amount of hospital workers had been slightly decreasing between 1996-1998. In 1998, there were 1,913 hospitals workers including 969 civil servants, 465 permanent employee and 449 temporary employee.

(Buddhachinaraj Hospital, 1998:7)

5.1.1 Hospital outputs

The hospital's outputs were highlighted in Table 5.4. I classified patients by outpatient and inpatient care, hospitalization day, discharged patient, referred patient, dead patient ,major surgery and minor surgery, normal labor and caesarian section respectively.

Table 5.4 Hospital Output Information, Buddhachinaraj Hospital, 1998

Outputs	FY 1998
New patient this year (case)	86,746
Total Outpatient(case)	339,754
Total Inpatient(case)	54,395
Hospital Stay (day)	310,248
Discharge Patient(case)	37,656
Dead Rate (per 1000 discharge patient)	55.69
Refer Patient from other hospital (case)	11,226
Refer Patient to other hospital(case)	2,006
Major Surgery (case)	14,172
Minor Surgery(case)	18,452
Normal Labor(case)	5,496
Cesarean Section(case)	2,996
Ratio of OP:IP	6.25:1

Source : Budhachinaraj Hospital, 1998: 25

5.1.2 Outpatient Care

The hospital provided outpatient care more than inpatient care. Number of outpatient per day was 1,188 case which was much more the other sample hospitals. Not all inpatient could be cured in the hospital. Some of them had to be referred to higher tertiary care.

Outpatient visits were also classified by time of visit and medical specialty. More than 40 % of outpatient went to see medicine doctors, compared with only 2.8 % to psychiatric department. By working hour, 85.4% of the total patient was treated within former working hour. Table 5.5 showed the increasing trend of hospital care during informal hours and increasing trend of public subsidization during 1996-1998.

Table 5.5 Outpatient Visit During Informal Hour,
Buddhachinaraj Hospital, 1996-1998

Outpatient Care	1996	1997	1998
Outpatient Visit	19,543	22,155	28,182
Outpatient per day	54	61	77
-civil servant	5,457	6,924	6,276
-state enterprise employee	3,644	3,633	3,830
-pensioner	5,124	5,224	4,264
-health card	1,148	2,258	3,389
-social security card	2,681	3,206	4,300
-low-income card	1,089	1,040	1,813
-other health insurance	812	781	1,219
-general patient	7,579	6,326	3,744
Total patient revenue	5,543,400	7,390,833	12,045,574
Free Patient Care	747,737	1,403,546	1,111,888

Source : Buddhachinaraj Hospital, 1998: 29

The hospital had incentive to provides convenience to outpatient visits during these informal hours because some physicians were paid according to not having their own clinics-the measure to encourage physician contribute more time to hospital patients. They are paid for doctor fee for each visit.

Majority of outpatient during informal hours were civil servant, state enterprise employee, pensioners, health card and social security cardholders respectively. Most employed patients preferred to see doctors during this time because of convenience. On the contrary, the indigents lived far away and they had to bear their own transportation cost. There were decreasing of out-of-pocket patients because the hospital charge higher price for drug prescriptions.

5.1.3 Inpatient Care

Outpatient and inpatient during FY 1996-1998 of the hospital were classified according to both ICD-10 and DRG codes. (Budhachinaraj Hospital, 1998 : 39-44, 45-63.) There were 21 causes of diseases of outpatients and 75 ones for inpatients. Common diseases according to DRG groups are Specific cerebrovascular disorder except TIA (DRG14), Lens procedures with or without vitrectomy (DRG39), Esophagitis, gastroenteritis (DRG184) Cesarean section without complication (DRG371) and Vaginal delivery without complicating diagnoses (DRG373) respectively. Table 5.6 provided leading diseases of inpatient utilization and causes of dead inpatients.

Table 5.6 Leading Diseases of Inpatient and Length of Stay, Buddhachinaraj Hospital, 1998

Rank	ICD code	Description	IP	LOS
1	P03	Fetus and newborn affected by other complication	2,740	4
2	H25	Senile Cataract	1,769	4
3	J18	Pneumonia	703	9
4	A09	Diarrhoea	668	3
5	I64	Cerebrovascular accident	664	7
6	N18	Chronic Renal Failure	606	7
7	K35	Acute appendicitis	551	5
8	A91	Dengue Haemorrhagic Fever	539	3
9	K92	Other diseases of digestive system	480	5
10	J45	Asthmatic Bronchitis	458	3

Source : Buddhachinaraj Hospital, 1998 : 64

Table 5.7 Leading Disease of Dead Inpatients in Buddhachinaraj Hospital, 1998

Rank	ICD code	Description	IP	LOS
1	A41	Other Septicemia	253	5
2	S06	Intra-cranial Injury	168	5
3	J18	Pneumonia, organism unspecified	155	11
4	J96	Respiratory Failure, not elsewhere classified	134	13

Table 5.7 (Continued)

5	I64	Cerebrovascular accident	129	8
6	I61	Intra-cerebral Hemorrhage	106	4
7	K92	Other diseases of digestive system	98	4
8	K74	Fibrosis and cirrhosis of liver	72	6
9	S09	Other and unspecified injuries of head	70	2
10	I50	Heart Failure	69	7

Source : Buddhachinaraj Hospital, 1998 : 65

From table 5.6, most of leading disease were common diseases which length of stay was not more than 10 days. Children and elderly were prominent patients. The first leading diseases of admission were Fetus and newborn affected by other complication of labor and delivery and Senile Cataract. I noticed that the incidence of these diseases reflected the unqualified nursing care and increasing demand of eye surgery in public hospitals. Table 5.7 showed inpatients of leading-death diseases stayed not more than 15 days. Most patients were firstly injured at their head and end up with death. Table 5.8 provided the over views of patient characteristics of the sample hospitals.

Table 5.8 Comparison of Demographic Characteristics of Inpatient by Hospital, 1999

Descriptive statistics	Chiangrai Hospital	Buddhachinaraj Hospital	Hatyai Hospital
Number of inpatient	30,734	34,320	22,883
Dead patient (%)	4.8	5.3	2.8
Not improved patient (%)	4.3	4.1	2.6
Transfer (%)	.9	2.7	.8
Against discharge (%)	2.2	1.7	1.4
Female (%)	50.3	53.1	55.9
Age range*	1-98	1-98	1-97
Self-pay patient(%)	25.6	42.8	64.2
Reimbursed patient(%)	13.3	17.2	10.5
Social security patient(%)	1.5	1.5	3.4
Health card patient(%)	16.7	23.1	10.7
Elderly (%)	16.1	7.9	5.6
Children under 5 yr(%)	8.8	5.5	3.2
Student patient (%)	0.7	0.4	0.4
Disable(%)	0.6	0.4	0.1

Source: statistical analysis of patient-record file

Examining the comparison of demographic characteristics of selected patients in three sampled hospitals found that there was large different regarding proportion of patient by payment groups, dead rate and transfer rate. For example, the Hatyai hospital had the highest proportion of selfpay patient. The Buddhachinaraj hospital treated about 17.2 percent of reimbursed patient. The Chiangrai hospital provided free care to large percentage of elderly than others. However, gender and age distribution among three sampled hospitals were relatively the same.

Not only demographic characteristics were different, each hospital also had different patterns of resource consumption. Table 5.9 displayed the comparison of resource used for hospitalization. The resource variables were DRGs' Relative weight, length of stay, investigation charge, operation-related charge, drug charge, hospital service charge and total charge per admission.

Table 5.9 Resource Used in Patient Admission by hospital, 1999

Descriptive statistics	Chiangrai Hospital		Buddhachinaraj Hospital		Hatyai Hospital	
	Mean	S.D	Mean	S.D	Mean	S.D.
RW	1.12	.89	1.2	.92	.77	.68
LOS	5.88	9.21	6.42	9.81	5.67	9.38
INVEST	618.76	961.17	941.34	2263.35	559.12	1186.29
OP	2,112.08	4329.19	1385.66	3145.88	1692.04	3741.35
MEDS.	858.04	2797.37	331.93	1427.94	2012.59	8180.48
Drug	1384.42	4096.72	1615.59	6985.31	1610.14	5862.95
Bed	854.95	2307.46	855.13	2785.49	364.91	1814.419
Total IP charge	5917.61	10039.59	5245.08	12055.07	6382.88	16577.80

Note: RW-DRG relative weight, LOS-length of stay, INVEST-investigation charge, OP-operation-related charge, MEDS.-Medical service charge, Drug-drug charge, Bed-bed charge, Total IP charge-total inpatient charge

The above table provided comparison of average DRGs' relative weight, length of stay, other charge items and total charge. The Buddhachinaraj Hospital treated more complicated patient than others because average DRG's RW was the highest number. On the contrary, Hatyai Hospital had the highest average inpatient charge.

To examine the distribution of charge items by means and standard deviation, I found that Hatyai hospitals had the highest amount and variation of medical service charge while Chiangrai Hospital had the highest variation of operation charge. Buddhachinaraj Hospital also had the highest value of investigation charge and length of stay.

5.1.4 Discussion of the Results

Buddhachanaraj Hospital is not only a regional hospital but also a medical school. Most patients admitted in the hospital usually need specialties' care. In order to confirm the complication of diseases incurred, physicians of the Buddhachinaraj Hospital are likely to require more times and diverse laboratory investigations. The highest DRG's relative weight, accordance with the highest length of stay confirmed that the patients in Buddhachinaraj Hospital are more serious ill, compared to the other two hospitals.

Chiangrai Hospital which is located in the North of Thailand has high proportion of elderly and other free care groups to be cured. Comparing between people in the South, people in the North is more poorer and needy of social welfare. The Chiangrai Hospital has to provide free care to large group of patients. Hospital administration is likely to need cost recovery by charging more on operation-related items.

On the contrary, the Hatyai hospital is situated in the Songkla province which most of the people are merchant and prosperous. The hospital had higher proportion of selfpay patient. In addition, the hospital can charge higher because people have higher purchasing power.

5.2 Characteristics of the Medical Record File

5.2.1 Patient Background

I used two steps to select patient records for analysis. First, all three patient-record files were integrated into an analytic file. Second, I selected patient records by common DRGs. Common DRGs are particular DRGs with high frequency cases. Then the analytic file represented selected patients of high frequency DRGs. Table 5.10 displayed the number of cases in each sample hospital and number of cases in the selected DRG.

Table 5.10 Number of Inpatients in Each Hospital of the common DRG file

Hospital	Frequency	Percent
Chiangrai Hospital	12,816	37.5
Hatyai Hospital	10,921	32.0
Buddhachinaraj Hospital	10,443	30.6
Total patient	34,180	100.0

Source: Statistical analysis of patient-record file

In order to test the proposed model of inpatient charge by path analysis, Firstly, we drop out all invalid cases and run multiple regression according to three structural equations. Table 5.11 provided descriptive statistics of variables in the analytic file.

Table 5.11 Descriptive Statistics of the Analytic File, N = 27,883, all sample hospitals, 1998

Variable	Minimum	Maximum	Mean	Std. Deviation
RW	.22	3.39	1.0345	.8449
age of patient	1	102	35.03	21.14
Inpatient charge	1	35939	5215.94	5504.88
dead discharge	0	1	3.61E-02	.19
Los	1	30	4.60	4.31
Severity of illness	.00	4.00	.7212	.8289
Intensity of operative procedure	.00	4.00	.7179	.8285
Selfpay patient	0	1	.43	.49
Reimburse	0	1	.13	.33
social security	0	1	2.21E-02	.15
social security	0	1	2.21E-02	.15
moph subsidy	0	1	.43	.49
moph subsidy	0	1	.43	.49

Source: Statistical analysis of patient-record file

From the above table, there were 27,883 valid records of patients. Average total charge per admission was 5,216 Baht. Average age of Patient was 34.61 year. Average length of stay was 4.60 days. Proportion of patient by self-pay payment, reimbursed payment, MOPH

subsidized patient and social security patient were approximately 43 %, 13 % 43% and 2 % respectively.

5.2.2 Clinical Variable

Clinical variables are comprised of the date of admission, date of discharge, date of operation, physician code, diagnoses codes(principle diagnosis, secondary diagnosis, third diagnosis, fourth diagnosis), operative procedure codes(first operation , second operation, third operation, and fourth operation), discharge type, and discharge status. In this study I computed the composite variables such as severity of illness and intensity of operative procedure from the number of diagnoses and operative procedures.

The analytic file was comprised of 35 DRGs groups. The 5 highest ranks are diseases relevant to normal delivery , cesarean section, eye operation, digestive system, and trauma. All of them was accounted for over 40% of the patients in the analytic file.(Appendix D, Table 5.13)

5.2.3 Financial Variable

Financial variables were ten variables including lab charge, x-ray charge, medicine charge, medical supply charge, operation charge, ICU charge, room charge, food charge, nursing charge care etc. In this study I integrated some of similar charge items together according to their similar functions. They were total charge, investigation charge, drug and medical supply charge, curative service charge, operation charge, room and board charge respectively. Some of them were used in further analysis of price discrimination in chapter 7.

The average financial characteristics of patients in the three hospitals were displayed in Table 5.12. The Hatyai hospital charged the highest price. The Chiangrai hospital charged the highest rate for operation-related expenses. And the Buddhachinaraj hospital charged the highest average rate for investigation.

Table 5.12 Descriptive Statistics of Financial Variables by Hospital

Finance variable	Buddhachinaraj Hospital		Chiangrai Hospital		Hatyai Hospital	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Lab	941.34	2263.35	618.76	961.17	559.13	1186.29
OP	1385.66	3145.88	2112.09	4329.19	1692.05	3741.35
MedS.	331.94	1427.94	858.04	2797.37	2012.60	8180.48
Drug	1615.59	6985.31	1384.42	4096.72	1610.15	5862.96
Bed	855.14	2785.50	854.95	2307.46	364.92	1814.42
IPCh.	5245.09	12055.0	5917.61	10039.5	6382.89	16577.8
N(case)	34,320		30,734		22,883	

Source: Statistical analysis of patient-record file

Note: lab = all investigation costs, OP= all equipment related costs, MedS. = non-drug charge, Drug =drug cost, IPCh= inpatient charge

5.3 Variable Construction

5.3.1 DRGs' relative weight

Inpatients can be classified by certain characteristics. The classification distinguishes patients by the type of disease as well as their consumption of medical resources. The following are processes of constructing the DRGs relative weight for each patient.

1. The twelve data sets of each patient have to be merged into one record per admission according to an admission number and a hospital number.
2. A DRGs grouper program is used to partition each patient record into the DRG classification. This means that each admission is provided with the type of disease by DRG's code, relative Weight , average national days of stay or weighted Length of Stay (WLOS) and unacceptable days of stay or Outliner Trim Point (OT).
3. The process starts with the matching of these following variables: age and sex of patient, principle diagnosis, operating room procedures,

co-morbidity, complications (secondary diagnoses), length of stay discharge type.

4. Each record is assigned to one MDC, based on its principal diagnosis code. Each MDC is then partitioned on the presence or absence of procedure performed in the operating room .With at least one operating room procedure is " surgical" DRG and those with no operating room procedure is medical DRG.
5. In most MDCs, medical hospitalizations are then partitioned into clinically coherent groups of principle diagnoses, secondary and other diagnoses.
6. For surgical hospitalization, The procedure categories are hierarchical based on the intensity of resource consumption. A discharge with multiple operating room procedures is assigned to the surgical group based on the most resource intensive or procedure within this hierarchy.
7. Depending on the specified MDC and diagnostic groups, the patient record is further partitioned on the basis of age, the existence of co-morbidity and complications, and in a few cases discharge status.

Table 5.14 demonstrated only some DRGs. The seven major were DRG 373, DRG 371, DRG 183, DRG 184, DRG 14, DRG 486, and DRG 489. The table provided a description of each and its relative weight, length of stay and outlier trim point.

Table 5.14 Description of DRG , Relative Weight, Length of stay, and Outliner Trim Point

DRG	Description	RW	LOS	OT
373	Vaginal delivery without complicating diagnosis	0.33	3.19	6
371	Cesarean sections without complication	0.85	5.69	10
183	Esophagitis, gastroent & miscellaneous digest age >17	0.42	3.59	7
184	Esophagitis, gastroent & miscellaneous digest age <18	0.22	2.81	6
14	Specific cerebrovascular disorders except TIA	1.47	8.76	36
486	Other procedures for multiple significant trauma	3.39	23.03	44
489	HIV with major related conditions	1.99	10.2	39

Source: Diagnosis Related Groups Thai Version 1.0, MOPH, 1998

5.3.2 Severity of Illness

To construct a scale representing the severity of illness, this study used the number of diagnoses in each patient's discharge summary. Firstly, each diagnosis code was manipulated to be a dummy variable that represents its existence. There were four different types of diagnoses a physician had to specify for each patient discharge. The first one was the principle diagnosis. The second one was the co-morbid disease (disease for which the patient was being admitted). The third one was the complications of disease during admission and the fourth was other diseases. The more diagnoses a patient had, the more severely severity of illness he was. Second, to scaling the severity of illness was to quantify the number of diagnoses of the admission.

Severity of illness was scaled as three levels. Level 1 refers to the patient has either co-morbid disease or complication during the admission. Severity level 2 refers to the patient has both and severity level 3 if the other fourth disease exists.

5.3.3 Intensity of operative procedure

To construct a scale for intensity of operative procedure, this study used the number of operation each patient being treated. The operating physician of that admission had to specify the procedures in the patient's discharge summary. The procedures were ranked from the first operation to the fourth, according to its difficulty and quantity of used resources.

Firstly, each code of procedure was manipulated to show its existence. There were four types of surgical procedures ranked by the intensity of medical the supplies used. Patients with one or more than one surgical procedures was likely to use more medical equipment and supplies.

Second, scaling of the intensity were four level. Only patients with at least one operative procedure were the target of this scaling. Level 0 referred to having no operative procedure. Level 1 referred to having one operative procedure and level 2, 3, and 4 were according to number of operative procedure each patient being treated.

5.3.4 Hospital Charge Items

According to standard data system specified by the Ministry of Public Health, there are nine charge items as followed.

Table 5.15 Charge items , Buddhachinaraj Hospital, 1998

Code	Charge items
00	Investigation by laboratory
01	X-ray
02	Other investigations
03	Operation
04	Other curative care
05	Drug and medical supplies
06	Intensive Care Unit
07	Room Charge
08	Food Charge
09	Other charge

Source: Ministry of Public Health, Health Insurance Office. Standard Data File.

The investigation about charge items in the sample hospitals found that there were different pattern of charge items . While the Buddhachachinaraj Hospital has the same category as the standard charge items, the Chiangrai Hospitals' and Hatyai Hospitals' charge items were different. This might be because each hospital had its own design of financial transaction. Table 5.16 showed each category in both hospitals.

Table 5.16 Charge Items of Chiangrai Hospital, 1998

Variable	Description
Lab1	Investigation in laboratory
Blood1	Blood
CHE1	Pathology
XRAY1	X-ray
EXT1	Other investigations
OPER1	Operation
METER1	Artificial organ and treatment equipment
ANEST1	Anesthesia
DRUG1	Drug and medical supplies

Table 5.16 (Continued)

SALT1	Normal saline
BIRD1	Respiratory kits
O21	Oxygen expense
NONDRUG1	Non-drug expense
TERAPY1	Rehabilitation
TREAT1	Other curative care such as normal labor, wound dressing, dental care
ICUL	Charge of intensive care unit per day
ICUD	Length of stay in ICU
ICU1	Total charge in ICU
WARD1	Code of the first ward
WL1	Charge per day of bed in ward 1
WD1	Length of stay at ward 1
WT11	Total room charge for ward 1
FL1	Food charge at ward 1
FD1	Number of day of food charge at ward 1
FT11	Total food charge at ward 1
LOS	Total length of stay of the admission

Source: Chiangrai Hospital. Management Information System division, 1999

Table 5.17 Charge Items of Hatyai Hospital, 1998

Computer Code	Charge code	Charge item
List 1	Drug	Drug
List 2	Supply	Non drug material
List 3	X-ray	X-ray charge
List 4	Lab	Investigation by laboratory
List 5	Oinvest	Special investigation such as EKG, Ultrasound
List 6	Operate	Operation procedure charge
List 7	Otreat1	Operation equipment charge
List 8	Anaesth	Anesthetic application charge
List 9	Otreat2	Physician fee
List 10	Special bed	Charge for special room
List 11	Special food	Charge for special food
List 12	ICU	Intensive care unit charge
List 13	Otreat2	Physical therapy
List 14	Others	Other charge
List 16	Otreat2	Normal labor
List 17	Otreat2	Splint for a fracture bone

Source: Hatyai Hospital. Management Information System division, 1999

In order to standardize all sample hospitals' charge items, this study computed them into five scales of charge items in Table 5.18.

Table 5.18 Composite Variable of charge items

New Composite charge item	Description of Meaning
Invest	All laboratory investigation charge
Opercost	Operation charge
Medtreat	Drug charge
Ndrug	Other medical supplies other than drug
Bodytrea	Computed Medtreat and Ndrug as the Combination of drug and medical supplies
Therapy	Therapeutic charge
ICU	Intensive care unit charge
Bedcost	Inpatient bed charge
Foodcost	Inpatient food charge
Hotel	Computed bed and food expense
Totalcost	Combination of all charge per admission

Source: Computation of common charge items of all sampled hospitals by the author

5.3.5 Price Discrimination

According to the price discrimination variable, I integrated different patients due to type of health insurance into four payment groups. I could do this because the patient record files provided specific codes for each health insurance patients as presented in Table 5.19.

Table 5.19 Patient Type Coding by CHEM office, Health Insurance Office, and Public Hospitals

Description	CHEM	Std. File	Code ,Buddhach inaraj Hos.	Code,H atyai hos.	code, Chiang rai Hos.
Self Payment	15	A1	91	1	10
CSMBS reimbursed patient	14	A2	72,81,82, 83,84	7	20,30

Table 5.19 (Continued)

Health Card Patient	1	AI	20,21,22	2,3	31,32,
Social Security Patient	12	A7	53,61	6,	34
Low-income card holder	6	AB,AH	10	9,20,2 3,26	51
Free patients-monkshood, solders, local leader, health volunteer, royal mobile clinic, hospital-assistant patients	2,3, 4,5, 7,8	AE,AF ,AJ,A K,A3 to A6	18,19,31, 34,35,36, 37,41,42, 51,52	5,8,12 ,14,16 ,17,19 ,21,22 ,25,	40,41, 42,43, 44,45, 46,50, ,65,66 ,69,70 ,71,72 ,75,76 ,77,99
Elderly	9	AG	16	11	61
Children 0-5 yr	10	AA	11	10	62
Children 6-12 yr			11	10	74
Student		AC	12,13,14, 15	4	33
Disable	11	AD	17	18	64
Car Accident Patient	13	A9	63	13	n.a.
Workmen Compensation patient	16	A8	62		n.a.

Source: Integration of diverse name of the same patient right of health insurance from the Center of Health Equity Monitoring, the Health Insurance Office and the sampled hospitals

There are three systems of patient coding. The Center for Health Equity Monitoring Office (CHEM) provides arithmetic code for converting them into a single system. The Health Insurance Office, Ministry of Public Health provided letter codes while each sample hospital had its own codes.

In order to group patient by payment type, first, I converted all other systems' codes in the patient record

file into the CHEM code. Second, we integrated groups of patient according to four types of payments including self-payment patient, the reimbursed patient to the CSMBS, social security patient, and the MOPH subsidized patient respectively.

Table 5.20 Variables ,Type and Measurement of Variables

X	Variable Name	Type	Measurement of Variable
1	Age	Scale	Age of patient
2	Severity of illness	Scale	Level 1- patient with at least one second diagnosis Level 2 -patient with combination of co-morbidity and complication Level 3-patient with second , third and fourth diagnoses
3	Intensity of Operative Procedure	Scale	Level 0 refers to patient without any operative procedures Level 1 refers to patient with at only one operative procedure Level 2 refers to patient with two codes of operative procedures Level 3 refers to patient with three codes of operative procedures Level 4 refers to patient with four operative procedures
4.	DRGs' Relative Weight	Scale	Diagnosis-related groups' relative weight
5	Patient Type by Payment	Scale	Self-pay patient refers to the patient who paid the inpatient charge by his or own expense. Reimbursed patient refers to the patient who had health insurance certified by the Civil Servant Medical Benefit Scheme and the admitted had reimbursed payment from the Ministry of Finance MOPH patient refers to the patient who were not charged according to one of the several rights mandated by the Ministry of Public Health such as social welfare groups, low-income card holders, and health card holders. Social Security patient refers to patient who registered as the social security member of the hospital.
7	Dead discharge	Dummy	Proportion of patient who dead in hospital
8	Inpatient Charge	Scale	Amount of money aggregated from all charge items in an admission

Source: Description and type of variables, specified by the researcher of this study

5.4 Chapter Conclusion

This chapter provided general characteristics of the sample hospitals. They were hospital outputs, major outpatient-visit department, and leading diseases. I compared the hospitals by demographic characteristics and resources used including RW, LOS, charge items and average inpatient charge. I found that the Hatyai Hospital had the highest amount and variation of medical service charges while the Chiangrai Hospital-operation charge, and Buddhachinaraj Hospital-investigation charge and length of stay. This might be because the Chiangrai Hospital born financial burdens from high proportion of elderly and free care. The hospital needed cost recovery by charging more on operation-related revenue. The Buddhachinaraj Hospital was a medical school, which treated more severity patients, professionals needed comprehensive laboratory investigation than the others.

Characteristics of the analytical file such as demographic, clinical and financial variable were displayed in Table 5.11-5.13. Variable constructions were DRG's relative weight, severity of illness, intensity of operative procedure, hospital charge items and patient type were displayed in Table 5.15-5.19 respectively.

CHAPTER 6

HYPOTHESIS TESTING AND REVISED MODEL

6.1 Hypothesis Testing

6.1.1 Hypothesis 1 : Factors Influencing Administrative Decision of Hospital Pricing

The following statements elaborated logical relationships among four factors, influencing administrative decision of hospital pricing. The pricing implicitly reflected patient discrimination. They were Financial Burden, Potential Source of Finance, Government Regulation and Criteria of Third-Party Payment. Descriptive analysis was used to present the factors and their effects on inpatient charge.

- (1) The regulation of public subsidization for the low-income and underprivileged groups imposes financial burden to public hospitals.
- (2) The regulation of professional compensation imposes additionally financial burden to public hospitals.
- (3) The regulation of health service revenue releases the public hospitals' financial burden.
- (4) The regulation of medical service pricing provides public administrators chance of patient discrimination.
- (5) Criteria of Third-Party Payment provides public administrators chance of cost shifting among major third-party payers.
- (6) Potential source of hospital revenue appears to be the Civil Servant Medical Benefit Scheme.

6.1.1.1 Factor One : Criteria of Third-party Payment

They were major criterion of payment, which allowed patients' cross subsidization. The criterion were retrospective reimbursement by fee-for-service of the CSMBS, prospective payment by capitation of the SSO, and allocation budgeting of the Health Insurance Office to subsidize the low-income, underprivileged and health card

patients. I started the description of prospective payment, then followed with criterion of the allocated budget and then retrospective reimbursement.

1) Prospective Payment by Capitation

The Social Security Office promises to pay in advance an amount of money to any hospital that social security members choose. The office provides four types of payments including capitation, utilization-related payment, payment for high-cost medical service and reimbursement by patients of emergency illness. (Somkiat Chayasriwong, 1997:19) The capitation rate are the definite price of 1,000 or 1,100 Baht per member per year for either public or private hospital. The payment monthly depends on the actual number of SSO members.

Regarding the utilization-related payment, a maximum of one hundred Baht per member per year should be paid yearly after reporting requirements are met. The payment depends on relative utilization of the contracted hospitals. To get this budget, the hospitals are required to send monthly medical abstracts and patient costs to the office, and at least 7 months in a year. The payment aims to increase utilization as well as to get actual data for calculating future capitation rate.

The additional payment for high-cost medical services aims to compensate the expense that might not cover medical costs. The office provides only limited liability. The last payment for emergency and accident, the members are allowed to reimburse their advanced expenses by the specified criterion. For instance, at maximum of two times of outpatient services and two times of inpatient charges and transportation costs are allowed. However, each item of charge will be paid by the final justification of financial officers. Sometimes, providers may facilitate the patients for the reimbursement. It is likely that providers and patients cooperate to abuse the reimbursement.

The criterion provides hospital fixed amount of money every month and limited additional payments too, regardless of quality and quantity of services provided to the registered members. There are both advantage and disadvantage of the payment method. It seems to be effective for cost control but probably undermine the quality of services. Previous researches revealed that the utilization rate was much relative lower than other health

insured members. This might be because the target group are mostly adult and workers. They are likely to avoid physician visits during their working time.

For financial administration, the SSO payment becomes additional source of revenue. It can be determined in advance how much money is payable. Public administrators may use the account payable to release other financial burdens. Because of low utilization rates and few monitoring of quality control, the registered hospitals have gained cost recovery with the large surplus. In order to gain more such money, some hospitals have attracted more SSO members by shorten waiting time of outpatient visits. However, no improving quality of services has been reported. Dissatisfaction towards unqualified medical care by patients has been extensively reported.

Because of cost consciousness among professionals, only necessary medical care is provided to the patients. Patients have to be charged for requested drugs, treatments, and accommodations, those out-of-list for the SSO members. The physicians are also structurally inhibited to prescribe non-essential drugs and high-cost laboratory investigations. Each hospital's guideline of pricing specifies types of drug and laboratory investigations, allowed to the patients. In addition, hospital workers' perception of the capitation payment influences their cost awareness. Occasionally, some physicians might cost shift the patients' expense to the Workmen Compensation Fund by documenting that their illness were work-related. However, limited controls from both the SSO and Workmen Compensation Office provide probability of reimbursement abuse.

This reflected probably unjustified treatments. The prospective payment by capitation method of the Social Security Office might release financial burdens of public hospitals. Public hospitals have retained the capitate payment in their service revenue accounts, which were more flexible to use according to the Regulation of Health Service Revenue. The revenue was usually used to pay for hospital workers' special payments.

In short, the capitate payment provided three advantage benefits to Thailand public health system. It released financial burden of public providers. The hospitals could maintain financial viability surrounded with the context of the MOPH subsidization. Second, providers, in order to compete for the registered members, improved physical facilities provided to outpatient visits.

And lastly, the capitate payment induced hospital professionals' cost-awareness of rendering medical services. On the contrary, there were two disadvantages to society. Because of asymmetry information between physicians and patients and lack of quality assurance, no obvious quality of services has intended to render to the SSO patients. And the other, different standard of services existed in hospitalization, which undermine health equity.

2) Public Subsidization for Health Insurance

Thai government provides a safety net to rural indigents by two health insurance schemes. On behalf of the government, the Ministry of Public Health subsidizes the Health Card Revolving Fund and the Low-income and underprivileged Project. The Health Insurance Office of the MOPH is responsible for allocating the appropriated budgets to provincial health offices and then, public hospitals respectively.

(1) Low-income and Underprivileged Project

In the fiscal year 1998, the office allocated three program budgets to public hospitals. It included the Low-income and underprivileged Project, the Ssecondary Student Health Service Project and the Social Investment Loan for Institutionalize DRGs payment in the six selected hospitals. The appropriated budget were 7,428,330,000 Baht, 524,550,000 Baht, and 559,988,000 Baht respectively.

In order to ensure health equity, the Ministry of Public Health directed a new approach to allocate the budgets on September 11, 1998. It aimed to use DRGs's relative weight as a variable of hospital outputs or work-load factor and logically represented their related costs. The allocation criteria involved hospital costs, which were measured by workload factors, historical expense in fiscal year 1997 and the inflation rate. The work load factors were measured by inpatient and outpatient's relative weight of each hospital. The following equations displayed the representation of DRGs' relative weight for hospital costs. (Health Insurance Office,1998:11)

$$\text{Cost} = 689,586 + 92.47 * \text{OPRW} + 2,277.97 * \text{IPRW}$$

- Cost refers to hospital costs measured by the work load
- OPRW refers to calculated relative weight according to outpatients
- IPRW refers to calculated relative weight according to inpatients

Practically, consideration of budget amount to each province depended on the predicted number of low-income eligible, the hospital costs by DRGs, the hospital expenses, the hospital type and level, and the inflation rate. After the central agency allocated each province budget to corresponding provincial public health Offices, it became the responsibility of the administrative unit for internal allocation to public hospitals in its respective area. Because of the centralized administration in the offices, distorted reallocation of the money has been extensively reported.

Not only did MOPH hospitals receive a reallocated-provincial budgets, they also were compensated by another budgets. They were high-cost inpatient payment and above 2.5 DRG RW payment. The Health Insurance Office scrutinized the sent medical abstracts from public hospitals and paid back the costs. The office retained the pooling fund from a deduction of 2.5 % of the allocated budget as reinsurance expense. The high-cost inpatients were identified either by DRG's Relative weight or type of diseases with actual costs. Public hospitals were reimbursed the total medical costs of those inpatients, according to unit price of DRG'RW (4,000-8,000 Baht per one RW) and total DRG's RW of each hospital. In 1997, the high-cost budget was accounted for 175.84 million Baht. (Health Insurance Office, 1988.)

(2) Health Card Scheme

Public hospitals recovered their operating costs from the Health Card Revolving Fund. It was a voluntary health insurance for farmers and workers in informal sector at community level. Recently the central administration decentralized the financial management of the fund to provincial level. It became the health-card revolving fund for each province. (Supasit Pannarunothai, et al., 1997:5)

Only 2.5 % of national matching fund was hold by the Health Insurance Office for reinsuring the high-cost payment.

The guideline for payments on medical services was issued by the Executive Committee for Health Care Revolving Fund on February, 20,1997. The national committee pooled the fund by the integration of each health-card member's contribution and equal subsidy from the government. Then the central fund had to forward the money to each province according to the number of health cards. The provincial fund was regulated for use in both basic health services, within the network and extra-network medical services.

To achieve this objective, financial regulations were necessary to the Health Card Revolving fund. The Controller General Department, the Ministry of Finance had set up a new accounting system for the health card scheme since 1995. The system consisted of three different-level accounting systems at the national ,provincial and district levels.

The first account accumulated money from individuals and government matching budgets. The second account was for paying medical services. It distributed the money transacted from the first account to provincial public health offices,the second account. And the third account was for paying administrative costs. For a first part of the second account, medical services at community health centers were reimbursed by flat fee. In addtion, at least five percent of the total fund in the second account had to be allocated to the lowest level of care. It was intended to encourage preventive services. The second part of the second account distributed to within-network medical services in the same province and extra-network medical services of the other provinces. In certain circumstance, patients might be medically transferred to other providers outside the network. At least 10% of the money had to be allocated for extra-network medical services according to DRG's relative weight.

Because each health card member had a covered health benefits of the owner and other four family members. Public hospital usually awared of treating this patient group. Alike with the Low-income card group, cost recovery of the indigents imposed financial burden to public hospitals. The hardships were analyzed later on in the fourth factor, financial burden.

3) Reimbursement from the CSMBS Allowed Budgeting

Retrospective reimbursement by fee-for-service is the main criteria of the Controller General Department. The CSMBS eligible need not to pay inpatient charge in public hospitals. The hospitals, in turn, after treating the patient, collect all charges incurred from the admission and send a legally verification of the reimbursement directly to the department. The money is paid by fee-for-service with the limitations specified by the department.

The Civil Servant Medical Benefit Scheme (CSMBS) covers the medical care expense of all government employees (permanent employees and civil servants), pensioners and their dependents including spouse, parents and under-20-year three children. The scheme is financed through the central budget. It provides comprehensive benefits without co-payments in public hospitals. (see appendix IV ,Table 6.1)

(1) Revision of Payment Criteria of the CSMBS

Objective of the revision of payment criteria was to contain the increasing central expenditure, reimbursed by the CSMBS, both outpatient and inpatient services. By changing the regulation relevant to criteria of payment had evidentially reduced the expenditure of only two years. (further analysis in the next chapter) According the fast increasing of government financial burden of the civil servant welfare, the government has put continuous efforts to resolve the problems by controlling the reimbursed expenditure with demand-side strategy. That is to control the unnecessary use of medical care by co-payment and limited benefits.

The regulation, related to the eligible 's demands are co-payment for non-essential drugs and additional payment for accommodation of extensive hospitalization beyond the CSMBS limit length of stay. The General Controller Department revised the choice of provider and medical benefits. The reimbursement is allowed only public providers; limiting the number of admission day; not allowed the reimbursement of non-essential drugs, unnecessary treatments, non-official hour doctor fee, etc. However, the revised regulation can not induce more either health efficiency or equity. It may due to the relationship between physicians and the patients. Normally, public hospitals' physicians, as the beneficiaries too, perceive

their clients' difficulties and try to help with their discretion.

There were two factors relevant to the revision of payment criteria. They were economic crisis and previous research findings. During economic crisis 1996-1997, Thailand cabinet tried to reduce the national expenses by adjusting government budgeting. The cabinet issued on August 19, 1997 to reduce that year budget and called for the revision of payment criterion which emphasized on the cautious, economized, and efficient reimbursements.

The Committee of CSMBS Revision drafted explicit measures. The committee was comprised of related central agencies including the Budget Bureau, the Civil Servant Commission, the National Economic and Social Development Board, the Social Security Office and the Ministry of Public Health. The committee issued at October 15, 1997 the government measures and hospital practices as in Table 6.1. (Appendix D: Table 6.1-6.5, 6.21)

4) Discussion of the effects of the third-party payments to administrative decision of hospital pricing

So far, the main characteristics of three third-party payments to public hospitals were described. They could be the opportunity or threats to administrative decision of each hospital's pricing. Fee-for-service and the reimbursed payment provided hospital opportunity for substantial amount of cost recovery, as they wanted. According to this payment, a hospital could use the money to subsidize all uncollected expenses from other patients. It was likely that the hospital pricing would be designed to shift the costs of uncompensated patients to the CSMBS eligible. It was price discrimination phenomena.

Social Security payment provides an opportunity for hospital cost recovery as well as being more efficient in use of medical resources. The capitation fee is fixed and then multiplied by number of social security members. The related utilization payment rewards reporting performance. The high-cost payment can be reimbursed up to 30,000 Baht. Hospitals are likely to support the marketing in order to increasing the capitation budget. Advantages of the payment are the following. It discourages unnecessary treatments and hence, reduces overall utilization. On the contrary, hospital administrators perceive this payment as opportunity to get more revenue. They compete with the

private counterparts for hospital care and contractor networks. The revenue source encourages hospital to be more efficient because of cost awareness.

On the contrary, Health Card members and the Low-income cardholders imposed financial burdens to public hospitals rather than cost recovery. Because public hospitals had received very low subsidies compared to their actual costs. It was a threat to hospital finance. Public hospitals with the opportunity to shift the costs from the groups to the CSMBS or any other charge-based patients.

6.1.1.2. Factor Two: Regulations Related to Hospital Pricing and Hospital Finance

In this section, substantive contents of the five regulations influencing decision-making of public hospitals' administration were described. They are (1) the Regulation for Health Service Revenue 1995; (2) The Regulation of Public Health Subsidy 1994; (3) Regulation of Health Personnel Compensation 1993 ; and (4) MOPH Pricing Regulation 1994. The regulations provide financial burdens and the release.

1) Regulation for Health Service Revenue 1995

The Ministry of Public Health's Regulations for Health Service Revenue was modified recently in 1995. The previous versions of 1984 and 1992 were abandoned. The revisions aimed to increase financial flexibility and facilitate the operation of public health units. The regulation provides definitions of health service revenues, holding criteria and allowed payments.

The health service revenue appears to be non-governmental budget fund of each hospital. First, a public health unit can retain all the surplus of revenues relating to direct provisions, contracted provisions, special services to patients and relatives, selling of products as such, rent for the use of buildings and other assets, surplus from meetings, training programs and seminars, compensated payments from other organizations (damage and contractual penalties), donations without a specific purpose, and other revenues, as specified by Ministry of Public Health and approved by the Ministry of Finance.

Second, the regulation clearly specifies the revenue's holding methods and type of payments. A public hospital,

according to its size, can hold a specified amount of money according to the regulation. The surplus has to be deposited in the hospital account in the Bank of Thailand, or any private bank approved by the MOF.

In short, the Ministry of Public Health's Regulation for Health Service Revenue has provided flexibility to hospital administrators since 1995. All income at the point of service can be retained. I view that the regulation provides financial opportunities to public health organizations. For instance, the hospital administration can use the revenue for several types of expenses, including compensation of temporary workers, over-time, hospital welfare, etc. The more revenue collected the higher the financial viability of the hospital. Therefore, health-service revenue becomes an important source of finance.

2) The Regulation of Public Health Subsidy 1994

The regulation of the MOPH subsidy was revised recently, in August 1994. Previous versions of the 1981-1991 regulations were abandoned. The regulation requires public health providers to provide free and/or reduced price of medical services to some particular groups of citizen. The subsidies are conditional type of services as follows.

- (1) Charges for drug, blood, blood supplements, oxygen and other similar kinds of curative care,
- (2) Charge for substitute organs, curative equipment and reparation
- (3) Charge for medical service, laboratory examinations, disease diagnoses and exceptions for any other special compensation of health personnel.
- (4) Charges for annual physical examinations with the rate specified by CSMBS, Ministry of Finance.
- (5) Normal charges for hospital stays except for special rooms and food.

Beneficiaries of the regulation include eligible persons and their family members. Family members are sons and daughters under 20, spouse and parents. There are four types of beneficial groups including Type A , Type B, Type C MOPH subsidized patients .(see appendix) Not only did the 1994 regulations for Public Health Subsidy enlarge the number of people eligible for free care or reduced charge,

it also provided health personnel discretion to reduce price or free care to other patients. It can be concluded that the regulation affected financial constraints on public hospitals according to the following statements:

1. There are a large number of potential patients in these four eligibility groups and their families that public hospital cannot get revenue to cover their costs.
2. The regulation does not clearly specify the beneficiaries. Normally, the identification requires only membership cards. It is impossible to ascertain how many of these groups of people being hospital customers. Ultimately, the regulation has a threat to hospital fiscal solvency.
3. All medical benefits and public subsidies are subject to be changed by the MOPH without any participation and negotiation with all stakeholders.

3) Regulation of Health Personnel Compensation 1993

Nine groups of health personnel are paid according to the Regulation of Health Personnel Compensation since 1993. The rate of payment for each group depends on type of work, Personnel Classification (PC) level, and the level of professionalism.

Because a public hospital must provide twenty-four-hour services, the three-8-hour rounds of working schedules must impose on available human resources. The regulation allows hospital administrators, with the approval of hospital committees , to rearrange both the schedules and compensations to their workers. Therefore, each hospital personnel receives extra money, added to his/her own salary, depending upon medical knowledge and professional qualifications. The following table shows the rate of additional payments by type of worker, PC and the source-of-finance employee.

Table 6.2 (Appendix E: Regulation) distinguishes rate of payments among hospital professionals. According to the table, rate of compensation for hospital personnel depends mostly on type of profession. Civil servants gain more compensation than employees. Although medical care personnel have to work in team, the compensation regulation discriminates professional remuneration. Apart from the paid compensation according to type of profession and PC

level, the nursing- service payment also depends on the level of professional and difficulty of works. On the contrary, physician payment depends on the amount of time. Surprisingly, actual level practice skills are not be used as criterion for the payment.

According to Table 6.3 (Appendix E: Regulation), hospitals have to reimburse their nurses according to their level of professional; physicians according to their time contribution and type of operation. It is very interesting that the relationship between difficulty of work and payment are roughly specified in surgical procedures (large or small operation).

A hospital director has to adjust hospital workers' payment because certain types of costs cannot be paid from the government budgets. The Health-Service Revenue has to be proportionally distributed to serve internal interests as well as maintaining the financial viability of the hospitals. Because reducing professionals' income is very difficult, only one choice is to impose hospital pricing for obtaining more cost recovery.

According to the Physician Profit Maximizing Model, physicians are groups of personnel who determine the conducts within hospitals. Their compensation pattern appears to be built-in incentive exclusively for physicians. In my opinion, it is not justified to pay the professional team individually either by level of professional or time contribution. It should be paid collectively the whole team because of their shared responsibility and complexity of works.

4) The MOPH's pricing regulation 1994

In 1994, the Ministry of Public Health issued a guideline for The Rate of Medical Service. All public health organizations are partly subsidized by the Ministry of Public Health and regulated to provide free care, reduced charges, maintain fiscal solvency by charging only out-of-pocket and private insured patients. To prevent over-charging public health organizations, the Ministry of Public Health has to keep equity by issuing the reference price. However, there is no standard charge for every item of medical service in public hospitals. The rate serves as only the guideline for public hospitals to construct their own price for each type of service.

Before drafting the guideline of pricing, the nominated commission conducted a cost-accounting study, public hearings, and suggestions from academics. The rate was based on two principles. One, the rate had to be cheapest price and two, hospitals could recover their operating costs and afford their own medical facilities if necessary. To investigate more detail of administrative fallacy in the reference pricing, set by the MOPH, the following description demonstrated two categories of pricing. Drug and charge for pathological investigation.

Drug categories include both self-produced and purchased drugs. According to the regulation, only some items of self-produced drugs are specified. For other types of produced drugs, a hospital can charge more but not higher than 30 percent. The purchased drugs from other industries, the hospital has the authority to construct its own scale between 15-30 percent of the purchased price or costs, or depending on the hospital director as approved by the hospital committee.

This regulation, only provides a general guideline for setting the selling price of drugs and medical products. Since, they are major components of hospitalization, it is crucial to investigate hospitals' authority in setting drug prices. Some hospitals set lesser while the others set higher. Who are the affected groups of their decisions? Certainly, the self-authorized pricing of public hospitals has increasingly deterred the out-of-pocket patient. In addition, the self-manufacturing products are not subject to be standard pricing or quality assurance.

Table 6.4 and Table 6.5 (Appendix E: Regulation) displayed the charges for laboratory investigation and general surgery. The description of each type is not a specific name. They are just relevance to certain kinds of medical treatment. In addition, differences between minimum and maximum charge appears to be double. This implies the allowance of subjective discretion for practitioners to charge patients.

5) Discussion

The pattern of almost doubling range from minimum to maximum is clearly demonstrated in surgical procedures. There are 116 procedure, most of them range to double the amount of the charge. We can witness the general pattern of double pricing in medical services. The description of each

operating procedure does not follow the operating procedure of DRGs classifications too. (DRGs Thai Version 1, 1997 p.26).

This pattern allows for financial discretion, to discriminate among patients. There is also no consistency of price between two hospitals in the same street or even patients having had the same operating procedure. Hospital pricing might effect self-paying patients. Not only have the reimbursed patients been price discriminated against, the self-paying group would also be affected by the cost shifting from the CSMBS.

Generally, changes in one third-party payment criteria might affect the other patient groups. Imagine that if the CSMBS changes its payment method to a new one, perceived as reducing revenue, what would be happen to the financial stability of public hospitals and then, the level of the service charge to the out-of-pocket patients. Certainly, hospital administrator inevitably raises the price charged to either the uninsured or the privately insured instead of the CSMBS.

6) Factor three and four : Potential Source of Revenue and Financial Burden

(1) Buddhachinaraj Hospital

(1.1) Potential Source of Revenue

The statement of revenue and expense of the hospital was shown in the following table.

Table 6.6 Statement of Revenue and Expense, Buddhachinaraj Hospital 1998

Items	Fiscal Year 1998 (Baht)
Revenue	
Appropriation from government budget	665,039,371
a. normal budget	335,383,552
b. low-income budget	36,179,269
c. other budgets	293,476,550
Collection from patient care	352,259,377
a. direct out-of-pocket	166,997,225
b. CSMBS Payment	131,176,082
c. Social Security Fund Payment	28,635,819

Table 6.6 (Continued)

d. Car Act Reimbursement	14,830,706
d. Workmen Compensation Fund Payment	10,485,348
Total revenue	1,017,298,748
Expense	
Total Expense	987,570,596
Expense from government expenditure	649,567,851
Expense from patient sources	338,002,745
Balanced Cash at end of fiscal year	65,551,259
Inventory value	37,946,173
Debt at end of fiscal year	53,376,044

Source: Buddhachinaraj Hospital, 1998: 11

The hospital got its revenue from two financial sources-government budgets and patient services. The government budgets included the normal budget, low-income budget and other types of budgets. The statement of operation above indicated that the low-income budget was relatively small with regard to the other budgets. On the other hand, the patient service revenue came from both direct, out-of-pocket payment at point of service and indirect payments. The out-of-pocket payment was accounted as 43.26 % of total patient-service revenue. The proportion of direct and indirect payment were compared as follow.

Table 6.7 Patient Revenue by Payment Type, Buddhachinaraj Hospital, 1998

Revenue	Amount (Baht)	Percent
Total Patient-Service Revenue	352,259,377	100.00
Total Out-of-pocket payment	152,982,142	43.26
Total Indirect Payment	199,277,235	56.57

Source: Buddhachinaraj Hospital, 1999

Table 6.8 Distribution of The Indirect Payment,
Buddhachinaraj Hospital ,1998

Revenue	Amount (Baht)	Percent
Total Indirect Payment	199,277,235	100.00
CSMBS	131,176,082	65.83
Health Card Revolving Fund	28,635,819	14.37
Social Security Fund	28,845,789	14.48
Car Act Reimbursement	10,485,348	5.26
Workmen Compensation Fund	134,197	.07

Source: Buddhachinaraj Hospital, 1999: 12,20,21

From the table the hospital got majority of indirect payment from the Civil servant Medical Benefit Scheme. In 1998, the CSMBS payment was 131,176,082 Baht, as 37.24 % of total patient revenue. This was the major source of patient revenue of the hospital.

(1.2) Financial Burden of Buddhachinaraj Hospital

Table 6.9 provided empirical data of hospital subsidization to the indigent groups. Major groups of patients were elderly, health-card holders and the uninsured.

Table 6.9 Operating Costs by Health Insurance,
Buddhachinaraj Hospital, 1998

Type of Patient	Total Patient (IP+OP)	Total Costs (IP+OP)
1.Low-income welfare		
a. low-income card holder	5,333	5,334,097
b. children 0-12 yrs.	7,993	14,936,119
c. secondary student	2,668	1,951,899
d. elderly (more than 60 yrs.)	21,643	37,923,897
e. disability	1,437	1,633,472
f. former soldier	1,278	818,376
g. religious member	3,075	3,434,67
2. Health Card Holders		
a. normal citizen	61,631	68,104,163

Table 6.9 (Continued)

b. local leader	1,094	1,716,124
c. health volunteer	3,921	4,801,778
3. Exempted Patient due to 1993 MOPH subsidized regulation	234	1,178,608
4. Uninsured Patient	7291	16,328,161
5. Immigrants	78	75,040
Total Subsidized patients	117,676	158,236,406

Source: Budhachinaraj Hospital, 1998: 19

The hospital provided free hospital care to diverse groups of indigents. They were low-income-card holders, health-card holders and other patients of charity care. About 160 million Baht was exempted for the groups. In addition, cost of 44 million Baht, due to the referred patients from other provinces, had to be waited for retrospective reimbursement from the patients' registered hospitals. In addition, although the Health Card Fund provided revenue by membership registration, the hospital had to subsidize over 60% of the total costs. This subsidization caused financial burden to the hospital.

The hospital was highly subsidized from government budgeting. However, only public sources were not enough to cover the operating costs. Revenue from patient care contributed only one third of the hospital revenue. The out-of-pocket payment and third-party payments financed the hospital with the CSMBS played major role. Because the CSMBS criteria of payment was retrospective reimbursement by fee-for-service method and directly from public hospitals to the General Controller Department. The hospital usually transferred its operating costs by the cross-subsidization from the CSMBS to the indigents in order to overcome both financial burdens.

(2) Chiangrai Hospital

(2.1) Potential Source of Revenue

Table 6.10 Revenue by source, Chiangrai Hospital, 1998

Source of Hospital Revenue	Amount (Baht)	Percent
Total Hospital Revenue	606,781,826	100.00
Total Government Budgets	315,599,359	52.01
Total Patient Service Revenue	291,182,467	47.99

Source : Chiangrai Hospital. Finance Division,1999 :1

Table 6.11 Distribution of Patient-Service Revenue, Chiangrai Hospital,1998

Source of Patient Revenue	Amount (Baht)	Percent
Total Patient Service Revenue	291,182,467	100.00
Out-of-pocket payment	199,899,670	68.65
Social Security Fund payment	4,348,356	1.49
Health Card Revolving Fund	20,875,085	7.17
Charity Fund	6,970,178	2.39
CSMBS payment	58,830,260	20.20
Other hospital revenue	258,916	.09

Source : Chiangrai Hospital. Finance Division,1999 :1

Chiangrai Hospital got two source of hospital revenue. About 52 percent of the revenue was subsidized from the government. Total patient-service revenue was about 291.2 million Baht. Two major sources came from the out-of-pocket payment and the CSMBS. They were 68.65 and 20.20 percent of the patient-service revenue respectively. Most of the patient-service revenue was paid for the hospital's operating expense, salary of temporary workers and building and equipment's expense accordingly. The hospital revenue was used to pay several categories as follows.

Table 6.12 Distribution of expense from patient-service revenue, Chiangrai Hospital, FY 1998

Type of Expense	Amount (Baht)	Percent
Total Patient Service Revenue	199,899,670	
Total Expense	186,937,942	100.00
Salary of temporary workers	21,854,268	11.69
Operating expense	134,692,290	72.05
Utilities	4,002,662	2.14
Building and equipment 's expense	19,835,149	10.61
Supportive expense	425,000	.23
Other expense	6,128,573	3.28

Source : Calculated from Statement of Patient-revenue Expense in Summary of Performance Report, Finance Division, Chiangrai Hospital, 10 August, 1999: 45

(2.2) Financial Burden of the Chiangrai Hospital

Examining proportion of patients by type of health insurance, most of them were social welfare and health-card-holder patients. About 150 million Baht was used to subsidize the social welfare and health card groups. Table 6.13 showed the number of outpatient visits, total operating costs and average cost per visit.

Table 6.13 Number of Outpatient Visit , Total Operating Costs and Cost per Visit by Health Insurance Group

Health Insurance	Number of OP Visit (visit)	Total Operating Costs (Baht)	Average Cost per Visit (Baht)
Social Welfare	62,497	14,746,950	236
Student Health Insurance	555	177,643	320
Health Card Holder	43,505	12,895,277	296
Social Security	19,605	3,328,920	170
Total	126,162	31,148,790	

Source: Chiangrai Hospital, 1998: 31

Table 6.14 Number of Inpatient, Hospital Stay, Total Cost and Average Cost per Admission by Health Insurance

Health Insurance	Number of IP (case)	Hospital Stay (day)	Total Cost (Baht)	Cost per Admission (Baht)
Social Welfare	15,990	118,172	91,644,122	5,731
Student Health Insurance	128	585	433,108	3,384
Health Card Holder	5,302	32,502	30,240,750	5,704
Social Security	538	3,195	3,148,874	5,853
Car Act	1,001	n.a.	16,931,058	16,914
Total	22,959	Approx. 154,454	142,397,912	

Source: Chiangrai Hospital, 1998: 32

Majorities of the insured patients were the social welfare and health-card groups. The operating costs of the groups both for outpatient and inpatient were 150 million Baht. To investigate more comprehensively about the type of social welfare patients, I partitioned the number of cases by social welfare. I found that three major utilized groups were the elderly, children under five and type A of the low-income-card holder. About 31.95 and 32.48 % of inpatient and outpatient in the social welfare groups were elderly. (Chiangrai Annual Report, 1998: 31-32) It might be concluded that the increasing trend of elderly and children under five of the population would increase financial burden to the hospital.

Comparing average cost of outpatient visit among the health insurance groups, average cost per admission of the categorized groups, the car act group was the highest while the student group was the lowest. The figures reflected the resource used in each group. Because the car act group expense could be reimbursed to private insurance companies whereas the student budget by capitation. The former could be charged higher without question. However, the hospital

was likely to avoid the costs of social security and student patients because of the cost awareness for the capitation budget. This kept the average cost of the group the lowest among others.

Not only the subsidized care caused financial burden, special payments to hospital worker did. Salary and wage were regular compensation types, paid to hospital workers. There were total 1,580 workers including 782 civil servants, 350 permanent employees and 428 temporary employees. According to government regulation, the temporary employee's compensation must be paid only by the hospital's patient revenue. The amount and percentage of the compensation was displayed in Table 6.15.

Table 6.15 Hospital Expense by Compensation, Chiangrai Hospital, 1998

Compensation Type	Government Budget Source	Patient Revenue Source	Total Expense
Salary	124,590,377	-	124,590,377
-Civil Servant Salary	111,362,385	-	111,362,385
-Professional Compensation	13,277,992	-	13,227,992
Wage	31,903,948	21,584,268	53,488,216
-Permanent Worker	31,903,948	-	31,903,948
-Temporary Worker	-	21,584,268	21,584,268
Mandated Compensation	1,846,050	27,855,859	29,701,909
-Autopsy	-	280,000	280,000
-night compensation	-	2,892,349	2,892,349
-housing (continue)	989,050	-	989,050
-overtime food expense	-	165,100	165,100
-Aids risk taking incentive	-	-	-
-overtime compensation for physician	-	21,900,410	21,900,410
-not have private practice compensation	857,000	2,518,000	3,375,000
Grand Total	158,340,375 (76.21%)	49,440,127 (23.79%)	207,780,502

Source: Financial Analysis of annual reports of each sampled hospitals

The hospital used up to 207.8 million Baht for man-power costs. About 24 % of the costs had to be recovered by patient revenue because the government subsidized only 76 % of the costs. Within the patient-revenue source for compensation, about a half of it was paid for physicians. Night compensation of the whole group was accounted as only 10% of the payment.

Whether it is justified to pay a lot of money to physician with not have private practice in public hospital? The question is that physician is not only one profession of the hospital-worker team. Whether or not the type of payment is not the means to induce better clinical practice but rather discourage other professions in the same setting.

It can be concluded that the causes of hospital financial burden are operating costs for social welfare and health-card patients. In addition, the hospital bears the costs for the mandated compensation and temporary employee wage. Both causes are imposed by the MOPH regulations. In order to achieve hospital efficiency, to deregulate or change the content of the regulations may help to correct the financial management.

(3) Hatyai Hospital

(3.1) Potential Source of Revenue

The hospital got its revenue from two financial sources-government budgets and patient services. The Annual Report 1998 showed patient service revenue and expenditure by both government budgets and patient-service sources. They were comparatively equal amount from the sources.

Table 6.16 Revenue by Source, Hatyai Hospital, 1998

Source of Hospital Revenue	Amount (Baht)	Percent
Total Hospital Revenue	474,659,013	100.00
Total Government Budget	233,029,347	49.09
Total Patient Service Revenue	241,629,666	50.91

Source : Calculated from Table of Revenue and Expense ,
Hatyai Financial Report, FY1998: 20-25.

Table 6.17 Patient Revenue by Payment Type, Hatyai Hospital 1998

Revenue	Amount (Baht)	%
Total Patient-Service Revenue	241,629,666	100.00
Total Out-of-Pocket Payment	142,299,743	58.89
Total Indirect Payment	99,329,973	41.11

Source : Calculated from Table of Revenue, Hatyai Financial Report, FY1998: 20.

Table 6.18 Distribution of The Indirect Payment, Hatyai Hospital, 1998

Revenue	Amount (Baht)	Percent
Total Indirect Payment	99,329,973	100.00
CSMBS	58,189,941	58.58
Public Enterprise Patient Services	17,733,252	17.85
Workmen Compensation Fund	807,753	.81
Social Security Payment	22,599,027	22.75

Source : Calculated from Table of Revenue, Hatyai Financial Report, FY1998: 20.

From Table 6.17 the out-of-pocket payment was accounted as 58.89 % of total patient-service revenue. And from Table 5.18 the hospital got majority of indirect payment from CSMBS. In 1998, the CSMBS payment was 58,189,941 Baht, or as 58.58% of the total indirect payment. This was the major source of patient service revenue of this hospital.

(3.2) Financial Burden of Hatyai Hospital

Table 6.19 provided empirical data of hospital subsidization to the indigent groups. Major groups of them were elderly, children under 12 years, health cardholders and the uninsured patients. About 130 million Baht a year that the hospital had to subsidize free patients.

Table 6.19 Operating Costs by Health Insurance Group ,
Hatyai Hospital, 1998

Type of Patient	Total OP Case	Total OP Costs	Total IP-Day	Total IP Costs	Total Costs
1. Low-income Welfare					
a. Low-income card holder	6,397	1,257,125	3,692	5,885,488	7,142,613
b. children 0-12 yrs.	13,187	1,700,154	20,031	14,699,174	16,399,328
c. secondary student	914	145,150	689	630,676	775,826
d. elderly more than 60 yrs.	19,616	5,477,565	17,240	28,301,735	33,779,300
e. disability	1,230	750,074	860	680,618	1,492,409
f. former soldier	2,567	1,308,877	510	680,618	1,989,495
g. religious member	1,355	393,082	966	1,509,693	1,902,775
2. Health Card Holders					
a. normal	56,628	11,978,104	25,552	29,151,183	41,777,541
b. local leader	1,668	321,992	614	682,969	1,138,634
c. health volunteer	4,080	928,401	2,464	2,513,063	1,138,634
3. Exempted Patient due to 1993 MOPH subsidization regulation	245	90,475	63	1,883,763	1,974,238
4. Uninsured Patient	7,959	1,100,041	18,006	16,779,319	17,879,360
5. Immigrants	0	0	0	0	0
Total Subsidized Patient	115,846	25,451,040	90,687	103,460,656	129,852,192

Source : Calculated from Table of Free Patient Care by Social Welfare, Hatyai Financial Report, FY 1998 : 40

Examining the proportion of patients by type of health insurance, I found that most of them were social welfare groups and health-card holders. About 25 and 103 million Baht were subsidized for outpatient visits and inpatient admission respectively. Not only the subsidized care caused financial burden to the Hatyai Hospital, I found that about 50 million Baht or 25% of hospital worker compensation was paid from the patient service revenue.

Table 6.20 Hospital Expense by Compensation, Hatyai Hospital. 1998

Type of Expense	Government Budget Source	Patient Revenue Source	Total Expense
1. Salary	124,349,112	-	124,349,112
Civil Servant	116,691,767	-	116,691,767
Position Payment	7,657,345	-	7,657,345
2. Wage	28,488,737	20,049,672	48,538,409
- Permanent Worker	28,488,737	-	28,488,737
-Temporary Worker	-	20,049,672	20,049,672
3. Mandate Compensation	2,755,280	30,405,093	33,160,373
-Nursing Care compensation	1,435,140	27,613,307	29,048,447
-Overtime Compensation	13,100	2,531,386	2,544,486
-additional payment to physician	-	120,000	120,000
-lecture payment	41,200	110,400	151,600
-procurement commission payment	-	30,000	30,000
-physical exam expense	217,190	-	217,190
-housing	1,048,650	-	1,048,650
-Grand Total Salary , Wage and Compensation	155,593,129 (75.51%)	50,454,765 (24.49%)	206,047,894 (100%)

Source : Hatyai Financial Report, Fiscal Year 1998: 21.

The author explored the distribution pattern of the sample hospitals' total revenue and cost. Total hospital revenue came from two different sources-government appropriation and patient-service revenue. The patient-service revenue can be categorized generally as out-of-pocket payment and indirect payment. I found that CSMBS was the major source of the indirect payments and accounted for about 30 percent of total patient-service revenue.

There were two causes for hospital financial burdens. One was the money spent for the operating costs of services for social welfare and health card patients. The other was the payment for hospital worker. About 25 % of the payment was paid from the patient service revenue.

Summary of Hypothesis Testing 1

I found the results of testing six hypotheses, derived from the conceptual framework of hospital pricing as the following.

1. The regulation of public subsidization for the Low-income and underprivileged group increases public hospitals' financial burdens. The sample hospitals subsidized about 150-160 million Baht for the group.
2. The regulation of professional compensation increases public hospitals' financial burdens. According to the regulation, public hospitals have to pay overtime payment to hospital workers, special compensation to physician without private practices and special payment for operation. The regulation reveals this unfair pattern of professional payments because the criterion depends on type of civil servant and employee, personal classification, and profession type rather than practice skills and performance of the hospital team.
3. The regulation of health service revenue reduces public hospitals' financial burden of free care. Since the regulation provides flexibility in hospital finance. Public hospitals have to use the revenue for personal compensation.
4. The regulation of medical service pricing provides public hospital chance of price discrimination by setting the different prices for certain services and patient types.
5. Criterion of third-party payment provides chance of cost shifting from the free care programs to the CSMBS.
6. The potential sources of public hospitals' finance are out-of-pocket payment and retrospective , fee-for-service payments from the CSMBS.

It can be concluded that hospital administrators use the criterion of public regulations to reduce financial burdens. The burdens came from the MOPH's subsidization of the low-income indigents and inadequate budgeting. In this case, public administrators set their hospitals' pricing to get enough revenue for personal compensation and free care. Cross-subsidization is facilitated by the regulation of medical service pricing and retrospective, fee-for-service payment of the CSMBS.

6.1.2 Hypothesis 2: Factors Affecting Physician Decision of Patient Care

Four hypotheses were set for testing the proposed model of inpatient charge. The following statements reveal the hypotheses.

- (1) Inpatient Charge can be determined by patient type by payment, length of stay, DRGs' relative weight, dead discharge status, age of patient, severity of illness and intensity of operative procedure
- (2) Patient characteristics including age of patient, severity of illness and intensity of operative procedure significantly affect DRG's relative weight.
- (3) Price discrimination that implicitly resulted from hospital pricing can be measured by patient type by payment.
- (4) DRG's relative weight can be a measurement of admission cost.

I tested the above hypotheses by Path Analysis. This dued to my several reasons. First, it is an effective technique for statistical analysis. Although it appears to be very complicate, it is good at studying data and concepts.

Second, It is the technique that directly induces conceptualizations into data analysis. Because it enforces researchers to create relevant models displaying relationships among variables. Then the researchers have to assess their models by statistics. (Boyle, 1970:461) The testing needs logical relationships, which show clearly and exactly the relationships between each couple variables rather than any other techniques. (Babbie, 1970:440) The technique also imposes the sequence of the variables and their linkages. Not only the relationships between independent variables and dependent variables but also the independent themselves. (Asher, 1976:9)

Third, path analysis is a fractional analysis and interpretation among group of variables. They are causal relationships in a closed system. (Kim and

Kohout,1975) However, it is not the technique for exploring the causes of phenomenon. It helps to test the theories but not build the theories.(Kerlinger and Pedhazur,1973:305)

Fourth , the researchers can find the correlation between variable directly and indirectly. Relative quantity of the relationships can be used to compare the significance of each pair of variables in the hypothetical model. The technique also helps the researchers to decompose the relationship of the couple variable into both causal and non-causal relationships. I cannot find the capability in any other techniques. I would like to conclude that path analysis should the effective method for verifying our hypothetical model by using existing data of our real world.

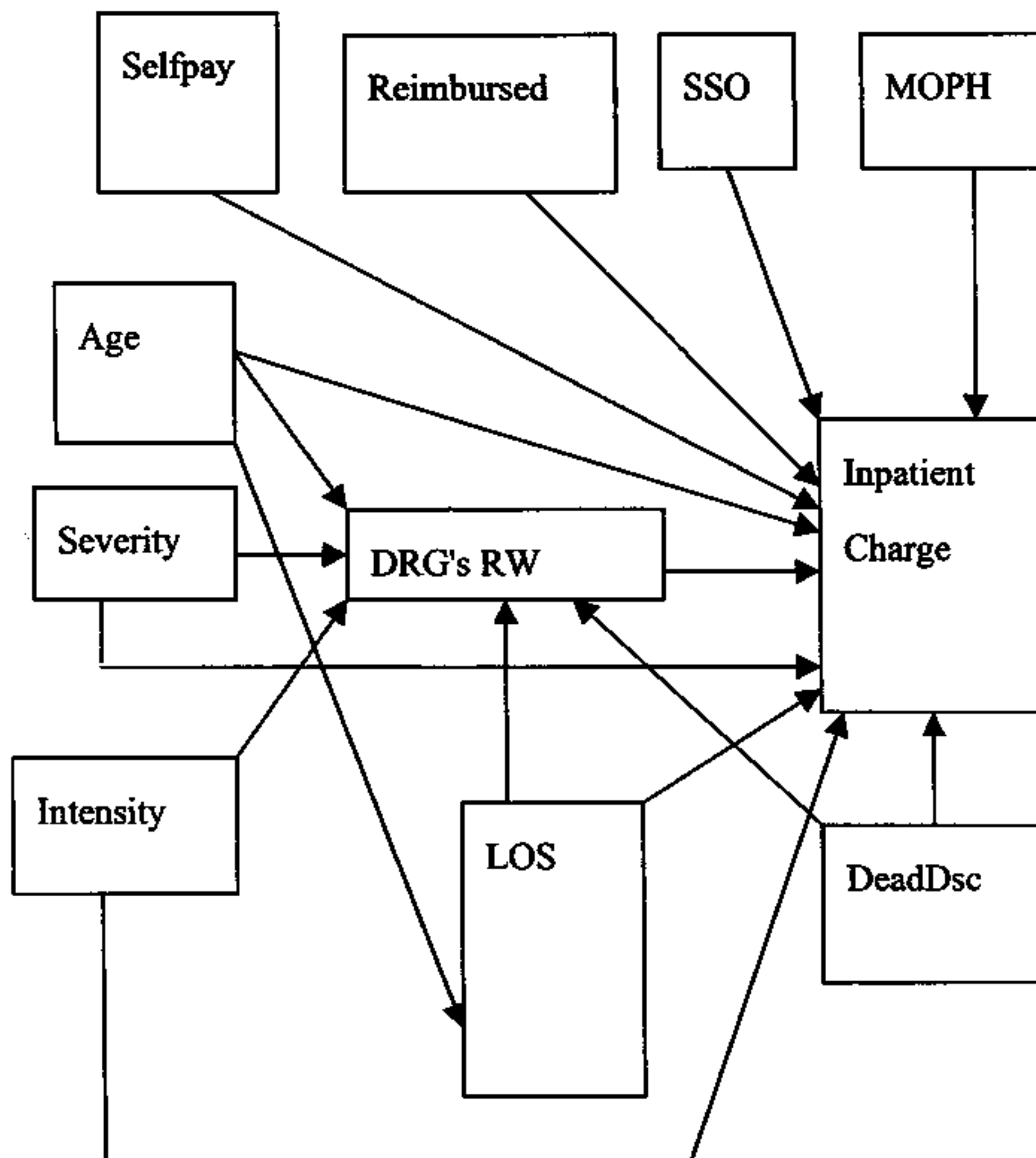


Figure 6.1 Hypothetical Model of Inpatient charge

The hypothetical model shows relationships of ten independent variables with Inpatient Charge. From the model, ten independent variables directly affect Inpatient Charge. They are four patient types including Self-pay, Reimbursed, MOPH and SSO patient respectively. In addition, the resource variables including Length of Stay, DRG' relative weight and Intensity of Operative Procedure also hypothetically might affect the Inpatient Charge. Age of patient, severity of illness and Dead Discharge are patients' clinical characteristics which previously found increase inpatient charge.

There are other four independent variables indirectly affecting Inpatient Charge via DRGs' relative weight. This is because DRG's grouping software must identify the variables before assigning the particular code. The variables are age of patient, severity of illness and intensity of operative procedure and Dead Discharge. And the last relationship, age affect length of stay.

From the model, I mapped the relationships among independent and the dependent variable as well as among independent variables themselves. This testing used Path Analysis to find causal effects of each independent variable with Inpatient Charge. The following structural equations represented linear relationship between the independent and dependent variables.

Structural Equation I

$$\text{Inpatient Charge} = a_0 + a_1 \text{ Age} + a_2 \text{ Severe} + a_3 \text{ Intense} + a_4 \text{ RW} + a_5 \text{ LOS} + a_6 \text{ DeadDsc} + a_7 \text{ Selfpay} + a_8 \text{ Reimbursed} + a_9 \text{ MOPH} + a_{10} \text{ SSO} + e_1$$

Structural Equation II

$$\text{RW} = b_0 + b_1 \text{ Age} + b_2 \text{ Severe} + b_3 \text{ Intense} + b_4 \text{ LOS} + e_2$$

Structural Equation III

$$\text{LOS} = c_0 + c_1 \text{ Age} + c_2 \text{ Severe} + c_3 \text{ Intense} + e_3$$

Note: Severity = severity of illness, Intense = Number of Operative Procedure, LOS = length of stay, RW= DRG's relative weight, a_0 to a_{10} , b_0 to b_4 and c_0 to c_3 = regression coefficient of subsequent equation

After I conducted the correlation among independent variables of the second equation against DRG' relative

weight , I got the Pearson correlation coefficient as shown in Table 6.21.(Appendix E: Regulation)

I found that there was not high relationship among independent variables. It was not likely to have multicollinearity. Hence it was general for research in social and behavioral science that we can analyse the variables with ordinary least square. In addition, the medium relationship among independent variables would not cause too high or too low regression coefficient. In other words, there was no large variation among regression coefficient from each sample group of the same population.(Purachai Piemsomboon,1981:44)II got the regression result as shown in Table 6.22.

Table 6.22 Regression Result of three Structural Equation of Inpatient Charge Model

Structural Equation	Regression Result	R ²
1	Inpatient Charge = 4215.520 + 41.167 Age - 208.827 Severe + 1352.828 Intense + 396.918 RW + 607.576 LOS + 2228.550 DeadDsc - 5357.663 MOPH + 2866.418	R ² = .445, R=.667, F=2236.961 , Sig=.000
2	RW = .321 + .0035 Age + .355 Severe + .133 Intense + .0442 LOS + .310 DeadDsc + .008	R ² = .301, R=.549, F=2763.036 , Sig=.000
3	LOS = 2.991 + .04344 Age + .045	R ² = .045, R=.213, F=1523.212 , Sig=.000

From the regression result I got standard regression coefficient of each equation and then presented graphically in the following figure.

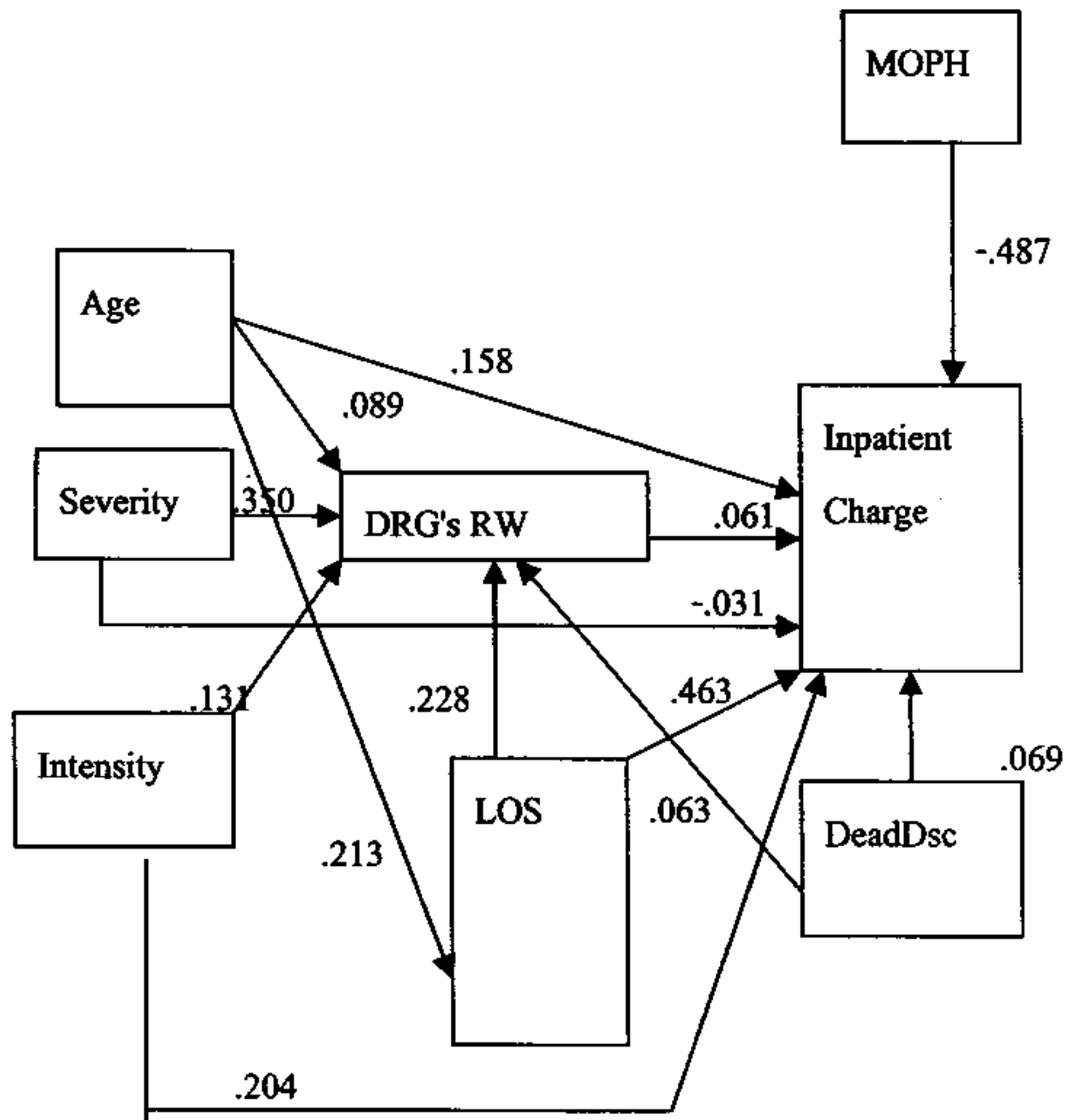


Figure 6.2 Partial Coefficient of Independent Variable against Inpatient Charge

Table 6.23 Indirect Effect and Direct Effect of Independent Variables of the Inpatient Charge Model Against Inpatient Charge

IV-Inpatient charge	Direct effect	Indirect effect	Total Causal Effect	Total Non-causal Effect	Zero-order correlation
Age	.158	(.089*.061)+ (.213*.463)	.262	.066	.328
Severe	-.031	(.350*.061)	-.009	.184	.175
Intense	.204	(.131*.061)	.212	.09	.302
RW	.061	-	.061	.225	.286
LOS	.463	(.228*.061)	.476	.055	.532
DeadDsc	.069	(.063*.061)	.073	.007	.080
MOPH	-.487	-	-.487	.389	-.098

Table 6.23 displayed both direct and indirect effect of each variable against Inpatient Charge. I found that all variables had significantly effects with the dependent variable. Four variables including age of patient, Length of stay, MOPH patient type and Intensity of operative procedure had large causal effects on Inpatient Charge. The other three variables including DRG'RW, Severity of Illness and Dead Discharge had relatively less causal effect with Inpatient Charge.

Although DRG ' relative weight could be explained by Severity of Illness, Intensity of Operative Procedure and Length of stay (partial coeff = .350, .131, .228 respectively) it was not likely to explain the variation in Inpatient Charge (causal effect=.061) This could be interpreted that high-RW patient did not be charged higher than low-RW patient as it would have been.

Summary of Hypothesis testing 2

This study found major factors affecting variation in Inpatient Charge. I found that the four factors were comprised of patient type, length of stay, age of patient and number of operative procedure. From the study I could summarize that Inpatient Charge varied directly with age of patient, length of stay and number of operative procedure and varied inversely with the MOPH's subsidized patient.

Hence, elderly patients with long length of stay and had several operation procedures and being subsidized from the MOPH health insurance would be charged more than younger patients with shorter length of stay ,no operation procedure and not being subsidized from the MOPH health insurance.

I also found that DRG's relative weight had the most relationship with number of second diagnosis and length of stay. It had relatively less relationship with number of operative procedure, age of patient and dead discharge status. Therefore we should use the DRG's relative weight as the index of severity of illness and used resource per admission.

6.2 A Revised Model of Inpatient Charge

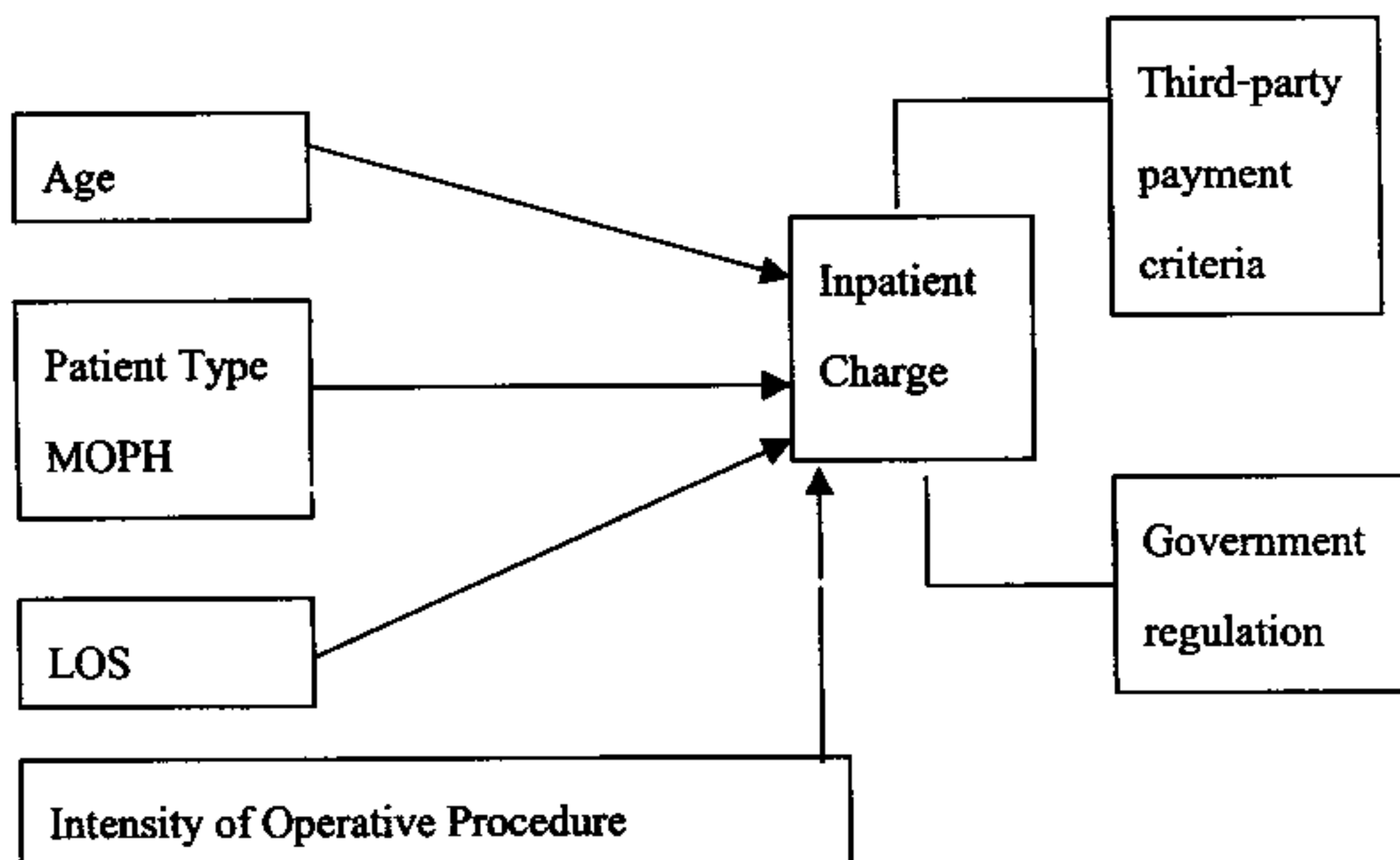


Figure 6.3 A Revised Model of Inpatient Charge

It can be concluded that there are six explanatory variables for public hospital inpatient charge. Age of patient, Length of stay and number of operative procedure have positive effects on inpatient charge while MOPH subsidized patient type has negative effect on inpatient

charge. Hence one, the more age a patient be, the higher inpatient charge. Two, the more patient stay in a hospital, the higher inpatient charge. Three, the more times a patient gets operation and related procedures, the higher inpatient charge. And finally, if a patient is subsidized by the Ministry of Public Health, either being eligible for the Low-income scheme, Health Card Scheme or any other MOPH subsidized patient, the lower inpatient charge. Another two external variables influencing the inpatient charge are third-party payment criteria and government regulation.

6.3 Chapter Conclusion

My major findings for supporting both hypotheses were displayed in this chapter. I verified the first group of hypotheses by the discussion of relationships among the four factors influencing hospital pricing.

I firstly described the details of Criteria of Third-Party Payment via prospective payment by capitation, public subsidization for health insurance and the reimbursement from the CSMBS respectively. Then I described the second factor regarding hospital pricing and hospital finance regulation by pointing whether the regulation increased or decreased hospital financial burdens.

The rest factors, potential of hospital revenue and financial burden were discussed together. In this part, I analyzed hospital financial data in fiscal year 1998. I started with the statement of operation and expense of each hospital. Proportion of patient-service revenue revealed the potential source of patient revenue and major source of indirect payment. Amount of money for subsidizing the free patients pointed to hospital burdens. It was then exacerbated by proportion of hospital workers' special compensation that can not be reimbursed from government budgets.

I tested the second hypotheses by statistical techniques-multiple regression and path analysis. The revised model is comprised of four explanatory variables including age, length of stay, patient type and number of operative procedure.

I also found that DRG's Relative weight did not explain the variation in inpatient charge. However, three variables have positive effect on DRG's relative weight. They are length of stay, severity of illness and intensity

of operative procedure. It implies that the relative weight reflects the used resource of inpatient. But because the charge pattern of public hospital has been distorted by price discrimination, the charge is not corresponding to inpatient costs. Then DRGs' relative weight can be used as an index for inpatient costs.

Finally my revised model of inpatient charge is comprised of four explanatory variables and two external variables. They are age, length of stay, number of operative procedure and MOPH's subsidized patient, third-party payment criteria and government regulation.

CHAPTER 7

FINDING FOR POLICY FORMULATION

7.1 Further Analysis of Payment Mechanisms

Research findings relevant to the proposed framework of hospital charge were displayed in the sixth chapter. I found that the important factors influencing hospital charge were the MOPH regulations, payment criterion of health insurance organizations, patient type by payment, age and used resources including length of stay and number of operative procedure.

In order to control cost-shifting phenomenon among third-party organizations and out-of-pocket payers, we need a standard payment of inpatient charge. The government should put a measure on the supply-side of medical care. Also, from the research findings I disclosed that the DRG's relative weight reflected severity of disease, the used resource per inpatient, measured by length of stays and number of operative procedures of each patient.

Sofar, the MOPH has mandated DRG's relative weight as relative operating costs among public hospitals for allocating annual budgeting. This chapter further investigated necessity of the existing third-party payers to use DRGs' relative weight as the standard factor of payment. Subsequently, it revealed the inefficient administration of retrospective, fee-for-service reimbursement of special payments of both the Social Security Office and Health Insurance Office. For instance, they were additional payment for nine special diseases, accidental cases in non-registered hospitals and high-cost patients with DRG'RW more than 2.5. The payments caused management problems and increased transaction costs as well as dissatisfaction of providers for late payments. The payments took bureaucratic steps. As the results, both public and private contractors have experienced a long time for cost recovery. In other words, they lost their opportunity costs.

Not only inefficient administration of the special payments, existing payments induced social inequity. People of the same DRG disease, when adjusted with length of stay,

should be charged the same money. In this chapter, I analyzed the patient-record files of the sampled hospitals by multivariate analysis of variance. The analyses intended to verify the discrimination by payment groups. I found that patients of the same DRG with different payment methods used different inpatient resources.

Whether a unified payment for inpatient of all insurance plans might correct the discriminations was still in administrative question. The DRGs payment has several advantages. For instance, first, it induces efficient use of resources because medical care providers have financial incentives to treat only necessary treatments. Second, in the process of payment, physicians have to comprehensively record their drug prescriptions, physical treatments, nursing care, as well as summarizes all diagnoses and operations of each patient. Third, the information provides the medical-record information in real time for the progressiveness of diseases, type of operations, and charge items which may benefit the formation of the general practice guideline of each DRG, standard prices, future studies of drug prescriptions and use of medical equipment.

In the mean time, I described the additional payment of physician specialties, accidental payment of the Social Security Office, the high-cost payment of DRG 2.5 and nine-disease payment to public hospitals from the Health Insurance Office respectively. The description pointed to the systematic inefficiency. In addition, I analyzed average inpatient charge of common DRGs to compare pattern of charge items for both medical and surgical DRGs. And finally I analyzed charge items of the same DRGs for different patients by payment method. All of these findings pointed to the necessity of a standard payment method for inpatient charge in public hospitals.

7.1.1 Third-party Special Payment Methods

7.1.1.1 Physician specialty reimbursement

The Social Security plan pays additionally and retrospectively to its contracted hospitals, which treated its insured members with the nine groups of diseases. They are acute renal failure, Cancer, Heart Surgery, Brain Surgery, AIDs, instrumentation etc. Table 7.1 (Appendix F: Special Payment)displayed the limited maximum rate of fee for each type of disease. During 1999, the Social Security

Office spent about 70 million Baht for the payment. Table 7.2 (Appendix F: Special Payment) revealed that the open heart surgery and coronary bypass were the highest and the second high rank of inpatient charge per admission, which were approximately 100,000 Baht. The payments required medical-record reviews by the Social Security Office's nominated professionals. It took months to finalize the payments.

7.1.1.2 Accident and emergency payment

Social security members are allowed to use non-registered hospital care in case of accident and emergency. Expenses of the first 72 hours can be reimbursed directly by fee-for-service to the SSO's provincial offices. After the duration, either the providers on behalf of the patients or patients their own can reimburse the extra expenses both outpatient and inpatient services according to the fee, listed by the office's announcement. (Table 7.3, Appendix F: Special Payment) The reimbursement list provides the maximum rate of each type of service. For instance, patients can reimbursed 300 Baht per time for outpatient with maximum 2 times a year. If the hospital charge more than the fee, patients have to pay out-of-pocket for the rest.

The office, by years, found that hospitals have different charges. Sometimes, patients have no cash and the hospitals usually facilitate the reimbursements that might subject to false claims and abuse. Then the office decided to replace the payment with DRGs payment. To obtain the standard price for emergency episodes, the Social Security Office supported a study for development of DRGs payment for accidental cases since December 8, 1997. (Social Security Office, Physician Committee of Social Security Fund (5th), 1999: 45-46) Not only the payment is perceived to be a cost-control measure, but also the office recognizes the DRGs payment to reduce the money its members have to pay additionally, in the same time to avoid reimbursement abuse.

The DRG payment provides several advantages to the Office. First, every hospital, which has treated emergency patients, either the first or referred hospitals, are paid with the same rate for the same episode according to DRG's relative weight. Second, the DRGs-grouper program was developed and distributed to every hospital for the

convenience of reimbursement. Third, the new payment will be evaluated technically for further adoption for the payment policy. And finally, a management model for emergency patients has been developed and enhances the efficient payment.

7.1.1.3 High-cost payment by DRG's relative weight

Both the Social Security Office and the Health Insurance Office reinsured their members against high-cost admission. The Health Insurance Office set a criterion to determine the high-cost case by the DRGs' relative weight that equals to or above RW 2.5. Target hospitals are only public hospitals, not private hospitals. The hospitals were paid according to total relative weight of patients with the criteria. During the fiscal year 1999, the office paid the high-cost money to 289 public hospitals. They were 190, 67, 25 and 7 community hospitals, provincial hospitals, regional hospitals and other special hospitals respectively. Average payment per case for each was presented in Table 7.4.

Table 7.4 High-cost payment for patient with DRGs RW equal to or above 2.5, the Health Insurance Office, 2001

Hospital Type	N	%	Total Payment (Baht)	Mean (Baht)	S.D (Baht)
Community Hospital	190	65.74	14,588,400	76,781	107,695
General Hospital	67	23.18	82,663,080	1,233,777	1,254,568
Regional Hospital	25	8.65	101,000,000	4,036,448	3,581,857
Other Provider	7	2.42	5,129,200	732,742	918,515
Total	289	100	203,380,680		

Source : Statistical analysis of the high-cost patient-record files from the Health Insurance Office, April 2001.

A total of 203.4 million Baht was paid for the reinsurance. The 25 regional hospitals got the highest total payments among others. The subsequent ranks were general hospital, community hospital and other special hospital respectively. However average per case was the lowest for community hospital. Tenth of the most for this payment was displayed in Table 7.5

Table 7.5 High-cost payment, Health Insurance Office

Rank	Hospital Name	Type	Region	Case	Total RW	Total Payment (Baht)
1	Supasit-tiprasong	R	7	1,017	3,474.83	13,899,320
2	Khon-kan	R	6	848	3,169.09	12,676,360
3	Maharaj-Nakorn-rajchasima	R	5	530	1,858.68	7,434,720
4	Udontanee	R	6	552	1,828.59	7,314,360
5	Suraj-tanee	R	11	515	1,765.06	7,060,240
6	Buddhachinarj	R	9	463	1,671.98	6,687,920
7	Chiangrai-prachanukao	R	10	469	1,528.06	6,112,240
8	Sakol-nakorn	P	6	412	1,465.21	5,860,840
9	Lum-pang	R	10	442	1,428.19	5,712,760
10	Buree-lum	R	5	332	1,090.35	4,361,400
N	10 Hospitals			5,580	19,280.04	77,120,160

Source: Statistical Analysis of Aggregate Payment for DRG2.5 case, 1998, Health Insurance Office, 2001.

Note: R=Regional Hospital, P= Provincial Hospital

From the table, Sumprasit-tiprasong Ubonrajchatanee received the highest amount of 13.8 million Baht while other hospitals received the relative lesser amount. Nine of these ten hospitals were regional hospitals. All these ten hospitals treated 5,580 patients and received about 77 million Baht or average of 13,820 Baht per case.

7.1.1.4 Compensated payment for nine special diseases

In order to compensate high-cost care for public hospitals which treated both low-income cardholders and the MOPH's health insurance cardholders, the Health Insurance Office has to pay retrospectively the treatment costs for specific groups of patients. They are patients treated with hemodialysis, open-heart surgery, coronary bypass, percutaneous balloon valvuloplasty, brain surgery and AIDs with Cryptococcal Meningitis. The retrospective reimbursement has caused administrative problems because of the case-by-case reviews. The medical-record reviews might not take such a long time unless there was shortage of professional expertise working in the office. Due to the reviews, the office has been claimed with bureaucratic and delayed payments. It resulted in public hospitals' financial burden of treating free patients with these diseases. And it might have ultimate impacts on the indigents, intentionally subsidized by the MOPH.

7.1.1.5 DRGs Payment of the CSMBS plan

There has been fast increasing of medical expenses reimbursed by the CSMBS eligible with the increasing rate of 15-20 percent per year. During Thailand 's economic crisis, the government put the short-term measures by co-payment of non-essential drug and long length of stay. The result had affected the increasing expenses shortly. However, the government did not intend to increase efficiency by reforming the plan. (Health System Research Institute.2001)

A research proposed the reimbursement policy, hospitals will be paid by DRG's relative weight with a capped budget. Principle researchers of the Health System Research Institute and the Center for Health Equity Monitoring have extensively studied the DRGs methods. The method of payment was scrutinized by the Delphi techniques among relevant stakeholders and representatives . (Viroj Tangchareonsathien, Chongkol Satiandumrong, and Suchart saranasataporn, 1998: 11-15)

The DRGs payment with definite budget is operationalized as the payment within a global budget. The government spends the fix amount of health expenditure in a

year regardless of number of sick people. The payment is retrospective method which the amount of money providers should get, depended on the complexity and used resources of each patient of that hospital.

The government acts as a giant purchaser who controls the budget as well as requirement and criterion of payments. Management of the DRGs payment to each provider is limited to its geographical area. The local health administration, specified by the government, should be responsible for the allocation of the global budget for 2-3 million residents

Technical methods for quarterly payment are follow. Three set of information including demographic, clinical and expenses of each patient must be sent by providers to the regional payment office. The data is computerized and assign the DRG code to each patient record. Each provider will be paid retrospectively according to the relative severity and used resources of each patient comparing with all treated patients in the area. An actual amount of money is calculated by multiplication of unit price per RW of the hospital and its total RW.

Patients being treated and their used resources in a particular region become financial risk pooling of providers. Unit price of each RW is calculated from dividing the global budget with total RW of all hospitals. Unit prices of RW in different regions are, of course, different because they depend on the size of global budget and total RW. Hospitals in the same region will be paid according to hospital type, hospital special functions, hospital level, and total RW.

The method has both advantage and disadvantage. Advantages are efficient and fair payments. It controls increasing government expenditure. Physicians are imposed with financial stress. As the result, it induces physicians' incentive to treat only necessary curative care. On the contrary, the method might increase claimed abuse by reporting false diagnoses. In addition, physicians might be boring with detail requirements of the claim reports. And finally, it might undermine future innovative treatments with which physicians want to try. Check and balance of medical record reviews might not prevent the abuse. It consumes huge administrative costs to detect fault. To reduce the problem, the medical-record reviews should be made within hospitals internally and

periodically by external auditors, nominated the regional purchasers.

7.2 Further Analysis of Price Discrimination by Payment Group For Each DRG

Price is the amount of money that has to be paid to acquire a given product. Insofar as the amount people are willing to pay for a product that represents its value, price is also a measure of value for money. So long as they are not artificially controlled, prices provide an economic mechanism by which goods and services are distributed among the large number of people desiring them. Of course, a totally free and non-discriminated price mechanism does not exist in practice. Therefore, a phenomenon of artificially control for price is called price discrimination.

In Thailand, each hospital pricing is resulted from hospital administration. Hospital pricing is a list of charges for hospital services and medical supplies. My findings disclosed three factors contributing to hospital pricing in public hospitals. First, the MOPH regulation which guides some charge rates. The MOPH regulation provides a wide allowable range of charges. Difference between minimum and maximum rates is usually two times. Beside the MOPH regulation, public hospitals have their autonomy to set their own hospitals' price of particular services, those not being specified in the regulation.

Second factor affecting hospital pricing is a general guideline of each hospital according to administrative directives. A hospital may set pricing according to treatment type, office time, service type, patient type by insurance rights, etc. And the last factor is the immediate consideration and self-discretion of hospital professionals.

There is implicitly logical relationship between hospital pricing and price discrimination. Price discrimination is the crucial hospital management for cost recovery and uncompensated care. Table 7.6 displayed a general guideline made by public hospitals.

Table 7.6 Rate of Service Charge, Buddhachinaraj Hospital, issued by June 1995

Patient Type	Service Charge		Medical Investi- -gation charge	Special medical supply charge
	Official time	Non-official time		
1. Inpatient				
1.1 Reimbursement , Social security, health card and other public subsidized patients	Maximum rate	Add 50%	Maximum rate	Hospital price
1.2 Selfpay patient	Minimum rate	Add 25%	Minimum rate	Hospital price
2 Outpatient				
2.1 selfpay and appointment	Minimum rate	n.a.	Minimum rate	Hospital price
2.2 Referred patient from private hospital	Maximum rate add 50%	Add 100%	Maximum rate	Hospital price

Source: Internal information, Medical-Record Department, Buddhachinaraj Hospital, 1998

From Table 7.6, the hospital set pricing according to service charge, medical investigation charge, particular medical-supply charges according to type of services and patients. The Buddhachinaraj Hospital charged patients coming within non-official time higher than official time. For the same type of service and timing, self-pay patient was charged with the lowest price among others. The referred-outpatient from private hospitals was charged with the highest price. On the contrary, all patients were charged equally according to hospital price of special medical supplies.

Not only charges for service were different, Chiangrai Hospital classifies set bed-and-board charge according to degree of accommodation and type of patient.

Table 7.7 Rate of Room Charge, Chiangrai Hospital, 1998

Code	Ward	Charge for patient bed per day
031	gynecology 1	50,750
051	Pediatric 1	50
012	Medicine for Male 2	50
053	Pediatric 3	50
018	Medicine for Female 2	50
013	Medicine for Female 1	50
082	Orthopedics for female	50,600,750
081	Orthopedic for male 1	50,600,750
083	Orthopedics for male 2	50,600,750
015	Medicine (special ward)	600,750
026	Surgery for male 3	50
011	Medicine for male 1	50
023	Surgery for female	50

Source: Chiangrai Hospital, Management Information System Division

- Note:
1. Orthopedic-the prevention or curing of deformities of bones, joints, ligaments, muscles and tendons, esp. in children,
 2. Pediatrics - the branch of medicine concern with the health and illness of children,
 3. Gynecology-the study of women's diseases, esp. diseases of the female genital organs and urinary disturbances, excluding problems occurring in the late pregnancy(cf. Obstetrics)
 4. Room Rate
 - 50 Baht- rate of ordinary patient bed
 - 600-rate of special room with motor fan
 - 750-rate of special room with air condition
 - 70-rate of ordinary bed for social security member for normal delivery room
 - 200 Baht per day with shared rest room
 - 300 Baht per day with included rest room

From Table 7.7, patients were charged differently by degree of convenience. The more convenience the accommodation, the higher price. In addition, for social security member, they were charged higher for ordinary bed than ordinary patients . For instance, while ordinary

patient was charge by 50 Baht per bed per day, the social security patient, 70 Baht. Not only patient types being charged differently, public hospitals had their own price lists of drug and medical supplies using in operation room as follow.

Table 7.8 A Form of Hospital Prices for Anesthesia Services in Operation Room, Chiangrai Hospital, 1998

Item	Description	Amount	Charge
1	General Anesthesia -first hour (600-1,000) -succeeding hour (150-300)		
2	Under mask (100-300)		
3	Intravenous (100-300)		
4	Regional Block (500-1,000)		
5	Local anesthesia (100-200)		
6	Halothane 1 hour (100)		
7	Forane/Sevo 1/2 hour (150)		
8	Diprivan 2 Baht per one cc		
9	Monitors 100 Baht per hour		
10	Flexible tube (900)		
11	Rae's tube (320)		
12	Profile Tracheostomy (900)		
13	Double lumen tube (3200)		
14	Haemaccel (360)		
15	Haas-steril (552)		
16	Blood supply (370)		
17	Air filter (200)		
18	Special Drug List: -dobulrex -dopamine -inocor -nitrodisc -ampicilline -metergin -synto		
Total charge.....Baht Charger Name anesthetic nurse)			

Source: Chiangrai Hospital, 1999.

Table 7.8 provides discretion-driven charge items in an operation room. During operation, a surgery team is comprised of physicians, anesthetic nurse, and other helpers. Although physicians have to make decision about operative procedures but anesthetic nurses control drugs and other applicants as well as collect used resources in the operation and then calculate total charge to each patient. Public hospitals often allow the anesthetic division to set supply prices. According to charity perception, anesthetic nurses mostly charge the highest price to those patients who have private insurance, the reimbursed patients, and Workmen Compensation Scheme's patients. On the contrary, she would charge marginal price to self-pay patients.

In this section, I further pointed out the statistics of price discrimination. The discrimination could be measured by the significant different charges of different payment inpatients of the same DRG. The inpatient charge with excluding bed and room charges became the charges for the consumed medical treatments. Table 7.9 compared difference in four charge items according to patient type.

The quantitative methods followed. First I selected the common-DRG patients from the analytic file of each hospital. Multivariate Analysis of Variance was run by using patient type by payment as the independent variable and the four charge items as the dependent variables. I found that each hospital had significant different charge as presented in Table 7.9

Table 7.9 Comparison of Charge Items by Patient Type of all common-DRG patients of sampled hospitals

Hospital	DRG	Dependent Variable	F	Sig
Chiangrai	18DRG	Investigation	1.243	.290
		Operation	28.468	.000
		Drug treatment	22.240	.000
		Charge for services other than drug	1.598	.172
Buddhachin araj	15 DRG	Investigation	842.032	.000
		Operation	216.516	.000
		Drug treatment	764.742	.000
		Charge for services other than drug	176.345	.000
Hatyai Hospital	18 DRG	Investigation	171.644	.000
		Operation	117.591	.000
		Drug treatment	441.470	.000
		Charge for services other than drug	495.784	.000

Source: Statistical analysis of patient-record file

Table 7.9 displayed significant difference of charge items of all patients with common DRGs in each hospital. There was significantly difference of four charge items according to patient type. For instance, the Chaingrai Hospital had price discriminated charges for drug and operation. On the contrary, both Buddhachinaraj Hospital and Hatyai Hospital had price discriminated all charge items.

To further investigation about price discrimination of each individual DRG , I statistically controlled the used resources per admission by fixing Length of stay and regressed each charge item with patient types. The result of the multivariate analysis of variance of charge items (four dependent variables) with patient type (independent variable) were presented in Table 7.10

Table 7.10 Comparison of inpatient charge items by DRG and hospital

Hospital	DRG	Total Case	Invest	Opercost	Drug	Ndrug
Chiangrai	14	287	.002	.000	.000	.000
	39	562	.000	.000	.000	.189
	88	684	.000	.000	.000	.041
	167	496	.092	.000	.007	.000
	183	507	.000	.000	.012	.005
	184	611	.000	.003	.001	.000
	243	444	.000	.209	.000	.128
	305	347	.222	.000	.000	.002
	316	525	.003	.556	.000	.242
	371	1,207	.015	.000	.467	.597
	373	1,873	.000	.000	.000	.000
	396	897	.000	.000	.000	.745
	423	416	.745	.007	.000	.000
	468	608	.238	.000	.000	.246
	485	346	.344	.000	.167	.485
	486	805	.000	.199	.000	.322
	489	916	.277	.000	.000	.000
	490	1,283	.001	.003	.000	.161
	PriceD. &	12,814	67.00	83.00	94.00	50.00
Hospital	DRG	Total Case	Invest	Opercost	Drug	Ndrug
Hatyai	14	376	.849	.826	.101	.025
	29	230	.013	.022	.013	.037
	47	823	.210	.000	.000	.000
	70	267	.004	.015	.000	.319
	183	314	.384	.134	.000	.352
	184	542	.002	.000	.000	.000
	189	672	.047	.061	.020	.120
	190	251	.514	.561	.669	.949
	243	252	.363	.201	.031	.000
	254	229	.199	.449	.368	.152
	369	543	.000	.007	.273	.001
	371	808	.000	.000	.170	.006
	373	3860	.111	.000	.049	.001
	380	375	.590	.551	.910	.082

Table 7.10 (Continued)

	384	246	.288	.007	.003	.000
	422	531	.010	.000	.001	.004
	445	262	.093	.427	.365	.001
	489	340	.001	.004	.001	.019
	<i>PriceD. %</i>	<i>10,921</i>	<i>50.00</i>	<i>61.00</i>	<i>61.00</i>	<i>78.00</i>
Hospital	DRG	Total Case	Invest	Opercost	Drug	Ndrug
Buddhachinaraaj	14	522	.000	.002	.000	.000
	30	242	.667	.625	.111	.006
	39	1,320	.903	.000	.000	.000
	82	276	.000	.069	.000	.963
	89	220	.000	.000	.000	.000
	167	447	.251	.000	.000	.000
	183	723	.000	.000	.000	.000
	305	281	.000	.000	.002	.000
	357	276	.109	.000	.087	.018
	371	1,512	.000	.000	.000	.000
	373	2,522	.000	.000	.000	.000
	416	224	.948	.308	.001	.327
	468	718	.000	.902	.000	.000
	486	626	.684	.357	.000	.021
	487	533	.000	.953	.001	.005
	<i>PriceD. %</i>	<i>10,442</i>	<i>67.00</i>	<i>78.00</i>	<i>89.00</i>	<i>89.00</i>

Source : Statistical analysis of patient-record file

Note : PriceD. % refers to proportion of DRGs groups with price discriminated patients to total DRGs groups.

From the table, the more percent of DRGs groups being significantly different according to patient type, the more I interpreted it as discriminated price of services. It can be concluded , in general, public hospitals are likely to discriminate operation and drug price.

7.3 Further Analysis of Inpatient Charge of Common DRGs

Common DRGs of each hospital was obtained by statistically selecting a number of patients of high frequency, descending ranked from the top. The total patient of each DRG were not less than 200 cases and length of stay was not beyond 30 days. From the analyses, each hospital had different groups of DRG patients or difference in case-mix pattern. I selected 10,443 inpatient cases of 15 DRGs from the Buddhachinaraj Hospital's analytical file. The common DRGs of Chiangrai and Hatyai Hospital were 12,816 and 10,921 case of equal 18 groups of common DRGs as presented in Table 7.11 (Appendix F: Special Payment)

They were different in both DRGs type and number of patients in each particular DRG. The sample hospitals had the five top number of patients as displayed in Table 7.12.

Table 7.12 The Top Five Common Diseases by Hospital

Rank	Buddhachinaraj	Chiangrai	Hatyai
1	Vaginal Delivery	Vaginal Delivery	Vaginal Delivery
2	Cesarean Section	HIV	Disorder of the eye, age >17
3	Len Procedures	Cesarean section	Cesarean section
4	Esophagitis Age >17	HIV with major related conditions	Digestive system age>17
5	Extensive OR procedure unrelated to principle diagnoses	Red Blood Cell Disorders age 0-17	Menstrual & other female reproductive system disorder

Source: Statistical analysis of common DRGs in the sampled hospitals

The pattern of case-mix reflected both local health needs, societal and hospital problems. For instance, Chiangrai Hospital is situated in the North where most immigrants suffering from AIDS diseases. Hatyai Hospital is in the South where prostitute business is common. Foreigners might be the carriers of cross-national sexual

diseases. Buddhachinaraj hospital had DRG 468 which indicated distinct operative procedures that of the DRG-grouper library lists. The patient-record file of the Buddhachinaraj Hospital should be scrutinized the ICD 9-CM coding specified by the hospital coders.

Table 7.13 Average Inpatient Charge, Average Length of Stay, Average Charge Item for patient in DRG 373 and DRG 371 in Buddhachinaraj ,Chiangrai, and Hatyai Hospital, FY 1999

DRG	Resource Type	Buddhachinaraj Hospital		Chiangrai Hospital		Hatyai Hospital	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
373	IP charge	1997.54	1619.25	1489.14	1571.90	2229.48	1951.58
	LOS	3.05	1.46	2.57	1.10	2.83	1.57
	Invest	472.43	319.39	118.80	150.54	123.24	656.18
	Opercost	109.39	699.60	590.39	733.57	165.50	1,075.83
	Medtreat	556.81	516.39	208.39	353.67	448.84	2,406.98
	Ndrug	316.98	249.25	190.18	354.23	1,797.0	13,087.67
DRG	Resource Type	Buddhachinaraj Hospital		Chiangrai Hospital		Hatyai Hospital	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
371	IP charge	8426.05	4092.41	7762.71	3314.7	8,998.7	3,144.33
	LOS	3.80	1.79	4.29	1.58	4.58	1.85
	Invest	249.02	392.90	137.09	235.18	216.89	254.99
	Opercost	5,295.2	3,051.5	5685.10	2176.2	5,848.3	2,060.16
	Medtreat	1,182.7	660.16	392.30	350.51	799.31	541.452

Table 7.13 (Continued)

	Ndrug	354.00	311.79	308.21	234.63	1,395.6	4,008.33
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Source: Statistical analysis of patient-record file

Note: IP charge- inpatient charge, LOS-length of stay, Invest-investigation charge, Opercost-operation cost, Medtreat-Drug and other medical supply charge, Ndrug-medical service charge

From the table, average inpatient charge, length of stay, average charge item of DRG 373 and DRG 371 were very different. For example of the Buddhachinaraj Hospital, inpatient charge of DRG 373 and DRG 371 were 1,998 and 8,426 Baht respectively in spite that the length of stay were not very different. DRG 371 was surgical DRG and had the high share of operation cost that exceeded 5,000 Baht. When compared average charge of different hospital, average charge for DRG 371 of the Hatyai Hospital was the highest value.

7.4 Further Analysis of Financial Burden

There has been changing healthcare financing in Thailand. The government mandates the universal coverage of health care policy in October 2001. The government purchases an essential package of medical care for every Thai citizen by capitation. The amount of 1,202 Baht per person per year is paid for preventive care, outpatient and inpatient care. The DRGs 's relative weight appears to be the standard price for inpatient services. The plan does not cover formal employees such as the CSMBS eligible and SSO members.

Since half of operating expense of public hospitals are from direct payment at the point of services in health care unit. The capitation payment for universal coverage imposes financial pressure on public hospitals. The hospitals have to increase the concern about all operating costs.

To prepare themselves for the drastic change, public hospitals should study unit cost of each type of service, standard practice guideline that increase efficiency,

establishing hospital information system according to the regional purchasing office, implementing cost-effectiveness healthcare and empowerment hospital workers during this transformation period.

7.5 Chapter Conclusion

This chapter emphasized the further analysis of crucial factors affecting inpatient charge of public hospital. They were special payments of health purchasers , price discrimination, common DRGs and financial burden of public hospitals if the universal coverage of health care has its legislative effects. I started with the analyses of special payments of third-parties including the Social Security Office, the Health Insurance Office in the Ministry of Public Health and the Controller General Department. I then analyzed the price discrimination of common DRGs and each particular DRG. For two particular common DRGs -DRG 371 and DRG 373, I disclosed that surgical DRG used up about four times of medical DRG.

Public hospitals in the future would be challenged with a new universal coverage policy and the DRGs payment. I would like to recommend some management options in the next chapters for cope with the drastic changes and maintain financial viability of public hospitals.

CHAPTER 8

SUMMARY, CONCLUSION AND RECOMMENDATION

8.1 Summary and Conclusions

This study tested two groups of hypotheses from a proposed conceptual framework of inpatient charge. The first group was relevant to four factors influencing hospital pricing while the second group drafted price and cost factors, related to inpatient charge.

Descriptive analysis of four factors influencing hospital pricing disclosed their interrelationships. The factors were criterion of third-party payment, public regulation, potential source of revenue and financial burden. Indirect payment according to the first factor had effects on hospital pricing as follow.

First, capitation induced physician prescription only necessary medical care and being a regular source of hospital revenue. It motivated contracted hospitals to provide convenience and fast access to hospital care. However, improvement of service quality seemed not to be obvious. Second, financial allocation in the Low-Income Project had been changing due to health inequity. The Health Insurance Office of the Ministry of Public Health applied DRGs' relative weight as one of several factors for budget allocation. And third, retrospective and direct reimbursement for inpatient charge of the Civil Servant Medical Benefit Scheme was about to be changed to the DRGs payment with a global budget.

The second factor affecting hospital pricing was the MOPH's regulations imposing on public hospitals. The regulations affected financial viability. The Regulation of Public Health Subsidy 1994 and the Regulation of Health Personnel Compensation 1993 increased financial burdens while the Regulation for Health Service Revenue 1995 decreased the burdens. The MOPH Pricing Regulation 1994 provided a general guideline for service prices which provided hospitals' discretion of self-regulated prices. According to different third-party payment methods, hospitals shifted their burdens to chargeable patients.

The third factor influencing hospital pricing appeared to be hospital revenue. Public hospitals got more than half of it from the government's subsidized budgets. This study found that the low-income budget was relatively less than the normal and public health program budgets. Patient-service revenue was comprised of service charges at hospitals (direct payment) and payments of other health insurance units (indirect payment). Revenue from direct payment was much more than indirect payment.

Fourth, financial burdens were the effects of free-of-charge patients and special payments to hospital workers. The burdens of each sample hospital were different. However, each year more than one hundred million Baht of operation expense was due to free patients. In addition to free patients, the hospitals had to use the patient-service revenue paying special types of worker compensation. It was about 25% of total labor costs a year.

Implication of these description and explanation of four factors was administrative decision-making of hospital pricing. Hospital executives set their hospital price lists after the assessment of the increasing and decreasing financial burdens and potential sources of revenue. The MOPH's guideline of service price provided discretion of setting different price for the same service. When the self-regulated prices integrated with multi-method of health insurance payments, it enabled providers cost-shifting to chargeable patients. Excluding revenue from government budgets, major patient-revenue was out-of-pocket payment at the point of service and the CSMBS reimbursement.

Regarding to major factors affecting inpatient charge in the second group of hypotheses, findings from statistical analysis with path analysis disclosed that there were four major factors significantly affect inpatient charge. The factors are patient age, length of stay, MOPH-insured patient, and number of operative procedure. DRGs' relative weight has significantly related to severity of illness, length of stay and number of operative procedure. It can be concluded that the DRG's relative weight reflects both severity of illness and inpatient costs that measured by length of stay and number of operative procedure. Therefore we can use the relative weight measures relative severity of patient and used resources.

Integrating both findings, the revised model of inpatient charge is comprised of six factors including: criterion of third-party payment method, the MOPH's regulations, patient age, patient type by payment, length of stay and number of operative procedure. Although DRGs' relative weight is not directly affect inpatient charge, it can measure both severity of patient and inpatient cost.

This study would like to suggest formulation of a single payment policy, by using DRG's relative weight as a measurement. In order to support the necessity of the policy. Further relevant problems of special payments and future financial burdens of public hospitals were analyzed. Regarding to special payments, the Social Security Office had to pay retrospectively to hospitals treating specialty disease case by case. The payment had high transaction costs of medical record reviews by external specialty experts. However the office had never measured the administrative cost per case. The DRGs payment policy may reduce the problems and unforeseen administrative costs.

In addition, the Social Security Office had to pay retrospectively a flat fee for emergency and accident patients. However, social security members sometimes have to pay the differentials. It enables health inequity because hospital charges are widely different. The office changed the payment according to DRGs's relative weight in order to enhance social equity and provider efficiency.

Special payments of the Health Insurance Office, as a reinsurance agency, were high-cost payment and special-disease payment. Analysis of high-cost payment found that there were 289 public hospitals got about 203.4 million Baht in 1999. By hospital level, regional, provincial and community hospital were descending ranked. Findings of the reinsurance analysis had not revealed the adequacy of cost recovery. Whether it was unfair to the hospitals which could not send patient-record information to the Health Insurance Office? Did the Health Insurance Office send too late money for the specialty payments? It should be studied in the future research about normative methods to the high-cost payment that increase both efficiency and equity.

Despite of additional payment according to the high-cost patients, the office promises to pay public hospitals with patients cured in the nine special diseases. It was likely that high DRG's RW patients may

be the same patients as special diseases. The problem was the office could not cope with very late payment due to the shortage of specialty physicians for the claimed medical records. This study would like to suggest the abandon of these special payments.

This study would like to propose new inpatient payment by a standard method relevant to DRG's RW. In case of special payments according to high-cost inpatients of whatever reason, negotiated setting of the unit price per DRG's RW of the high-cost diseases may solve the administrative and efficiency problems. The new method based on DRGs may facilitate the check of medical charts only some suspected inpatients. In addition, appropriate statistical analysis of national inpatient database may double-check the correction.

The CSMBS should change criterion of inpatient payment to be based on DRG's relative weight. The change requires an organization for management all relevant information including registration and assessment of quality of medical care. However, the department has no experienced staffs to establish the organization. It has to contract with other health insurance units for all required tasks.

In sum, the result of this study gave the explanation of hospital pricing of public hospitals under the jurisdiction of the Ministry of Public Health. It underlied cross-subsidization among different payment payers. The phenomenon involved price mechanism and criterion of the MOPH's regulations and different payment methods of health insurance schemes. It resulted health inequity and inefficiency in hospitalization.

8.2 Recommendations

8.2.1 Implication For the Formulation of the Hospital Charge Policy

Patient-service revenue is about half of total hospital revenue. Public hospitals have to use it for facilitating operation expenses. Because more than half of all patients is the non-chargeable according to the MOPH mandates, cross-subsidization among multi-payer systems appears to be inevitable. Chargeable patients will be the target of shifting the costs. Whenever public hospitals have been imposed by new financial-burden regulations by whatever reason, it would certainly affect the patients who need to pay from out-of-pocket money.

In the future if public hospitals would be imposed by further regulations which might decrease the subsidized budgets, the hospitals had to find more income to maintain their financial viability from any source available. In addition, since the present charging system of inpatient in public hospitals lack standard price of services and drugs, it may cause inequity in health service delivery system.

Therefore this dissertation would like to propose a new payment policy for inpatient costs. It is a Hospital Charge Policy-a new financial regulation for inpatient charge of public hospitals. The MOPH should impose a single payment by DRG's relative weight for all inpatient cases regardless of payer type. If possible, either direct payment at the point of service or indirect payment from health insurance plan should be paid the same amount of the same disease.

8.2.2 The Hospital Charge Policy and the Universal Coverage of Health Care Policy

Thailand's government announced the Universal Coverage of Health Care Policy with 30 Baht co-payment per episode in February 2001. The uninsured citizens are eligible for a universal coverage card, which has equal medical benefits as the low-income cardholders. Systematically, they have to register as a UC member with primary care providers at their local area.

According to this policy, the government acts as a large purchaser of health care. Public budgets are allocated to provincial health offices depends on number of their UC members with per capita cost of 1202 Baht a year.

There are two alternative models for the budget allocation. One is prospective allocation by capitation and the other by main service-type methods -outpatient, inpatient and health prevention. The former model has been a pilot project, implemented in the Chiangmai province while the latter, in the Nakorn-rajchaisima province. For the main service-type model, outpatient and prevention budgets are integrated and prospectively allocated to individual provider with which local citizen registered. In addition, inpatient budget will be used for the retrospectively reimbursement by using DRGs' relative weight.

This method of DRGs payment has been studied in six Social-Investment-Project provinces three years before

the implementation of the Universal Coverage of Health Care Policy. They are financially subsidized by the Asian Development Bank and cooperated by the Health Insurance Office. Many health researchers have involved in this study believes that the allocation method will encourage efficiency in health resource allocation and hospital internal administration, improve quality of medical care and cover the accessibility to equal standard of hospitalization for all groups of citizen.

However, I would like to give two view points of hospital finance. First, the new payment is likely to affect hospital revenue and induce the changes of health care financing. The policy will integrate existing health insurance schemes into only three public funds and the rest of private insurance plans.

The UC fund should be administered by a National Health Insurance Office which will be under the supervision of Prime Minister Office. A central office for management information system of the Civil Servant Medical Benefit Scheme should be urgently established. A new Social Security Office that integrates the Worker Compensation Fund should be reengineering to be independent entity under the legitimacy of stakeholder representatives.

Payment of these major funds should be a single method. That is capitation for physician visit per year and DRGs with a global budget for inpatient care. Both private and public, contracted hospitals of the public insurance funds have their own customers who have the right to change their registered hospitals.

Therefore, future change of registered numbers would affect each hospital's revenue. Important factors affecting future revenue is choice of the hospital members. Therefore hospital operation should emphasize on patient-oriented approach more than bureaucratic management.

The new inpatient payment also requires valid patient and financial information in a unified form, specified by the National Health Insurance Office. Because the money contracted hospital would receive according to the number of registered population, the government control has been changed to verify the actual number of population, control quality aspects and customer satisfactions.

According to the Universal Coverage of Health Care Policy, hospital information system will be very important to public hospitals. They have to be reformed, response to this mandate changes. I would like to

recommend systematic changes such as management information system by computers, changing hospital workers' attitude towards patients as service mindset, and continuous improvement of quality of hospital services.

The second notice I would like to make is the change of future financial burdens which is likely to be totally different from the findings of this study. New burdens involve the consumption of hospital resources. When a hospital is compensated by the DRGs with the regional budget, the most significant factor is the consumption of hospital resources. This is because hospital revenue does not depend on actual used resources but standard price by DRGs' relative weight of the hospital and price per relative weight of each hospital type and location. If the hospital's workers do not help economize or reduce service costs, total annual income would not balance with the expenses.

According to these reasons, hospitals those want to develop their organizations for change should be interested in the following six aspects. They are attitude of hospital employees towards patients, the study of performance of physicians and other hospital workers regarding provision of services, attitude and utilization patterns of hospital customers, patient and registered member information system, financial analysis of hospital and cost-effectiveness treatment for the DRGs which have their costs higher than payment rate, etc.

8.2.3 Management Options for DRGs Payment with Global Budget

Management options refers to some dimensions that should be applied in order to response the DRGs payment with global budget policy. They are financial system, patient information system, worker compensation design to enhance hospital efficiency, internal audit of medical records, financial analysis of high frequency DRGs , clinical and financial analysis of high-cost patients case-by-case and the study of cost recovery from the reimbursement of high-cost patients. The following are some of the suggested options.

8.2.3.1 Financial information system

This new payment is very close relationship with financial management of public hospitals. Recording and sending inpatient information in the format of payers' specifications, cost accounting, summary of revenue and

expense of each service division and annual financial report of each hospital. Actual information contributes to the compilation of DRGs. In addition, the information has to be used for both internal and external audits from health care purchasers and reinsurance agencies.

Immediate measures a hospital has to invent for the DRGs payment is radical change of information collection. It needs capital investment of intra network information system and recruiting the network experts. In the same time, hospital has to calculate unit cost of outpatient visit by division, internal marketing, empowered internal audit teams and hiring reliable account auditors.

8.2.3.2 Hospital worker compensation

Since about half of hospital revenue comes from prospective capitation for outpatient care and retrospective reimbursement by DRG's relative weight, to control operating expenses hospitals should design a new worker compensation system. It has to be based on work performance instead of professional type and working hours. For example,

Hospitals should pay physician visit by doctor fee and marginal salary for outpatient operation. On the contrary, paying patient-ward workers by team rather than individual. Amount of the labor cost should be paid according to number of inpatients and severity of illness. Internal allocation of worker compensation should be decentralized with in each division.

8.2.3.3 Medical Record Review

It should have systematic medical record reviews within patient wards by internal audit teams. The team should comprise of at least four positions. They are a physician head, a senior nurse, a medical recorder and an accountant. After the team has sent medical abstracts to the hospital medical record division, the division has to recheck the validity of patient and financial information by randomly select extremely high and low costs of admission cases as well as the common DRGs patients.

Selecting patient cases should be comprehensively audited starting from coding audit, clinical audit and financial audit respectively. The inpatient audit team should be comprised of external experts of several medical specialties and representatives of some hospital divisions such as nursing, laboratory, pharmacy and accounting office. During the external audits, the error

should be remarked and the team should propose a general guideline for correction and improvement of medical records.

8.2.3.4 Calibration of the DRGs

Since human sickness has been changed according to risk factors while curative methods also correspondingly changed according to the progressiveness of medical sciences and the discovery of new drugs and alternative treatments. From time to time, given name of diseases and treatments have been continuously and diversely changed. Supply prices and labor costs are also float according to inflation rate and consumer price index. The changes affect the compilation of DRGs's groups and their relative weights. Therefore, DRGs' grouper program has to be upgraded correspondingly.

The medical record division of hospitals should provide these new names of diseases, ICD10 codes and innovative type of treatments to the National Health Insurance Office. In addition, statistical analysis of hospital costs due to operating expenses also help the revision of DRGs' software. This cooperation between providers and the MIS division of the office help the calibration of DRGs RW according to timely practices.

8.2.3.5 Pricing setting criteria

Pricing setting for DRGs' relative weight has to be different according to geographical area-urban, sub-urban and rural, type and level of hospital. For instance, Regional hospitals should be provided with higher unit price than general and community hospitals respectively. A private hospital should be provided higher unit price than a public hospital of the same size and geographical area because of different unit cost per admission. Hospitals have teaching and training functions should be subsidized by another education budgets.

The National Health Insurance Office should held responsible for the obligation of explicit announcement of unit price per relative of each geographical, type and level of contracted hospitals and other providers. If any hospital would like to argue the unit price to fulfill fairness or if there were any suspicion and not acceptable unit price, the office should provides negotiation meetings and refund for any obvious misunderstanding and computation error.

8.2.4 Direction for future research

8.2.4.1 Future research for Hospital Charge Policy

Hospital Charge Policy refers to a standard payment for hospitalization by DRGs' relative weight with a global budget specified by the National Health Insurance Office. The policy aims to achieve health equity coupled with the implementation of the Universal Coverage of health Care Policy. Every inpatient, his or her indirect payers should pay a single price for the same episode according to DRG code, its relative weight and unit price per relative weight of the hospital.

Since the policy would affect all inpatients of public hospitals, before the implementation phase, the National Health Insurance Office should conduct a feasibility study and find out the expected outcomes and all possible impacts towards public hospitals, registered patients, and national health care financing.

The policy requires a central office for processing the DRGs payment. Theoretically, it should not be subject to any bureaucratic and political pressure. In addition, the policy is likely to affect health care market, budget allocation methods and administrative problems in public hospitals. Hence, factors influencing the policy success and appropriate structure of the neutral office should be studied.

8.2.4.2 Future research on hospital finance

Financial system of public hospitals has been increasingly linked to other administrative systems. Public hospitals should study unit cost of each service and disease, high-frequency admission cases. In the present, the unit cost analysis of particular diseases have not been systematic studied. Few previous studies have not been generalized the appropriate research methodology.

I would like to suggest a prospective approach for the study. That is to study all relevant inputs of hospital resources by service division of common diseases. Hospital researchers have to firstly specify definite methods of diagnosis, treatments, operations and other rehabilitative services for the diseases. If a

sampled hospital improves its accounting system and has computerized patient information and financial information or charge items, the calculation of unit cost by service type and disease groups can be conducted based on patient abstracts and cost allocation methodology.

The National Health Insurance Office should support the studies. Target group of the study population should be public hospitals in the pilot project of the Universal Coverage of Health Care Policy. Benefits of these studies of various public hospitals by level and geographical areas would provide a general guideline of actual practice and average unit cost of each studied disease.

8.2.4.3 Future research on rate regulation by DRGs

The National Health Insurance Office on behalf of Thai government acts as an authorized purchaser of necessary health care for the uninsured citizens. Because correct payment depends on rate setting by DRGs, a study of historical charges and costs of public hospitals should be conducted.

Required information of the operation of the National Health Insurance Office are comprised of the registered member of main contractors, definition of basic services, basic information of public providers and their networks by geographical information system, utilization information of outpatient and inpatient, operating costs of every hospital, new name of diseases and operative procedure, etc.

The study may investigate questions of fairness to health providers and their understanding of the DRGs payment too. The findings would reduce the theory-practice gap between standard price by DRGs' RW and conventional hospital charges. The study will collect actual information for setting unit price of RW for different hospitals. The study will design a format of input information, general principles for setting unit price RW for each level and type of hospitals, payment period and communication methods, as well as feedback and arguments for the payments.

Appendix A :Tables

Table 2.1 Allocation of Consumption Expenditure and Capital Expenditure by Source of Financing FY 1994

Source of Finance	% of Consumption Expenditure			Total Consumption Expenditure		Total Capital Expenditure		Total Health Expenditure	
	Adm %	Pub. %	Pri v. %	Pub. Prog %	Million Baht	percent	Million Baht	percent	Million Baht
MOPH	15	58	0	27	29,256.00	27.12	12,263.00	60	41,519.00
Central Gov..	8	61	30	1	17,282.00	16.02	136	0.66	17,418.00
Local Gov.	16	3	0	82	5,289.00	4.9	285	1.39	5,574.00
Households	0	34	66	0	49,676.00	46.05	7,265.00	35.55	56,941.00
Other Private	18	20	55	7	6,364.00	5.89	489	2.39	6,853.00
Total					107,867.00	100	20,438.00	100	128,305.00
									100

Source: Adapted from Health System Research Institute, Management Sciences for Health, 1999: Table 1.1

- Note: 1. MOPH-Ministry of Public Health, Adm - Administrative Unit, Pub.- Public Organization, Priv. - Private Organization, Pub. Prog- Public Health-Related Program.
 2. Total Consumption Expenditure is distributed horizontally by type of organization and public health program.
 3. Total Health Expenditure is comprised of Total Consumption Expenditure and Total Capital Expenditure.
 4. The Total Health Expenditure of 128,305 Million Baht is distributed vertically by source of finances including MOPH, Central governmental agencies, Local governmental agencies, Households, and miscellaneous private entities .

Table 2.2. Thailand National Health Expenditure (1992 price)

Financial Agency/Fiscal Year	1978	1980	1982	1984	1986	1987	1988	1990	1992
MOPH(Baht)	7,661.60	7,683.70	9,552.60	11,867.60	12,249.10	12,277.90	12,867.70	17,286.40	24,904.10
Other Min. (Baht)	3,265.10	3,894.60	4,081.50	4,730.70	5,176.10	5,203.40	5,326.50	5,020.10	4,836.50
CSMBS(Baht)	760.8	1,117.10	1,741.90	2,444.20	3,386.50	3,610.60	3,915.30	4,799.00	5,182.30
WCS(Baht)	140.0	168.1	217.3	340.4	288.6	345.5	430.5	492.7	753.00
SSO(Baht)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	811.9	1,823.00
State Enterprise benefits(Baht)	165.4	316.6	447.5	523.7	685.3	727.1	733.2	691.8	652.00
Private Insurance(Baht)	476.9	401.9	458.1	514.4	556.3	573.9	570.7	576.1	560.00
Foreign Aid(Baht)	376.5	642.6	547.0	536.8	660.4	644.5	390.8	87.9	362.80
Private Households expenditure(Baht)	25,721.80	30,461.60	29,503.30	47,296.40	56,934.40	63,974.40	71,413.70	85,258.10	109,381.40
Total	38,567.90	44,686.30	46,549.00	68,254.40	79,936.60	87,357.20	95,648.30	115,023.90	148,455.10

Table 2.2 (Continued)

Financial Agency/Fiscal Year	1978	1980	1982	1984	1986	1987	1988	1990	1992
Total Per Capita Expenditure (Baht)									2,474
Per Capita Expenditure from Insurance Plans/Gov (Baht)									645
Per Capita Expenditure from Private Households (Baht)									1,823

Source: Adapted from Table 1 National Health Expenditure Account: Thailand (1992 price in Baht). in Health Financing in Thailand :Proceeding of A National Workshop. November 11-13 , 1993.

Note: MOPH- Ministry of Public Health, CSMBS- Civil Servant Medical Benefits Scheme, SSO- Social Security Office, Other Min.- Ministry with related health activity, WCS- Workmen Compensation Scheme.

Table 2.3 Trends in Health Expenditure, Per capita Expenditure, Percentage of GDP Growth and Health Expenditure

Year	% increase Health Expenditure	Per Capita Expenditure (baht)	% GDP Growth	% of GNP on Health
1978	n/a	680	n/a	3.4
1979	4.4	710	5.05	3.6
1980	3.9	738	4.57	3.9
1981	8.1	798	5.96	4.2
1982	8.3	864	3.90	4.6
1983	8.7	939	6.76	4.8
1984	12.6	1,052	6.65	5.2
1985	7.6	1,132	3.40	5.6
1986	5.3	1,192	4.30	5.6
1987	7.6	1,282	7.74	5.7

Source: Adapted from Table 4 Trend of total per capita health expenditure (public and private spending) in the past decade and the projection to the year 2000.in Health System in Transition .Contemporary Health Issue No.1/95, Health Systems Research Institute, Thailand.

Table 2.4 MOPH Budget, Capital Budget, Free Health Budget, Population and Total National Budget 1978-1995

Year	Total Budget Million Baht	Capital Million Baht	Free Health Million Baht	Population In Million	Capital: Free Health	National Budget Million Baht
1978	3,405.80	770.2	350.8	44.455	2.19	81,000
1979	3,976.90	899.1	359.0	45.460	2.50	92,000
1980	4,494.60	966.6	423.2	46.455	2.28	109,000
1981	5,571.80	1,175.0	459.4	47.488	2.55	140,000
1982	6,652.30	1,472.1	542.5	48.490	2.71	161,000
1983	7,902.40	1,478.0	653.9	49.459	2.26	177,000
1984	8,617.60	1,464.8	659.7	50.396	2.22	192,000
1985	9,044.30	1,477.0	678.0	51.683	2.17	209,000
1986	9,274.70	1,231.1	678.0	52.654	1.81	211,650
1987	9,525.10	1,077.3	705.0	53.605	1.52	227,500
1988	10,372.50	1,210.6	725.0	54.536	1.67	243,500
1989	11,733.10	1,664.9	830.0	55.448	2.00	285,500
1990	16,225.00	2,945.3	1,509.0	56.340	1.95	335,000
1991	20,568.60	4,221.1	2,000.0	56.923	2.11	387,500

Table 2.4 (Continued)

1992	24,640.40	5,515.0	2,768.0	57,760	1.99	460,000
1993	32,898.10	7,757.0	3,469.0	58,584	2.23	560,000
1994	39,318.70	10,794.6	4,263.0	58,715	2.53	625,000
1995	45,102.70	14,418.1	4,273.0	59,278	3.37	715,000

Source: Ministry of Public Health, Division of Health Policy and Planning.

Table 2.5 Historical Development of National Social Security Program

Year	Important Event	Public Assistance	Government Fringe Benefits	Compulsory Health Insurance	Voluntary Health Insurance
1929	Private Insurance Business				Yes
1954	First Social Security Act (Not implemented)			Yes	
1974	Workmen Compensation Fund			Yes	
1975	Free Medical Care for the Poor	Yes			
1978	First Private Insurance Company				Yes
1978	Royal Decree on Civil Servant Medical Benefits		Yes		

Table 2.5 (Continued)

1981	First Issue for Low Income Card	Yes			
1983	Maternal & Child Health Development Fund				Yes
1984	Health Card Project (Community Based)				Yes
1990	Social Security Act			Yes	
1991	Health Card Project				Yes
1992	Free Medical Care for the Poor	Yes			
1993	Social Security Act cover 10-19 workers			Yes	
1993	Road Traffic Accident Victim Insurance			Yes	

Source: Adapted from Anuwat Supachutitikul, 1996: Table 2-1

Table 2.6 Characteristics of Health Insurance Scheme in Thailand

Insurance Scheme	Typology of Social Insurance	Covered Population (Million) (%)	Eligible Characteristics	Source of Fund	Financing Agent	
CSMBS and State Enterprise Health Insurance	Fringe Benefit	6.6	11	Civil Servant, State Enterprise Employee, Pensioner, and dependents	General Tax	Ministry of Finance
Social Security	Compulsory Social Insurance	4.8	8	Private Employee	Third-party contribution of 1.5% of upper -limit wage	Social Security Office
Voluntary Health Card	Social Welfare	6.0	10	Indigent, Contribute 500 Baht per family of 5 person	Ministry of Public Health Subsidy	Ministry of Public Health
Low-income Insurance Scheme	Social Welfare	27.0	45	low-income and underprivileged	Ministry of Public Health Subsidy	Ministry of Public Health
Private Insurance	Business Company	1.2	2	Healthy citizens	Risk-pooling fund	Private Insurance Companies
Total Insured %		50.4	76			
Uninsured %		15.9	24			

Source : Adapted from Health System Research Institute, Management Science for Health, 1999: Table 1.4

Note: Total Population = 66.3 million person

Table 2.7 Medical Benefits By Type of Health Financing Agency

Medical Benefit		Health Financing Agency					PI
	CSMBS	SSS	WCS	LICS	HCP		
Ambulatory Care Provider	Only Public	Public and private	Public and Private	Only MOPH provider	Only MOPH provider	Public and Private	
Inpatient Care Provider	Only Public	Public and Private	Public and Private	Only MOPH provider	Only MOPH provider	Public and Private	
Choice of Provider	Restrict	Restrict to Contracted Provider	Free choice	Referral Line	Referral Line	Free Choice	
Cash Benefit	No	Yes	Yes	No	No	Yes	
Inclusive Conditions	All	Non work-related sickness	Work-related sickness	All	All	As in contracts between payers and members	
Service Not Covered	Special Nurse	Private bed and special nurse	Covered but limit total expense	Private bed and special nurse	Private bed and special nurse	Vary	

Source: Adapted from Anuwat Supachutikul, 1996: Table 4-2

Table 2.8 Typology of Health Insurance by Provider and Financier

Financier/Provider	Public Provider	Private Provider
Public Financier	a. Social Welfare (LICs) b. Fringe Benefit (CSMBS)	NO
Mixed public-private financier	a. Social Security Fund b. Health Card Fund	Social Security Fund
Private financier	WCS, PI, Accidental Insurance	WCS, PI, Accident Insurance

Source: Adapted from Anuwat Supachutikul, 1996: Table 5.1

Note: LICs-Low-income Insurance Scheme, CSMBS- Civil Servant Medical Benefit Scheme,
WCS-Workmen Compensation Scheme, PI-Private Insurance MOPH-Ministry of Public Health

Table 2.9 Health Financing by Source of Finance, Responsible Agency and Type of Payment

Health Financing		Source of Finance	Responsible Agency	Type of Payment
1. Public Assistance				
a. Low-income	General Taxes	MOPH MOPH Min. of Education		• Budget Appropriation • Budget Appropriation • Capitation
b. Elderly	General Taxes			
c. Primary school children	General Taxes			
2. Fringe Benefits for Public Employee				
a. Civil servants and pensioners	General Tax	Min. of Finance		Fee-for-service
b. State enterprise employee	State enterprise expense	State enterprises		Fee-for-service
3. Compulsory Social Insurance				
a. Social Security Scheme	• Payroll tax • Employer contribution • Gov. subsidy • Only employer contribution • Car owner premium	• Social Security Office • Social Security Office • Private insurance company		• Capitation • Fee for maternity • Fee schedule for extra contractual services • Fee-for-service with fixed liability at 30,000 baht • Fee-for-service
b .Workmen Compensation Scheme				
c. Traffic Accident Insurance				
4. Voluntary Health Insurance				
a. Health Card Scheme	Premium and tax	MOPH		Capitation
b. Private Insurance	Insurance premium	Private insurance company		Fee-for-service

Source: Adapted from Anuwat Supachutikul, 1996: Table 6-1

Table 2.10 Characteristics of Health Insurance Plan by Type of Payment, Co-payment, Provider, Admission Per 100 members, Length of stay (days), Outpatient visit per capita and Expense per capita per year

Insurance Plan	Type of Payment	Co-payment	Provider	Admission per 100 members	Length of Stay	Outpatient per capita	Expense per capita per year
CSMBS	Fee-for-service	Nonessential drug	Public	13.6	11.9	5.5	1,781
SSS	Capitation	Private bed	Public and private	2.6	5.6	1.4	712
VHCS	Health Card Fund	None	Public	5.8	4.3	1.7	190
LICS	Gov. Budget	None	Public	3.0	5.1	0.7	225
PI	Multiple types	None	Private	N/A.	N/A	N/A	1,667

Source: Adapted from Health System Research Institute, Management Science for Health, 1999: Table 1.6

Table 2.11 Poverty Line and Percentage of Poor People.

Year	1988	1990	1992	1994	1996	1998
Poverty Line Baht /month /person	473	522	600	636	728	911
Number of the poor (million person)	17.9	15.3	13.5	9.7	6.8	7.9
Percentage of Total Population	32.6	27.2	23.2	16.3	11.4	12.9

Source: Chutima Suraratdecha, 1999:28-29

Table 2.12 Number and Proportion of Low-income Eligible, Poor Person, Person in Poor Family (1996-1998)

Year	Low Income		Poor Person		Person in Poor Family		Total Population	
	Number	Percent	Number	Percent	Number	Percent	Number	
1996	12,946,645	22.83	8,193,801	14.45	9,306,162	16.42	56,692,141	
1998	14,407,328	23.43	6,958,604	11.32	6,237,283	10.15	61,466,178	

Source : Modified From Chutima Suraratdecha,1999: Table 4.1-4.2

Note : 1. Poor Person refers to person who can earn his /her regular income less than 2000 Baht per month
 2. Low Income refers to person who has low-income card Person in Poor Family refers to person who is the member of the family with income less than 3,000 Baht per month

Table 2.13 Utilization of Low-income Eligible and The Poor with no insurance

Year	Low-income Eligible		Poor with no insurance	
	OP visit	IP admission	Op visit	IP admission
1996	4,643,677	372,228	3,642,714	364,100
1997	8,922,843	1,389,228	6,717,877	1,580,379

Source: Chutima Suraratdecha, 1999:28-29

Table 2.14 Low-income Budgeting

Year	Budget (Million Baht)	Percent Increase
1992	2,500.00	25.00
1993	3,456.00	38.24
1994	4,107.50	18.85
1995	4,237.12	3.16
1996	4,950.41	16.83
1997	5,639.63	13.92
1998	7,029.75	24.65

Source: Ministry of Public Health, Department of Health Policy and Planning, Planning Division.

Table 2.15 Regional Distribution of low income budget (1996 - 1998)

Region	1996		1997		1998	
	Amount (Baht)	% change	Amount (Baht)	% change	Amount (Baht)	% change
Central	648,070,600	n/a	835,571,000	28.93	956,098,367	14.42
East	251,536,700	n/a	316,144,000	25.69	360,840,403	14.14
North-east	516,338,100	n/a	1,827,039,000	20.49	2,248,145,538	13.05
North	934,107,400	n/a	1,145,164,197	22.59	1,311,104,799	14.49
South	605,256,200	n/a	779,539,000	28.79	922,185,531	18.3
Total	3,955,359,000	n/a	4,903,457,197	23.97	5,798,374,638	18.25

Source: Ministry of Public Health, Health Insurance Office. Provincial Allocation Budget.

Table 2.16 Estimated Medical Expenditure Per Capita by Insurance Scheme (1993)

Insurance Scheme	Public Provider			Private Provider		
	Baht/OP	Baht/IP	LOS	Baht/OP	Baht/IP	LOS
Public Assistance	58	2,746	5.8	N/A	N/A	N/A
Fringe Benefits	463	9,981	13.4	N/A	12,128	4.4
Social security	140	4,260	5.8	373	10,244	3.5
Health Card	60	1,558	N/A	N/A	N/A	N/A

Source: Adapted from Anuwat Supachutikul, 1996: Table 6-3

Table 2.17 CSMBS Reimbursement 1988-1994 (Million Baht)

Medical Expense (Million Baht)	Year						
	1988	1989	1990	1991	1992	1993	1994
Total Expense	3155.9	3520.9	4315.6	5127.3	5854.1	7906.1	9954.1
% increased		11.6	22.6	18.8	14.2	35.1	25.9
Outpatient Expense	1306.2	1485.3	1729	2021.8	2337.2	2766.5	3373.9
% Increase		13.7	16.4	16.9	15.6	18.4	21.9
Inpatient Expense	1849.7	2035.6	2586.6	3105.6	3627	5140	6580.1
% Increase		10.1	27.1	20.1	16.8	41.7	28
Rate OP: IP	41:59	42:58	40:60	40:60	40:60	35:65	34:66

Source: Calculated from data in Table 3.16 Actual Central Expenditure for Civil Servant and Pensioner. A Study of Budget Allocation Model TDRI (1997)

Table 2.18. CSMBS Expenditure By Type of Provider and Type of Eligible 1988-1944
(Million Baht)

A. Civil Servant

Type of Hospital	Year						
	1988	1989	1990	1991	1992	1993	1994
Public Hospital	1412.23	1523.6	1911.18	2264.65	2568.09	3551.55	4425.57
% increase		8	25	18	13	38	25
Private Hospital	325.31	370.58	491.03	596.85	769.3	1154.78	1553.96
% increase		14	33	22	29	50	35
Ratio: Public: Private	81:19	80:20	80:20	79:21	77:23	75:25	74:26

B . Pensioners

Type of Hospital	Year						
	1988	1989	1990	1991	1992	1993	1994
Public Hospital	88.43	111.05	142.4	187.83	213.71	318.16	449.06
% increase		26	28	32	14	49	41
Private Hospital	23.73	30.4	41.96	56.16	75.85	115.54	151.52
% increase		28	38	34	35	52	31
Ratio: Public : Private	79:21	79:21	77:23	77:23	74:26	74:26	75:25

Source: Adapted from Table 3.18 Actual Central Expenditure by Type of Hospital and Type of Beneficiary. **A Study of Budget Allocation Model.** TDRI (1997).

Table 2.19 CSMBS Expenditure by Type of Beneficiary and Type of Service**A. Civil Servants**

Type of Service	Year						
	1988	1989	1990	1991	1992	1993	1994
Total Expense	2936.13	3248.06	3965.64	4674.79	5419.38	7136.14	8905.9
% increase		11	22	18	16	32	25
OP Expense	1198.59	1353.88	1563.43	1813.29	2081.99	2429.81	2962.87
% increase		13	15	16	15	17	21
IP Expense	1737.54	1894.18	2402.21	2861.5	3337.39	4706.33	5979.53
% increase		9	27	19	17	41	27

B. Pensioner

Type of Service	Year						
	1988	1989	1990	1991	1992	1993	1994
Total Expense	219.78	272.86	349.91	452.51	544.76	770.37	1042.6
% increase		24	28	29	20	41	35
OP Expense	107.62	131.41	165.55	208.52	255.2	336.6	447.02
% increase		22	26	26	22	32	33
IP Expense	112.16	141.45	184.36	243.99	289.56	433.7	600.58

Table 2.19 (Continued)

% increase			26	30	32	19	50	39
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Source: Adapted from Table 3.17 Actual Central Expenditure by Type of Hospital Service.
A Study of Budget Allocation Model. TDRI (1997).

Table 2.20 Average Inpatient Charge, Length of Stay, Co-payment of Beneficiaries in Private Hospitals

Type of finding	Public Hospital		Type of finding		Private Hospital	
	Civil servant	Pensioner	Beneficiaries		Civil servant	Pensioner
Beneficiaries						
Length of stay	13.4	19	Length of Stay		4.4	6.5
Charge per day (Baht)	866	1,019	Charge per day		3,194	4,400
Type of beneficiaries			Co-payment		4,019	5,498
Reimbursement for his own rights	30%	69%				
Reimbursement for dependents	70%	31%				

Source: Viroj Tangchareonsatien, et al. 1999.

Note: Reimbursement for his own rights refers to utilization of public employee and pensioner; reimbursement for dependents refers to utilization of dependents of the public employee and pensioner.

Table 2.21 Age Distribution by Sex. Comparison between survey data and United Nation data

Age	Sex	1980*	1995**	1995***	2000*
60-69	male	30.3	29.64	24.51	28.77
	female	34.2	34.65	35.03	33.02
70-79	male	13	15.27	11.51	13.73
	female	15.91	20.44	17.46	17.47
more than 80	male	2.47		4.03	2.81
	Female	4.03		7.45	4.21
Total	male	45.77	44.91	40.05	45.3
	Female	54.13	55.09	59.95	54.7

Source: * United Nation. 1985.

** National Statistics Office. 1995.

*** Janpen Chuprapawan.1997.

Table 2.22 Perception of Health Status of the Elderly more than 60 by Sex 1994-1995

Self Appraisal	1995*			1994**		
	Total	Male	female	Total	male	female
Excellent health	9.5	13.2	6.9	6.9	9	5.2
good health	25.3	29	22.9	31.4	34.3	29
normal health	30.4	29.3	31.2	35.8	34.3	37.1
poor health	23.9	20.1	26.4	23	20.2	25.4
weak health	10.8	8.2	12.5	2.9	2.2	3.3

Source: * Janpen Chuprapawan, 1997.

** National Statistical Office, 1994.

Table 2.23 Percentage of Disease of the Elderly more than 60 by Sex
(1994-1995)

Year	1995*			1994**		
Disease	total	male	female	total	male	female
Hypertension	18.1	14.4	20.6	25	22.1	27.3
Synovialis	16.9	12.7	19.7	n.a.	n.a.	n.a.
Arthrosis	n.a.	n.a.	n.a.	72.4	67.3	76.5
Peptic Ulcers	13.1	12.4	13.6	20.5	21.7	19.6
Heart disease	8.1	5.5	9.8	9.2	6.7	11.2
Diabetes	5.8	4.3	6.8	5	4.3	5.6
Cataract	7.3	5.7	8.4	n.a.	n.a.	n.a.
Phacomalacia	3.8	2.4	4.6	n.a.	n.a.	n.a.
Eye disease	n.a.	n.a.	n.a.	43	39.1	46.1
Paralysis/paresis	2.2	3.1	1.7	3.8	4.1	3.5
Cancer	0.4	0.3	0.5	0.5	0.6	0.4

Source: Table 46 in Health Status Survey for Over 50-year Elderly in Thailand 1995

Table 2.24 Percentage of Urban Residence (1978,1987)

Urban Residency	1978	1987
The whole country	23.0	26.6
North	14.2	16.7
North-Eastern	10.4	10.5
Central	18.3	29.9
South	14.5	15.8
Bangkok	100	100

Source: Supatra Srivanitchakorn, et al., 1996.

Note : Urban Residency refers to all local authorities' area which are comprised of more than 5,000 person and population density 1,000 person per square kilometer

Table 2.25 Mortality Rate by Leading-Ten Diseases during 1967-1988
(per 100,000 population)

Cause of Death	1967	1977	1988
1 Injuries and Poisoning	26.2	34.6	46.7
2. Disease of the heart	16.5	15.9	44.5
3. Malignant neoplasm	12.0	19.0	33.5
4. Tuberculosis of all form	28.1	16.0	8.2
5. Pneumonia	19.6	12.8	6.3
6. Diarrhoeal Disease	27.6	13.2	3.7
7. Malaria	12.9	10.9	2.7
8. Disease of the Stomach and Duodenum	5.1	7.5	2.1
9. Nutritional Deficiency	n.a	2.4	0.5
10 Disease of Pregnancy still birth , and the puerperium	10.1	3.2	0.4

Source: Supatra Srivanitchakorn, et al., 1996.

Appendix B
Summary of Inpatient Charge in Health Card Project

รายการสรุปค่ารักษาพยาบาลใน โครงการประกันสุขภาพ

ส่วนที่ 1

ชื่อหน่วยบริการประจำครอบครัวหลัก (ที่ระบุในบัตร)..... เลขที่สิทธิบัตร..... ประเภทสิทธิบัตร.....

ส่วนที่ 2

ชื่อหน่วยที่ให้บริการ..... อำเภอ..... จังหวัด..... เลขที่ บ/ร หน่วยที่ให้บริการ.....

กรณีรับไว้รักษาต่อ ชื่อโรงพยาบาลที่ส่งมา..... สาเหตุที่ส่ง.....

ชื่อผู้รับบริการ..... อายุ.....ปี เพศ..... อาชีพ.....

เลขที่โรงพยาบาล (HN)..... เลขที่ผู้ป่วยใน (AN)..... วันที่รับไว้..... วันที่จำหน่าย.....

แผนก/หอผู้ป่วย.....

การวินิจฉัยโรค (ICD-10) 1..... 2..... 3..... 4.....

กรณี การผ่าตัด/หัตถการ (ICD-9CM) 1..... 2..... 3..... 4.....

วันที่..... แพทย์ผู้ทำผ่าตัด/หัตถการ.....

สถานภาพการจำหน่าย 1. Complete Recovery 2. Improved 3. Not Improved 4. Normal

Delivery

5. Un-Delivery 6. Normal child discharge with mother 7. Normal child discharge separate 8. Dead still birth

9. Dead

ชนิดการจำหน่าย 1. With Approval 2. Against Advice 3. By Escape 4. By Transfer 5. Other

(specify)

6. Dead Autopsy 7. Dead Non Autopsy

กรณีส่งไปรับการรักษาต่อ ชื่อโรงพยาบาลที่ส่งไป..... สาเหตุที่ส่ง.....

ส่วนที่ 3

รายการค่าบริการ	ค่าบริการที่เรียกเก็บรวม	รับเงินจากผู้ป่วย	รวมค่าบริการที่ไม่คิดมูลค่า
1. บริการชันสูตรโรค			
2. บริการคลังเลือด			
3. บริการพยาธิวิทยา			
4. บริการรังสีวิทยา			
5. บริการตรวจวินิจฉัยอื่น ๆ			
6. บริการผ่าตัด			
7. บริการระงับความรู้สึก			
8. ค่าอวัยวะเทียม/อุปกรณ์บำบัดรักษา			
9. ค่ายาเคมี / ฉายแสง			
10. ค่ายาและเวชภัณฑ์			
11. บริการเวชกรรมฟื้นฟู			
12. บริการบำบัดรักษาอื่น ๆ			
13. บริการหอผู้ป่วยหนัก จำนวน.....วัน			
14. ค่าห้องและอาหาร จำนวน.....วัน (ตามอัตราที่กำหนด)			
รวมทั้งสิ้น			

(ตัวหนังสือ).....

ขอรับรองว่าค่ารักษาพยาบาลถูกต้องตามที่เรียกเก็บ

ลงชื่อ.....

ลงชื่อ

(.....)

(.....)

หัวหน้าหน่วยบริการหรือผู้ที่ได้รับมอบหมาย

เจ้าหน้าที่การเงิน หรือผู้ที่ได้รับมอบหมาย

ส่วนที่ 4

ตามหนังสือเรียกเก็บที่.....DRG.....

RW.....จำนวนเงินที่คำนวณได้.....

Appendix C
DRGs Grouping

In order to identify characteristics of patients with similar patterns of services and resource use, a DRGs grouper program was established. This analysis applied an interactive version of Automatic Interaction Detector (A.I.D.) to a database of information from hospital discharge summaries provided by the Commission for Professional and Hospital Activities (CPHA) (Grimaldi and Micheletti, 1983: 20-21). This is accomplished by recursively subdividing observations into subgroups based on values of variables that maximize variance reduction of the dependent variable, Length of Stay.

Since resource use was the principle measure of interest, length of stay was selected as the dependent variable. At each stage of the analysis, a team of physicians reviewed the subgroups and suggested modifications to insure medical interpretability. The participation of professional physicians and the statistical analysis resulted in the formation of 467 distinct patient classes referred to as Diagnosis Related Groups or DRGs.

A DRG is assigned a specific code according to six variables as follows. Each DRG is defined in terms of one or more of the following variables: principle diagnosis, operating room procedures, co-morbidity, and complications (secondary diagnoses), age and in a few, causes of discharging status. As such, the DRG represents a multivariable system for classifying hospital discharges from acute care hospitals into patient groups or types of cases with similar expected patterns of resource use. Thus, the DRGs operationally define the products of the hospital in terms of classes of patients with similar a set of services.

In order to insure clinical interpretability, all principle diagnosis codes are condensed into 23 mutually exclusive and exhaustive Major Diagnostic Categories (MDCs). The category to which a particular diagnosis is assigned is a function of the organ system it predominantly affects or the specialist who would typically provide care. Then diseases that tend to be diagnosed and treated in similar ways by similar specialists are aggregated in the same MDC regardless of etiology. Under the DRG system of classification, each hospital discharge is assigned to one and only one MDC based on its principal diagnosis code.

With few exceptions, each MDC is then partitioned on the presence or absence of a procedure performed in the operating room. Discharges with at least one operating room

procedure (OR) are referred to as " surgical" hospitalizations and those with no OR as " medical" hospitalizations. In most MDCs, medical hospitalizations are then partitioned into clinically coherent groups of principle diagnoses and surgical operating room procedures referred to as procedure categories. The procedure categories are hierarchical based on the intensity of resource consumption. A discharge with multiple operating room procedures is assigned to the surgical group based on the most resource intensive or procedure within this hierarchy.

Depending on the MDC, diagnostic groups (corresponding to medical hospitalizations) and procedure categories (corresponding to surgical hospitalizations) may be further partitioned on the basis of age, the existence of co-morbidity and complications, and in a few cases discharge status. A composite variable of " age 70cc" is used extensively though out the system. This is a dichotomous (2 level) variable which takes on the value of " yes" if age>+70 and /or if there are substantial co-morbidity or complications, and not, if otherwise. In sum, the DRGs were constructed based on statistical and clinical input and cost information.

How does a hospital, fiscal intermediary, utilization review organization or regulatory agency assign DRGs ? It can either be done by hand or by computer which is more preferable because of convenience. The computer program, which assigns DRGs, is called a grouper. Certain information must be extracted from the patient's medical record.

Appendix D:

Methodology

Table 4.1 Regional Hospital Characteristics: Bed, Outpatient Visit Per Day, Inpatient-Day Per Year, Average Length of Stay and Occupancy Rate in Fiscal Year 1997.

Hospital Name	Region	Bed	OP visits per day	IP- day	LOS	%OccRm
Pranakorn Sri Ayutaya	1	384	704	146,658	6	105
Saraburi	2	638	842	213,685	6	92
Chaopraya Yommaraj Supanburi	2	368	736	169,255	6	126
Chonburi	3	777	1,269	237,855	6	84
Chaopraya Apaipubet Pracheanburi	3	409	577	176,436	6	118
Prapokkao Chanburi	3	733	812	215,929	6	81
Rayong	3	400	759	151,476	5	104
Rajburi	4	675	1,068	195,242	5	79
Nakornpratom	4	550	1,125	190,491	5	95
Burirum	5	522	742	208,150	4	109
Surin	5	652	691	223,549	5	94
Maharaj Narkornrajchasima *	5	1,039	1,204	363,754	5	96
Konkaen	6	661	1,104	286,169	5	119
Udontani	6	774	1,078	280,035	5	99
Sumprasitiprasong Ubonrajchatani	7	900	1,427	338,424	4	103
Sawanpracharat Nakornsawan	8	672	1,152	191,834	5	78
Buddhachinaraj Pisanulok *	9	878	1,076	311,669	6	97
Utaradit	9	550	843	194,985	6	97
Lumpang	10	803	1,142	264,515	5	90
Chiangrai Prachanukok	10	757	1,202	306,457	7	111
Surajitani	11	660	1,122	229,832	5	95
Maharaj Nakornsitamaraj *	11	768	1,010	296,795	7	106
Yala #	12	527	899	201,875	6	105

Table 4.1 (Continued)

Tang	12	370	769	144,316	5	107
Hatyai	12	640	1,300	228,070	6	98

- Note: 1. * medical school, # bed less than 500.
 2. OP visits per day- outpatient visits per day
 3. IP-day refers to the aggregate number of inpatient multiplied by the length of stay of each admission
 4. OccRM refers to the average percentage of beds occupied by total number of hospital beds

Table 4.2 : Hospital Characteristics by Physician, Temporary Employee, Ordinary Patient Bed, Special Patient Bed, Inpatient in Six Specialty wards, Ratio of Physician to Temporary employee, and Ratio of Special bed to Ordinary bed.

No.	Hospital Characteristics	Buddhachinara Hospital	Chiangrai Hospital	Hatyai Hospital
1	Number of Physician	84	64	78
2	Number of Temporary Employee	462	411	401
3	Ordinary Patient Bed	723	629	540
4	Special Patient Bed	155	128	100
5	Medicine Ward (beds)	155	166	74
6	Surgery Ward (beds)	133	210	219
7	Orthopedic (beds)	105	108	72
8	Eye, Ear, Nose, Throat (beds)	75	36	36
9	Gynecology (beds)	106	87	107
10	Obstetric (beds)	121	118	96
11	Ratio of physician to temporary employee	0.18	0.16	0.19
12	Ratio of special bed to ordinary bed	0.21	0.20	0.18
13	Total Inpatient bed	878	757	940
14	Percentage of major specialty beds of the total beds	695 (79.16%)	725 (95.77%)	604 (64.16%)

Source: Modified from a table in Annual Hospital Report 1996-1997 , pp. 239-286.

Table 5.13 Proportion of Patient of the Selected DRGs in the Analytic File

Description of DRG	Rank	DRG code	Freq.	%
Vaginal Delivery w/o complication	1	373	8,255	24.2
Cesarean Section w/o complication	2	371	3,528	10.3
Len Procedures with or without vitrectomy	3	39	1,882	5.5
Esophagitis, gastroent&misc digest, age > 17	4	183	1,544	4.5
Other O.R. procedure for multiple significant trauma	5	486	1,432	4.2
Extensive O.R. procedure unrelated to principle diagnosis	6	468	1,326	3.9
HIV without other related condition	7	490	1,283	3.8
HIV with major related condition	8	489	1,256	3.7
Specific Cerebrovascular disorders except TIA	9	14	1,186	3.5
Esophagitis,gastroent & misc digest, age <18	10	184	1,153	3.4
Appendectomy w/o complicated principle diag w/o cc				
Red Blood Cell Disorder, age 0-17	12	396	897	2.6
Other disorder of the eye, age >17	13	47	823	2.4
Medical Back Problem	14	243	696	2.0
Chronic Obstructive Pulmonary Disease	15	88	684	2.0
Other digestive system diagnosis, age >17	16	189	972	2.0
Kidney,ureter & major bladder proc for non-neopl w/o cc	17	305	628	1.8
Menstrul & other female reproductive system disorder	18	369	543	1.6
Other multiple significant trauma	19	487	533	1.6
Viral illness & fever of unknown origin, age 0-17	20	422	531	1.6
Renal Failure	21	316	525	1.5
Other infectious & parasitic diseases	22	423	416	1.2
Abortion w/o D&C	23	380	375	1.1

Table 5.13 (Continued)

Limb reattachment, hip and femur procedures for multiple significant trauma	24	485	346	1.0
Respiratory Neoplasm	25	82	276	.8
Uterine & adnexa proc for ovarian or adnexa malinancy	26	357	276	.8
Otitis media & URI age 0-17	27	70	267	.8
Traumatic injury ,age > 17 w/o cc	28	445	262	.8
Other digestive system diagnosis, age >17	29	190	251	.7
Other antepartum diagnosis w/o medical complication	30	384	246	.7
Traumatic stupor & coma < 1 hr., age 0-17	31	30	242	.7
Traumatic stupor & coma, com < 1 hr. age <17 w/o cc	32	29	230	.7
Fx, Sprn, strn & disl of uparm, low leg ex foot, age > 17	33	254	229	.7
Septicemia, age >17	34	416	224	.6
Simple pneumonia & pleurisy, age > 17 wcc	35	89	220	.6
Total DRGs	35		34,180	100.0

Appendix E
Regulations

Table 6.1 Mandated Regulation of CSMBS Revision Committee,
9 February 1997

Government Measure	Public Hospital Pragmatism
Short Measure 1. consideration of reimbursement for non-essential drug	1. Hospital director nominate a committee of medical supply and treatment. 2. The committee revise hospital drug lists having majority of essential drug items and only necessary non-essential drug items. 3. Each hospital drug is viewed as necessary drug according to the authority of the committee
2. Abandon of the reimbursement of doctor fee during non official hour	2. Separate every charge items of outpatient services during hospitals' non-official hour to declare doctor fee. The doctor fee can not be reimbursed.
3. Control of the reimbursement of unnecessary medical diagnosis and treatments.	3 There are a clinical practice guideline set by medical profession associations. Each hospital has to draft its own clinical practice guideline in order to classify unnecessary medical diagnosis and treatments.
4. Co-payment of room service charge in case of admission more than 13 days , of all aged groups.	4. General allowance of inpatient reimbursement is 13 days. In case of the needy of longer admission, patients have to pay the beyond dates at the hospitals' half price and capped with 300 Baht.
5. Physical Examination	5. Physical examination can be reimburse only those performed in public hospitals.
6. Control of Expensive Medical Equipment Procurement	6. Hospitals already control the procurement of extreme expensive equipment. However, to control the efficient utilization should be planned and implemented.
7. Temporary abandon of curative care in private hospitals	7. The reimbursement of private charges are allowed only in case of emergency and harmful illness that leading to possible death.
Long Measure Civil Servant Medical Fund	As proposed by HSRI study of a new medical fund, the cabinet approved the proposal and it will be supported in the future.

Source: Controller General Department, Ministry of Finance, 2000.

Table 6.2 Rate of Compensation for Hospital Personnel

Categories of Hospital Personnel Compensation	Rate of Payment per person (Baht)
A. Civil Servant	
1. Physician and Dentist	800
2. Pharmacist	500
3. Medical Scientist, Professional Nurse, Public Health Academic	400
4. Technical Nurse, Public Health Administrator, Technical Officers, Public Health Dentist, and Pharmacist Officers	300
5. Nurse's Aids, Public Health Workers, Technical Workers, Dentist Assistant and Pharmacist Assistant	250
6. Other administrative officers: compensation depends on salary level and graduate education	
6.1 PC level 1	250
6.2 PC level 2	300
6.3 PC level 3	400
B. Employee	200
Permanent Employee, Temporary Employee and Employee paid by Health Service Revenue	

Source: Ministry of Public Health, 2000.

Table 6.3 Rate of Compensation by Level of Profession, Time, and Type of operation

Category of Health Worker	Sub-type of worker	Rate of Payment
Level of Professional	1. Professional Nurse	200 Baht per 8 hrs.
	2. Technical Nurse	150 Baht per 8 hrs.
	3. Nurse helper	120 Baht per 8 hrs.
Time	1. Full-time physician who is ready for consultation	800 Baht per standby time
	2. Part-time physician	400 Baht per standby time
Type of Operation	1. Nurse and others in large operation team	200 per patient
	2. Nurse and others in small operation team	100 per patient

Source: Ministry of Public Health, 2000.

Table 6.4 Rate of Laboratory Investigation

Type of Exploration	Sub-type	Rate (Baht)
Pathological Exploration		
1. Surgical Pathology	Biopsy, small size (<2 cm)	100-200
	Biopsy, medium (2-5 cm)	200-500
	Biopsy, large (>5 cm)	300-500
2. Cytology	Cervical and Vaginal Smear	30-50
	Fine needle aspiration	120-150
	Other smear	80-120
3. Frozen Section		500-1000
Hematology and Clinical Microscopy Section		
1. Hematology	Acid phosphatase c tartrate resistance	30-60
	Bleeding time	20-40
	Bone marrow stain (routine)	
	Buffy Coat preparation	20-40

Source: Rate of Medical Service, MOPH, 1993. p.5.

Table 6.5 Rate for General Surgery

Type of Surgery	Operation Procedure	Rate (Baht)
Head and Neck	Tracheostomy	1000-2000
Thyroid gland	Lobectomy	2500-5000
	Subtotal or total thyroidectomy	4000-8000
	Thyroglossal duct cyst excision	2500-5000
Salivary gland	Superficial parotidectomy	3000-6000
	Total parotidectomy	4000-8000
	Maxillary gland resection	2000-4000

Source: Rate of Medical Service, MOPH ,1993. p.32

Table 6.21 Correlation of Independent Variables
Influencing Inpatient Charge, selected DRG,
three-hospital file

		RW	LOS	Severe	intense	age
RW	Pearson Correlation	1.000	.339(**)	.468(**)	.297(**)	.230(**)
	Sig. (2-tailed)	.	.000	.000	.000	.000
	N	34180	32659	34180	34180	33589
LOS	Pearson Correlation	.339(**)	1.000	.216(**)	.118(**)	.213(**)
	Sig. (2-tailed)	.000	.	.000	.000	.000
	N	32659	32659	32659	32659	32085
Severe	Pearson Correlation	.468(**)	.216(**)	1.000	.309(**)	.161(**)
	Sig. (2-tailed)	.000	.000	.	.000	.000
	N	34180	32659	34180	34180	33589
Intense	Pearson Correlation	.297(**)	.118(**)	.309(**)	1.000	.166(**)
	Sig. (2-tailed)	.000	.000	.000	.	.000
	N	34180	32659	34180	34180	33589
Age	Pearson Correlation	.230(**)	.213(**)	.161(**)	.166(**)	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.
	N	33589	32085	33589	33589	33589

** Correlation is significant at the 0.01 level (2-tailed).

Appendix F
Special Payment

Table 7.1 Payment Criteria of Additional Payment, Social Security Office

Type	Group of disease	Specialty	Upper limit (Baht)
1.	Acute Renal Failure	Hemodialysis	3,000 Baht per time
2	Acute Renal Failure	Peritoneal Dialysis	500 Baht per day
3	Cancer	Chemotherapy or Radiotherapy	30,000 Baht per case per year
4	Heart	Open Heart Surgery	100,000 Baht per case
5	Instrumentation	Implantation of Prothesis and Instrumentation	As SSO list
6	Brain Surgery	Open skull for Meningitis treatment or brain disease except Burr Hole Operation	15,000 Baht per person
7	Brain Surgery	Open skull for Meningitis treatment or brain disease with proved complication	30,000 Baht per case
8	Brain Surgery	Surgery of brain tissue and coma patient longer than 15 days	30,000 Baht per person
9	Brain Surgery	Surgery of brain vessel with special equipment	30,000 Baht per case
10	Heart	Coronary Bypass	100,000 Baht per case
11	Heart	Percutaneous Ballon Valvuloplasty	20,000 Baht per case
12	Brain	Treatment of AIDS and relation complex	15,000 Baht per case
13	Heart	Coronary Dilation by using Balloon or Percutaneous transluminal Coronary Angioplasty	30,000 Baht per time , max 2 times
14	Sterilize	Vasectomy	500 per time
15	Sterilize	Tubal Ligation	1,000 Baht per time

Source: Social Security Office Annual Report, 2001

Table 7.2 Additional Payment , Social Security Office,
1999

Additional Payment of Medical Specialty	Number of Patient	Total Payment (Baht)	Average per case (Baht)
1. Hemodialysis	422	1,109,850	2,629.98
2. Peritoneal Dialysis	30	15,000	500.00
3. Chemotherapy and/or Radiotherapy	1,980	9,290,001	4,691.92
4. Open Heart Surgery	187	15,504,832	82,913.54
5. Implantation of Prothesis and Instrumentation	11,489	26,772,575	2,330.28
6. Brain Surgery	469	7,941,189	16,932.17
7. Coronary Bypass	28	2,697,898	96,353.50
8. Percutaneous Ballon Valvuoplasty	21	409,319	19,491.38
9. Treatment of AIDS and relation complex with Cryptococcal Meningitis	1,475	3,571,782	2,421.55
10. Coronary Dilation By Using Balloon or Percutaneous Transluminal Coronary Angioplasty	17	464,248	27,308.71
11. Vasectomy	129	64,028	496.34
12. Tubal Ligation	1,535	1,528,600	995.83

Source: Cost of Medical Service by Treatment 1999, Benefit Division, Social Security Office

Table 7.3 Payment Criteria for Accident and Emergency Treatment , Social Security Office,1999

Service	Charge Item	Upper limit	Condition
OP	Curative treatment	300 Baht per time	Max 2 times per year
	Laboratory investigation	200 Baht per time	Addition to the curative treatment
	Expense for physical therapy	200 Baht	Addition to the curative treatment
IP	Curative treatment	1,500 Baht per day	Max 2 times per year
	Large operation, less than 2 hours	8,000 Baht	For each injury or illness
	Large operation, more than 2 hours	14,000 Baht	For each injury or illness
	Room and food expense	700 Baht per day	
	Intensive Care	2,000 Baht per day	Addition to the curative care
	High technology investigation , only Computed Tomography (CT Scan) or /and Magnetic Resonance Imaging (MRI)	4,000 Baht per episode	1. The patient needs brain surgery after the CT Scan or MRI 2. Emergency admission and physician' requirement of the investigation for the obstruction in brain vessel 3. Investigation for myelitis operation

Source: Summary of SSO Performance ,pp 32-36. the 5th Social Security Medical Committee, 20 June 1997-29 May 1999.

Table 7.13 Common DRGs Rank and Number of Patient in Buddhachinaraj Hospital, Chiangrai Hospital, and Hatyai Hospital ,1999

DRG	Buddha (case)	Rank	Chiangrai (case)	Rank	Hatyai (case)	Rank
373	2,522	1	1,873	1	3,860	1
371	1,512	2	1,208	3	808	3
39	1,320	3	562	10		
183	723	4	507	12	314	11
468	718	5	608	9		
486	626	6	806	6		
487	533	7				
14	523	8	287	18	376	8
167	447	9	496	13		
305	281	10	347	16		
82	276	11				
357	276	12				
30	242	13				
416	224	14				
89	220	15				
490			1,283	2		
489			916	4	340	10
396			897	5		
88			684	7		
184			611	8	542	6
316			525	11		
243			444	14	252	14
423			416	15		
485			346	17		
47					823	2
189					672	4
369					543	5
422					531	7
380					375	9
70					267	12
445					262	13
190					251	15
384					246	16
29					230	17
254					229	18
Total Case	10,443		12,816		10,921	

Source: Statistical Analysis of Patient-record Files for Only Selected DRGs

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BIOGRAPHY

NAME	Jarurat Yanggratoke
BACKGROUND ACADEMIC	BSc. (Chemistry) , Mahidol University M.P.A. (honor), NIDA
POSITION & OFFICE	Medical Scientist, Medical Science Department Ministry of Public Health
EXPERIENCE	Quality Control Chemist. Private Companies Scientist Teacher. Public Secondary Schools Company Manager. Ubonrajchatanee Province Company Consultants. Bright Entech Co., Ltd. Medical Scientist. MOPH