HEALTH TECHNOLOGY ASSESSMENT ON LAPAROSCOPIC SURGERY IN THAILAND: A CASE STUDY OF HYSTERECTOMY

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF SCIENCE IN PHARMACY
(PHARMACY ADMINISTRATION)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2010

Thesis
entitled

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was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Science in Pharmacy
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ACKNOWLEDGEMENTS

This thesis would never have been completed without the support and advice from the following persons to whom I would like to express my heartfelt thanks for their valuable help. I am very grateful for knowledge and experience that I have received from my major advisor, Assistant Professor Dr. Usa Chaikledkaew for all what she has done with greatest patience. Although she was very busy, she gave me clear guidance and intellectual direction every time.

I would like to express my great thanks and gratitude to my co-advisors, Dr. Yot Teerawattananon and Dr. Anurach Kulvanitchaiyanunt for their valuable times that they had spent helping me and their valuable suggestions while I was working on my thesis. I also would like to thank my external examiner, Assistant Professor Lily Ingsrisawang for her kindness in providing suggestions during thesis defense.

My sincere appreciation goes to all staffs at the Department of Obstetrics and Gynecology, Pranungkloa Hospital for their helpful and warmly support during data collection. My special appreciation is expressed to all Health Intervention and Technology Assessment Program (HITAP) colleagues for their valuable suggestions, helpfulness and knowledge on my thesis.

I would also like to thank all professors and friends at the Division of Social and Administrative Pharmacy, Department of Pharmacy, Faculty of Pharmacy, Mahidol University for their valuable helpfulness and friendship during my master study.

Last but not least, special love and thanks to my mother and my family for their caring, encouragement and understanding throughout my life which help enhancing my thesis completion.

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HEALTH TECHNOLOGY ASSESSMENT ON LAPAROSCOPIC SURGERY IN THAILAND: A CASE STUDY OF HYSTERECTOMY

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ABSTRACT

The aims of this study were divided into two parts: (1) to assess the utilization of laparoscopic surgery (LS) and determine the factors associated with the provision of LS in most common diseases using a nationwide database analysis and (2) to compare the value in monetary terms of laparoscopically assisted vaginal hysterectomies (LAVH) with total abdominal hysterectomies (TAH) using an economic evaluation model.

For the first part, hospitalization data of patients undergoing LS were obtained from the Central Office for Healthcare Information. The database contained 686,553 admissions with principle diagnoses related to LS from January 2005 to December 2007. Descriptive analyses and binary logistic regression models were used to analyze the data. For the second part, the study population was Thai women required to undergo a hysterectomy with or without bilateral salpingo-oophorectomy and without malignant conditions. A decision tree model was constructed to estimate the relevant costs and health outcomes (i.e. quality adjusted life years, QALYs) over a one-year time horizon using both societal and governmental perspectives. The costs were determined in 2009 using Thai Baht (THB). The results were presented as an incremental cost–effectiveness ratio (ICER) in THB per QALY gained.

There were a total of 24,175 hospitalizations (3.52%) with LS. The proportion of Civil Servant Medical Benefit scheme patients undergoing LS (7.8%) was higher than that of Universal Coverage scheme patients (2.68%). The provision of LS was associated with age, gender, principal diagnosis, admission year, hospital characteristics and type of insurance. Patients' health insurance scheme (i.e., CSMBS) was the most significant factor associated with the use of LS.

The ICER of LAVH versus TAH was 1,119,000 and 1,557,000 THB per QALY gained using the societal and government perspectives, respectively. With a willingness to pay 100,000 to 300,000 THB per QALY, LAVH was considered an ineffective cost option. This is because LAVH offers only a marginal benefit, but at a much higher cost, compared to TAH.

KEY WORDS: HEALTH TECHNOLOGY ASSESSMENT / LAPAROSCOPIC SURGERY / HYSTERECTOMY / ECONOMIC EVALUATION

83 pages

การประเมินเทคโนโลยีด้านสุขภาพของการผ่าตัดผ่านกล้องสำหรับประเทศไทย: กรณีศึกษาการผ่าตัดมดลูก
HEALTH TECHNOLOGY ASSESSMENT ON LAPAROSCOPIC SURGERY IN THAILAND: A CASE STUDY OF HYSTERECTOMY

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บทคัดย่อ

การศึกษานี้แบ่งวัตถุประสงค์การศึกษาออกเป็น 2 ส่วน คือ (1) การวิเคราะห์โดยใช้ฐานข้อมูลระดับประเทศเพื่อประเมินการเข้าถึงบริการการผ่าตัดผ่านกล้อง และเพื่อค้นหาปัจจัยที่มีผลต่อการเข้าถึงบริการการผ่าตัดผ่านกล้องในโรคที่มีความสำคัญในประเทศไทย และ (2) การประเมินความคุ้มค่าทางเศรษฐศาสตร์ของการผ่าตัดผ่านกล้องเปรียบเทียบกับการผ่าตัดแบบเปิดหน้าท้องในการผ่าตัดมดลูก สำหรับการศึกษาในส่วนแรกนั้นใช้การวิเคราะห์ฐานข้อมูลผู้ป่วยในที่ได้รับการผ่าตัดผ่านกล้องจากสำนักงานกลางสารสนเทศบริการสุขภาพ ตั้งแต่วันที่ 1 มกราคม พ.ศ. 2548 ถึง 31 ธันวาคม พ.ศ. 2550 โดยใช้การวิเคราะห์ทางสถิติเชิงพรรณนาและสมการถดถอยโลจิสติกส์ สำหรับการประเมินความคุ้มค่าทางเศรษฐศาสตร์ของการผ่าตัดมดลูก เป็นการวิเคราะห์ต้นทุน-อรรถประโยชน์ (ปีสุขภาวะ) ที่เกิดขึ้นเป็นเวลาหนึ่งปีของผู้ป่วยเพศหญิงที่ต้องได้รับการผ่าตัดมดลูกออกทั้งหมด ซึ่งอาจรวมถึงการผ่าตัดรังไข่และท่อนำไข่ เพื่อการรักษาโรคทางสูตินารีที่มิใช่โรคมะเร็ง เป็นการวิเคราะห์โดยใช้แบบจำลองการตัดสินใจทางเศรฐศาสตร์ (Decision Tree Model) ในมุมมองของสังคมและมุมมองของรัฐบาล

ผลการศึกษาพบว่าจำนวนครั้งของการนอนโรงพยาบาลของผู้ป่วยที่ได้รับการผ่าตัดผ่านกล้องรวมทั้งหมด 24,175 ครั้ง (ร้อยละ 3.52) ผู้ป่วยสิทธิสวัสดิการข้าราชการ (ร้อยละ 7.8) สามารถเข้าถึงบริการการผ่าตัดผ่านกล้องมากกว่าผู้ป่วยสิทธิประกันสุขภาพถ้วนหน้า (ร้อยละ 2.68) การเข้าถึงบริการการผ่าตัดผ่านกล้องมีความสัมพันธ์กับเพศ อายุ ชนิดของโรค ปีที่ทำการรักษา ชนิดของโรงพยาบาล และสิทธิการรักษาพยาบาล โดยเฉพาะผู้ป่วยสิทธิสวัสดิการข้าราชการเป็นปัจจัยที่มีความสำคัญมากที่สุดต่อการเข้าถึงบริการการผ่าตัดผ่านกล้อง อัตราส่วนต้นทุนต่อปีสุขภาวะที่เพิ่มขึ้นของการผ่าตัดผ่านกล้องในการผ่าตัดมดลูกเมื่อเทียบกับการผ่าตัดแบบเปิดหน้าท้องมีค่าเท่ากับ 1,119,000 บาท ในมุมมองทางสังคมและ 1,557,000 บาท ในมุมมองของรัฐบาล หากพิจารณาความเต็มใจที่จะจ่าย 100,000-300,000 บาทต่อปีสุขภาวะที่เพิ่มขึ้น การผ่าตัดผ่านกล้องในการผ่าตัดมดลูกไม่มีความคุ้มค่าเมื่อเทียบกับการผ่าตัดแบบเปิดหน้าท้องในบริบทของประเทศไทย

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LIST OF ABBREVIATIONS

AH	=	Abdominal hysterectomy
CHI	=	Central office for Healthcare Information
CI	=	Confidence Interval
CPI	=	Consumer price index
CSMBS	=	Civil Servant Medical Benefit scheme
ICD-10	=	Principal diagnosis code
ICER	=	Incremental cost–effectiveness ratio
LAVH	=	Laparoscopically assisted vaginal hysterectomy
LC	=	Laparoscopic cholecytectomy
LS	=	Laparoscopic surgery
NHS	=	National Health Service
NHSO	=	National Health Security Office
OR	=	Odd Ratio
PSA	=	Probabilistic sensitivity analysis
QALYs	=	Quality adjusted life years
QoL	=	Quality of life
SE	=	Standard Error
TAH	=	Total abdominal hysterectomy
THB	=	Thai Baht
UC	=	Universal Coverage
VAS	=	Visual analog scale
VH	=	Vaginal hysterectomy
WMD	=	Weighted mean difference
WTP	=	Willingness to pay

CHAPTER I
INTRODUCTION

Laparoscopic surgery (LS) is a modern surgical technique in which operations in the abdomen are performed through small incisions for treatment and diagnosis. As compared to larger incisions needed in traditional surgical procedures, the patients with LS had smaller incisions and less blood loss which leads to better quality of life.

The first incidental laparoscopic appendectomy was performed by Semm in 1981 and the first laparoscopic cholecytectomy in humans was operated by Mühe in 1985. In March 1987, Philippe Mouret in France removed a diseased gallbladder from a patient during a gynecologic laparoscopic procedure (1). There are a number of advantages to the patients with LS compared with an open procedure such as shorter duration of hospital stay, reduced pain and shorter recovery time (2-5). Moreover, some economic evaluation studies showed that LS was more cost-effective than traditional surgery in hernia repair, hysterectomy and colorectal cancer (2, 6-8).

In Thailand, several recent clinical studies have demonstrated that LS is safe, feasible, and associated with many short-term benefits compared with open surgery (9-12). However, LS is more expensive. Currently, the reimbursement method and rate are different among health insurance schemes. In addition, empirical evidences demonstrated an unequal access to LS amongst different type of patients' health insurance in Thailand. Most common diseases among Thai patients undergoing LS were diseases of gallbladder and gynecology. Laparoscopic cholecytectomy (LC) was first introduced in 1993 in Thailand. In 2001, LC accounted for only 17% of the overall rate of cholecystectomy (13). Unsurprisingly, only 13% of patients under the Universal Coverage Scheme (UC) that applies to approximately 80% of the Thai population had LC. This proportion was the lowest across public health insurance schemes. On the other hand, about 28% of patients under the Civil Servant Medical

Benefit Scheme (CSMBS) which covers government employees and their relatives had LC, since some certain surgical procedures such as LC could be reimbursed. However, there have been very limited studies on the access to LS among patients under different health insurance schemes. Moreover, no study has reported the factors associated with the use of LS in nationwide level yet.

In addition, the cost-effectiveness studies comparing LS and traditional surgery in Thailand have been still very limited. Only one study on the cost-utility analysis of LS compared with conventional open cholecystectomy in Thailand has been conducted. It revealed that the incremental cost per QALY was 144,692 Thai Baht (THB) under a governmental perspective and 86,464 THB under a societal perspective (13). This could be explained that LS would be considered as a cost-effective strategy regarding to a threshold of one to three times of gross domestic product (GDP) per capita (i.e., 100,000-300,000 THB) recommended by the subcommittee of the development of benefit package and service system, the National Health Security Office (NHSO) (14).

Furthermore, hysterectomy is one of the most frequently performed surgical procedure in gynecology (15). Traditionally, most hysterectomies have been abdominally performed. Nevertheless, laparoscopically assisted vaginal hysterectomy (LAVH) is becoming more popular because LAVH was less painful, had a shorter length of hospital stay and quicker return to work but more costly than total abdominal hysterectomy (TAH) (16). In Thailand, LAVH was introduced 10 years ago, but did not receive much attention, since there has been lack of laparoscopic surgeons. Until recently, there has been no study on cost-effectiveness analysis comparing LAVH and TAH in Thailand yet.

Therefore, this study aimed to evaluate the utilization of LS between patients under CSMBS and those under UC as well as the cost-effectiveness of LS in health insurance system in Thailand. The NHSO had required economic evaluation information to consider whether new health technology (i.e. LS) should be included in the benefit package of UC scheme. The results from economic evaluation in this study could be used as the information for policy decision making.

Objectives

1. To evaluate the utilization of LS between the patients under health insurance schemes in Thailand (i.e. CSMBS and UC)

2. To investigate the factors associated with the provision of LS in most common diseases

3. To compare the cost-effectiveness of hysterectomy between LS versus traditional surgical procedure in the most common disease (i.e. diseases of gynecology) in Thailand.

Expected outcomes and Benefits

Although LS has been provided for CSMBS, LS has not yet been included in the benefit package of UC health insurance scheme. In fiscal year 2008, the Health Insurance System Research Office (HISRO) had required an economic evaluation data of patients undergoing LS to consider whether LS should be included in the benefit package of UC scheme. The results from this study could be used to provide the information for policy decision making to support resource allocation decision and lead to organizational changes in the alternative treatment.

Definition of terms

Laparoscopic surgery (LS)

Laparoscopic surgery (LS), also called minimally invasive surgery (MIS) is a modern surgical technique in which operations in the abdomen are performed through small incisions (usually 0.5-1.5 cm) as compared to larger incisions needed in traditional surgical procedures.

Hysterectomy

Hysterectomy is the surgical removal of the uterus, usually performed by a gynecologist. It is the most commonly performed gynecological surgical procedure.

Total abdominal hysterectomy (TAH)

Total abdominal hysterectomy (TAH), traditional surgical procedure has been performed complete removal of the uterus including the corpus and cervix via the abdominal incision.

Laparoscopically assisted vaginal hysterectomy (LAVH)

Laparoscopically assisted vaginal hysterectomy (LAVH), the laparoscopic techniques is performed such that the final removal of the uterus (with or without removal of the ovaries) was via the vaginal canal. Thus, LAVH is also a total hysterectomy, namely, the cervix must be removed with the uterus.

Incremental cost-effectiveness ratio (ICER)

The alternatives are compared on the basis of the increments in costs and effectiveness**,** calculated by incremental cost divided by incremental effectiveness.

$$ICER = (C_L - C_T)/(E_L - E_T)$$

Where,

C_L = LAVH cost

C_T = TAH cost

E_L = LAVH effectiveness

E_T = TAH effectiveness

Conceptual framework

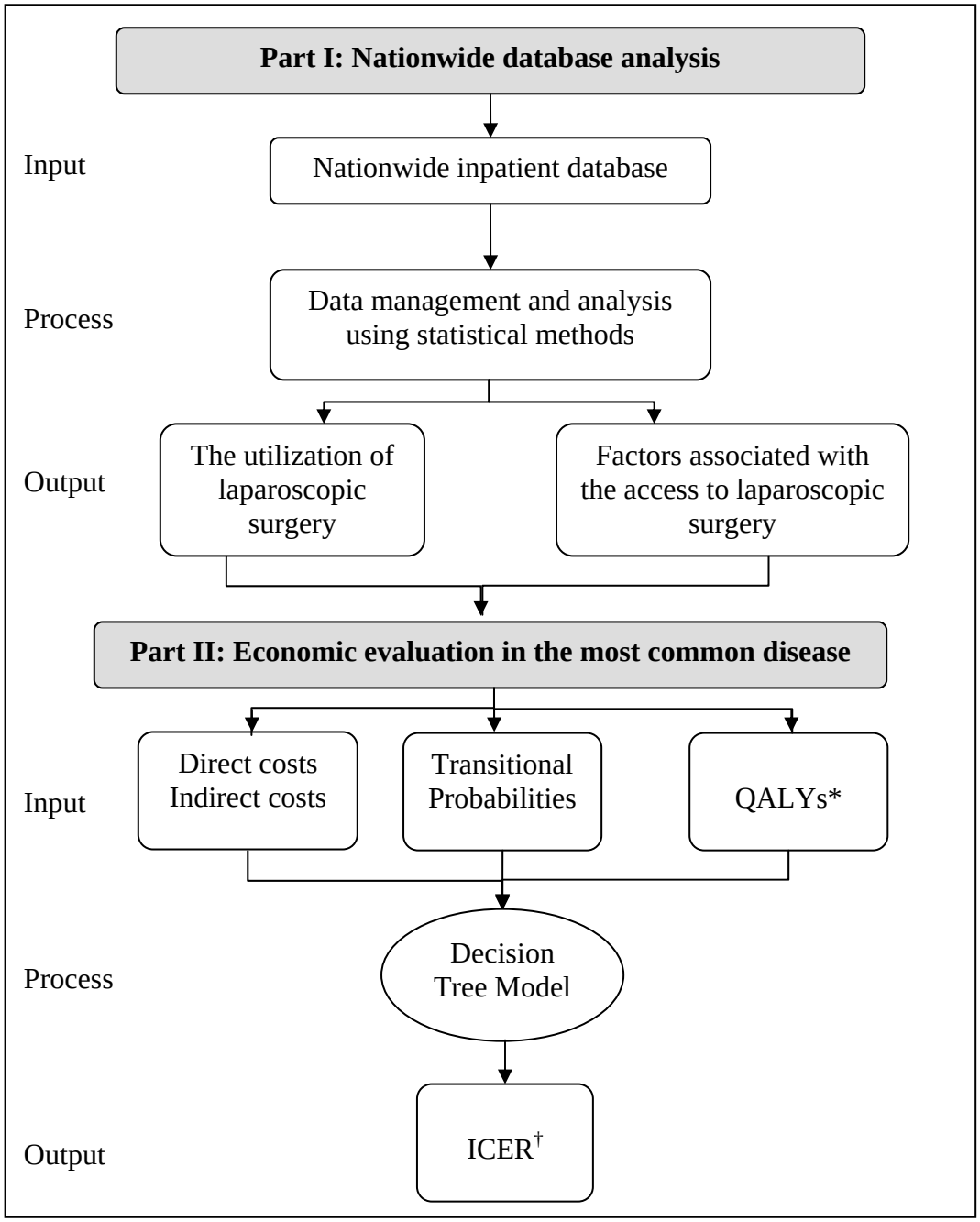


Figure 1 The conceptual framework of the economic evaluation and budget impact analysis

*****QALYs=quality adjusted life years

† ICER=Incremental cost-effectiveness ratio

CHAPTER II
LITERATURE REVIEW

Five parts of literature reviews are presented as follows :

Part I presents the description of LS including its history, procedure, and advantages.

Part II describes the description of hysterectomy.

Part III demonstrates the clinical effectiveness of interventions for hysterectomy patients.

Part IV describes economic evaluation for health care program

Lastly, part V is about the literature review of economic evaluation of interventions for hysterectomy patients**.**

Part I Description of laparoscopic surgery

1.1 History of laparoscopic surgery

LS, also called minimally invasive surgery (MIS) is a modern surgical technique in which operations in the abdomen are performed through small incisions (usually 0.5-1.5 cm) as compared to larger incisions needed in traditional surgical procedures. LS includes operations within the abdominal or pelvic cavities.

In 1902 Georg Kelling, a surgeon of Dresden, Germany, reported the first laparoscopic procedure in a living anesthetize dog and in 1910 H.C. Jacobeus in Sweden reported the first laparoscopic operation in humans (1). The first incidental laparoscopic appendectomy was performed by Semm in 1981 and the first LC in humans was operated by Mühe in 1985. In March 1987, Philippe Mouret in France removed a diseased gallbladder from a patient during a gynecologic laparoscopic procedure (1). In 1989, Harry Reich firstly described his laparoscopic hysterectomy

technique (17). Moreover, the earliest report of laparoscopic colon resections was written by Moises et al in 1991 (1). Operative laparoscopy has surprisingly advanced for the last ten years. Several operative procedures have been performed by this new approach. There are a number of advantages to the patients with LS versus an open procedure. These include reduced hemorrhaging, reduced pain and shorter recovery time.

In Thailand, LC was firstly introduced in 1993 (13). The advent of laparoscopic cholecytectomy was the single most important stimulus to the expansion of operative laparoscopy in surgery. Over the past two decades, advances in the laparoscopic equipment and minimally invasive techniques, within a short time period and various operative procedures have been performed laparoscopically including splenectomy, herniorrhaphy, adrenalectomy, nephrectomy, appendectomy, prostatectomy and colectomy (9-13, 18).

1.2 Procedure of laparoscopic surgery

The key element in LS is the use of a laparoscope. There are two types: (1) a telescopic rod lens system, that is usually connected to a video camera (single chip or three chip), and (2) a digital laparoscope where the charge-coupled device is placed at the end of the laparoscope, eliminating the rod lens system. A fiber optic cable system was connected to a 'cold' light source (halogen or xenon) to illuminate the operative field and inserted through a 5 mm or 10 mm cannula which is a tube that can be inserted into the body for the delivery or removal of fluid, or trocar, which is often passed inside a cannula and functions as a portal for the subsequent placement of other devices, to view the operative field (19).

The abdomen is usually insufflated, or essentially blown up like a balloon, with carbon dioxide gas (CO_2). This elevates the abdominal wall above the internal organs like a dome to create a working and viewing space. CO_2 is used because it is common to the human body and can be absorbed by tissue and removed by the respiratory system (19). It is also non-flammable, which is important because electrosurgical devices are commonly used in laparoscopic procedures.

1.3 Advantages and risks of laparoscopic surgery

The advantages of LS are reduced blood loss, reduced pain, faster postoperative recovery, shorter duration of hospital stay, lower intraoperative blood loss and smaller drop in hemoglobin level, decreased postoperative febrile morbidity, fewer wound or abdominal wall infections and faster return to normal activity (16).

The risks of LS are longer operating time, bowel injuries, vascular injuries, urinary tract injuries, abdominal pain after laparoscopy (16). Many patients with existing pulmonary disorders may not tolerate pneumoperitoneum (gas in the abdominal cavity), resulting in a need for conversion to open surgery after the initial attempt at laparoscopic approach.

Part II Description of hysterectomy

2.1 The indications for hysterectomy

Hysterectomy is the surgical removal of the uterus, usually performed by a gynecologist. It is the most frequently performed major surgical procedure in gynecology. Hysterectomy has a wide range of indications. The most common indications of hysterectomy are usually indicated for benign diseases i.e. leiomyomas, abnormal uterine bleeding (AUB), endometriosis, pelvic relaxation, pelvic pain and endometrial hyperplasia (15).

2.2 Approach for hysterectomy

The approach for hysterectomy depends on the surgeon’s expertise, the indication for surgery, the nature of the disease, patient’s characteristics, and patient’s choice. Each case must be individualized. Options include vaginal hysterectomy, laparoscopic assisted vaginal hysterectomy (LAVH), laparoscopic supracervical hysterectomy (LSH), total laparoscopic hysterectomy (TLH), and abdominal hysterectomy (subtotal, total or radical).

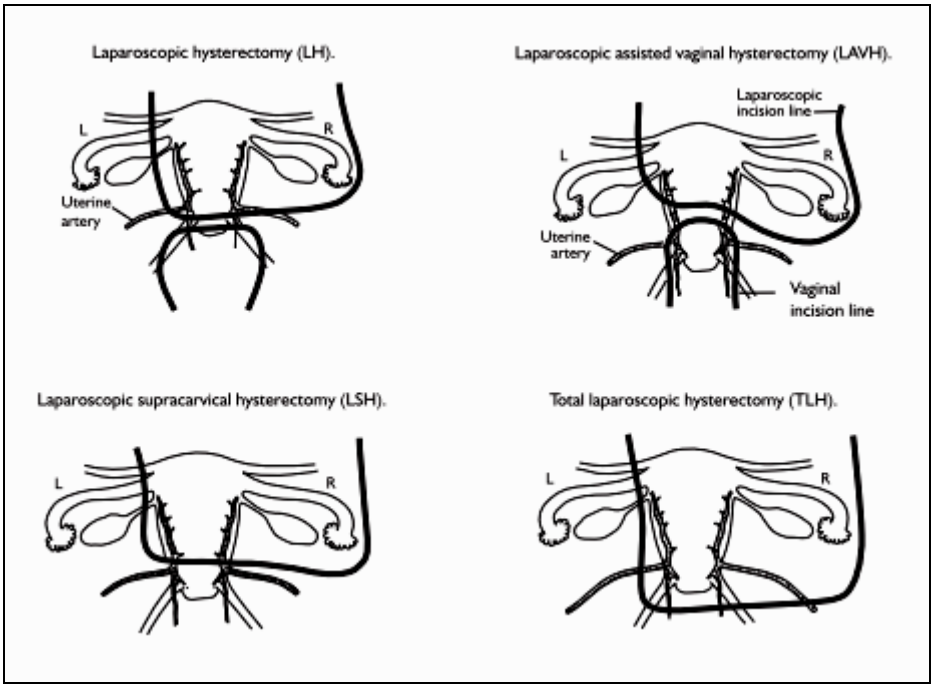


Figure 2 Diagrams of types of laparoscopic hysterectomy (20)

The vaginal route should be considered as the first choice for all benign indications. The laparoscopic approach should be considered when it reduces the need for a laparotomy (16)**.** However, in Thailand, standard treatment for hysterectomy is total abdominal hysterectomy (TAH). The most common procedure among laparoscopic groups is laparoscopically assisted vaginal hysterectomy (LAVH) (18, 21).

Part III Clinical effectiveness of interventions for hysterectomy patients

The aim of this study was to compare the cost and effectiveness between LAVH and TAH. Thus, the literatures on clinical effectiveness of both procedures which are specifically recommended for hysterectomy patients were reviewed.

With the majority of hysterectomies being performed in order to improve the patient's quality of life rather than to cure life-threatening conditions,

hysterectomy was considered as a safe procedure with a mortality rate of less than 0.1% (22). The risk of urinary tract injury reported was approximately is 0.5% to 3% (23). Fever was the most common perioperative complication occurring in 25% of cases, and bleeding requiring blood transfusion occurred less than 10% of all hysterectomies (24).

From the meta-analysis study (2006) of a Cochrane review reported that compared to TAH, the benefits of LAVH were shorter operation time {weighted mean difference (WMD) 7.6 min., 95% confidence interval (CI)=3.0 to 12.2 min.}, shorter duration of hospital stay (WMD 2 day, 95%CI=1.9 to 2.2 days), quicker return to normal activity (WMD 13.6 day, 95%CI=11.8 to 15.4 days), fewer wound infection (OR=0.32) and more urinary tract injuries {Odd Ratio (OR)=2.61} (16). Therefore, patients with LAVH had higher quality of life (QoL) due to fewer complications (i.e. organ injuries, infection, and hemorrhages) compared to TAH.

Eighty patients were given ad hoc questionnaires to evaluate the number of days that they can return to normal activities over a 6-week postoperative period (25). Laparoscopic hysterectomy with bilateral salpingo-oophorectomy as opposed to open hysterectomy with bilateral salpingo-oophorectomy resulted in an earlier return to normal activities. Ellström et al administered the SF-36 to 76 patients. After operation for three weeks, the laparoscopic group had significantly better scores in physical functioning, role-physical, bodily pain, and social functioning (26). At the end of follow-up, 12 weeks after surgery, there were no significant differences between the two patient groups.

Lumsden et al used the EuroQol Health Questionnaire (EuroQol HQ) to collect the data from 166 hysterectomy patients (27). The groups were compared 1, 6, and 12 months after surgery, but there were no significant differences in QoL. Falcone et al obtained the data from 48 patients using an ad hoc questionnaire and visual analog scale (VAS) for pain and activity after operation for 6 weeks (28). The laparoscopic group reported a shorter duration of fatigue and an earlier return to work. Schütz et al used an ad hoc questionnaire for QoL evaluation and the VAS for pain (29). A total of 35 patients were followed up for 12 months. The laparoscopic group had less postoperative pain and reported greater satisfaction with the operation. Thus,

laparoscopic assisted hysterectomy could improve QoL more than abdominal hysterectomy, but long-term results of QoL status were similar.

Also, the EVALUATE hysterectomy trial comprised two parallel randomized multicenter trials: one comparing laparoscopic with abdominal hysterectomy (AH) and the other comparing laparoscopic with vaginal hysterectomy(VH) for nonmalignant disease (20). The EuroQoL Instrument (EQ-5D) was used to collect the data from 1,346 hysterectomy patients. The QoL data were completed by patients at randomization, preoperatively and then by postal questionnaire at 6 weeks, 4 months and 1 year. Table 1 shows mean QALYs per arm of the trial over a period of 1 year. The utility was scored by 0 (equivalent to dead) to 1 (equivalent to good health). The QALYs over one year were calculated. The differences in QALY were very small and none of which reached conventional levels of statistical significance.

Table 1 Health outcomes measured in the EVALUATE trial: responses to the EQ-5D and QALYs (20)

	Vaginal trial				Abdominal trial			
	VLH (*n* = 324)		VH (*n* = 163)		ALH (*n* = 573)		AH (*n* = 286)	
	Mean	Median (IQR)	Mean	Median (IQR)	Mean	Median (IQR)	Mean	Median (IQR)
EQ-5D utilities								
Baseline	0.746	0.760 (0.725–1)	0.758	0.796 (0.691–1)	0.716	0.760 (0.691–0.848)	0.690	0.725 (0.689–0.812)
6 weeks	0.875	0.907 (0.812–1)	0.852	0.863 (0.76 – 1)	0.832	0.869 (0.76–1)	0.833	0.883 (0.76–1)
4 months	0.911	0.971 (0.848–1)	0.918	0.959 (0.848–1)	0.886	0.959 (0.812–1)	0.866	0.888 (0.796–1)
1 year	0.920	1 (0.881–1)	0.917	1 (0.861–1)	0.897	0.929 (0.848–1)	0.892	0.959 (0.822–1)
QALYs over 1 year[a]	0.899		0.897		0.870		0.862	
Differential QALYs over 1 year[b]	0.0015				0.007			
95% CI[c]	–0.015 to 0.018				–0.008 to 0.023			

[a] Adjusting for baseline EQ-5D utility.
[b] Laparoscopic-assisted minus standard.
[c] 95% non-parametric CI based on 1000 bootstrap replications.

Part IV Economic evaluation for health care program

There are generally four types of full economic evaluation in health care program (30, 31):

1. Cost-Minimization Analysis (CMA)
2. Cost-Benefit Analysis (CBA)
3. Cost-Effectiveness Analysis (CEA)
4. Cost-Utility Analysis (CUA)

The main difference between four types of full economic evaluation is how the outcomes to the individual are measured and valued.

Cost minimization analysis (CMA)

In cost minimization, the effect of the alternative interventions on the individuals' health-related quantity and quality of life are assumed to be equal. In these studies, all other resource consequences are measured in monetary terms. Some of these resource consequences such as reduced future levels of crime or health care costs can be seen as "benefits" of the intervention, whereas other aspects such as the direct costs of the interventions can be clearly defined as "costs." Published studies vary in the name given to some of the non-individual "benefits" — in some studies these are considered as part of the cost calculations but as benefits these sums are subtracted from other costs to give a net costs total.

If two interventions have the same individual health effects, then the one which can be judged as the most value for money will be the intervention which minimizes the net costs. It is, however, a strong assumption to assume that individual health effects are the same between two or more alternative treatments (or treatment scenarios if more complex questions are being posed). It would be an even stronger assumption to include all other benefits of treatment as equal. The advantage of the cost minimization approach is that the measurement problem is reduced to only examining resource consequences. However, the assumptions are difficult to justify prior to any experimental study.

Cost-benefit Analysis (CBA)

In cost-benefit analysis, all individual benefits are measured in monetary terms. This means that all costs and consequences are measured in the same units. The method is useful when there are a wide range of diverse outcomes associated with the treatments being evaluated. Because the results can be expressed in terms of whether the monetary value of benefits outweighs the costs, such studies are often seen to provide more powerful arguments for implementing programs (or not) than other forms of economic evaluation. However, the relevance of any study to decision-making depends on the alternative options being evaluated and the scope of the evaluation. Measuring health gains in monetary terms is sometimes viewed as problematic. For example, market values of the value of life, based on foregone earnings have been thought to undervalue some groups in society, particularly older and poorer people. This method of valuation is now rarely used.

Cost-effectiveness Analysis (CEA)

The majority of the published economic evaluation studies have been cost-effectiveness analysis. In this type of economic evaluation, the effect of treatment is measured in a single natural health unit. Costs and other consequences also are measured in monetary terms in the same way as for cost minimization analysis. The requirement for an economic study to have a single and principal outcome measure is needed to construct some cost-effectiveness ratio indicating the net costs required for each unit of outcome. For some health care interventions, the natural health unit outcome measure may be best reflected by deaths avoided or gains in life years.

The choice of outcome measure not only affects the validity of the study. To illustrate the use of cost-effectiveness studies, consider the following example of the effectiveness of brief interventions compared to a control intervention for those drinking alcohol above a low risk level. In this example, both costs and effects are measured as the excess over the control intervention.

Cost-utility Analysis (CUA)

All resources have an opportunity cost: opportunities to do something different with resources are lost when resources are committed in a certain direction. Within health care, there is a need to make decisions on the balance of resources, for example, between terminal care and prevention interventions. Such comparisons, however, require some common outcome measures that can incorporate quantity and quality of life changes. Such measures can be seen as measures of utility (or value of health) to individuals.

Drummond et al (31) suggest this method should be used when quality of life is the important outcome. Cost-utility studies might involve the evaluation of social care programs designed to help individuals who have been in long-term residential programs. Or, it might be used to compare interventions that have effects both on the length and quality of life. Finally, there are those programs that have a range of different outcomes arising from interventions and some common measure is required to make comparisons between them.

There are a number of different aspects to constructing and using health utility measures in economic evaluations. It is necessary to identify, measure, and value the health gains from any extension of life and improved quality of life. Some treatments may improve both aspects, but others may influence only the length of life or the quality of life. Whereas cost-effectiveness studies measure the outcome a particular point in time, for example one year after treatment ends, cost-utility measures must estimate how long the treatment effects will last.

Most cost utility studies measure quality adjusted life years (QALYs) among their participants. A QALY is based on the idea that categorizing people merely as “alive” or “dead” (i.e., quantity of life) does not capture adequately multiple states of health, or quality of life, which exist in individuals’ lives following treatment. QALYs assign the score of 1.0 to a (hypothetical) person who is in a state of perfect health. Then, deductions from 1.0 are taken for different symptom reports while answering quality of life questions.

Note that not all QALYs are calculated in the same way. Scoring for different questionnaires may be based on different ideas about what constitutes quality

of life. Utility scores are obtained through direct assessments using techniques such as standard gamble (SG), time-trade off (TTO), and visual analog scale (VAS), or by using multi-attribute systems such as the Health Utilities Index (HUI) or EuroQol (EQ-5D) (32). Based on the Thai Health Technology Assessment (HTA) guideline, CUA was recommended to be a method of choice. However, CEA could be used, especially when only intermediate outcomes of compared alternatives are available (33).

Part V Economic evaluation of interventions for hysterectomy patients

The economic study by Lumsden et al reported that total cost of LAVH to the National Health Service (NHS) was significantly higher than TAH (£2,112 vs. £1,667) (27). There was no significant difference in the change of patient's present health state before surgery at one month, six months or a year after surgery.

Moreover, Lenihan et al revealed that direct hospital costs and indirect costs (time to return to normal function, time to return to work, and time away from work required by other family members) of LAVH, TAH and total vaginal hysterectomy (TVH). In a comparison, direct hospital costs of LAVH were $16,459 and TAH were $14,027. The actual reimbursement was the greatest for LAVH ($9,194) and that of TAH was $8,825 (34). For most patients, LAVH provides a minimally invasive way to accomplish a hysterectomy with a lower cost to employers (payers) on the basis of lost work hours.

The EVALUATE hysterectomy trial reported that an incremental cost per QALY gained of LVH vs. VH was £267,333 ($471,789; €380,437) (Table 1, 2). The probability of laparoscopic hysterectomy being cost-effective was below 50% for a large range of willingness to pay for an additional QALY (Figure 3). In addition, an incremental cost per QALY gained of LH versus AH was £26,571 ($46,893; €37,813). If the NHS is willing to pay £30,000 for an additional QALY, the probability that laparoscopic hysterectomy was cost-effective was 56% (8, 20).(Figure 3**)**

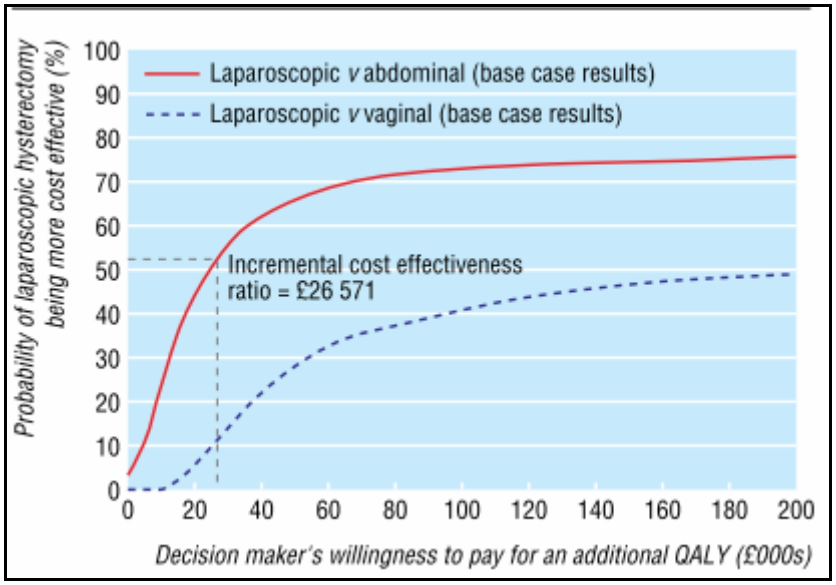
In Thailand, there were two studies estimating only the operative cost of LAVH and TAH. Kulvanitchaiyanunt A reported that the operative cost of LAVH was 11,653.85 ± 1,111.48 THB and that of TAH was 6,424.60 ± 555.09 THB (21). Jaturasrivilai P estimated that the operative cost of LAVH was 26,763.48 ± 2,718.37 THB and that of TAH was 22,345 ± 4,057.40 THB (18).

There has been no cost-effectiveness and cost-utility analysis of LAVH compared to TAH for hysterectomy patients in Thailand yet, and LS has not yet been included in the benefit package of UC scheme. Thus, this study was conducted in order to provide the information for policy decision making.

Table 2 Comparison of costs between laparoscopic and standard hysterectomy (1999-2000 prices,UK £) (8, 20)

	Vaginal trial				Abdominal trial			
	Laparoscopic-assisted hysterectomy (VLH) (n = 324)		VH (n = 163)		Laparoscopic-assisted hysterectomy (ALH) (n = 573)		AH (n = 286)	
	Mean	Median (IQR)	Mean	Median (IQR)	Mean	Median (IQR)	Mean	Median (IQR)
Theatre cost	806.54	635.43 (512.65–919.46)	395.72	361.98 (309.08–420.07)	788.37	646.11 (523.35–890.44)	453.10	430.52 (380.7 – 489.51)
Hospital 'hotel' cost	589.26	542.00 (406.5–677.5)	591.37	542.00 (406.5–677.5)	548.43	542.00 (406.5–677.5)	692.45	677.50 (542–813)
Other postoperative cost	14.20	0.05 (0–0)	17.64	0.00 (0–0)	21.48	0.00 (0–0)	12.74	0.00 (0–0)
Follow-up cost at 6 weeks	143.65	45.75 (0–107.75)	89.32	45.75 (0–107.75)	192.65	45.75 (0–107.75)	127.51	45.75 (0–107.75)
Follow-up cost at 4 months	36.57	0.00 (0–45.75)	46.87	0.00 (0–45.75)	39.46	0.00 (0–45.75)	87.90	0.00 (0–45.75)
Follow-up cost at 1-year	63.78	45.75 (0–45.75)	112.29	45.75 (0–45.75)	115.33	45.75 (0–45.75)	145.88	45.75 (0–45.75)
Total cost	1654.00		1253.20		1705.72		1519.64	
Differential mean cost[a]	400.79				186.08			
(95% CI)[b]	270.54 to 541.50				−25.96 to 375.47			

[a] Laparoscopic-assisted minus standard.
[b] 95% non-parametric CI based on 1000 bootstrap replications.



**ICER (incremental cost effectiveness ratio) for laparoscopic hysterectomy is not shown as it exceeds £200,000

Figure 3 Cost effectiveness acceptability curves for laparoscopic hysterectomy versus conventional hysterectomy (abdominal or vaginal) (8).

CHAPTER III
METHODOLOGY

The methodology of this study was consisted of two parts:

Part I Nationwide Data Analysis

Part II Economic Evaluation of Hysterectomy

Part I Nationwide Data Analysis

1. Data source

The data of inpatients undergoing LS in common diseases in Thailand were obtained from the Central office for Healthcare Information (CHI) from January 2005 to December 2007. The CHI contains data such as demographics (age, gender), principal diagnosis (ICD-10), admission year, type of hospitals and type of health insurance coverage (CSMBS, UC), and reimbursement medical charge. (Appendix A)

2. Selection of patients

All patients were selected with principal diagnoses related to LS.

3. Data management

All hospitalizations with an ICD-9-CM procedure code (35) that corresponded to LS were selected (Table 3). Thirty-eight procedure codes of LS were identified by searching through electronic database.

From Figure 4, from 38 procedure codes were used to retrieve principal diagnosis code of laparoscopic (ICD-10) which covers LS and other procedures. Then, all of the principal diagnosis codes of laparoscopic (ICD-10) at the 90^{th} percentile were selected. (Table 4)

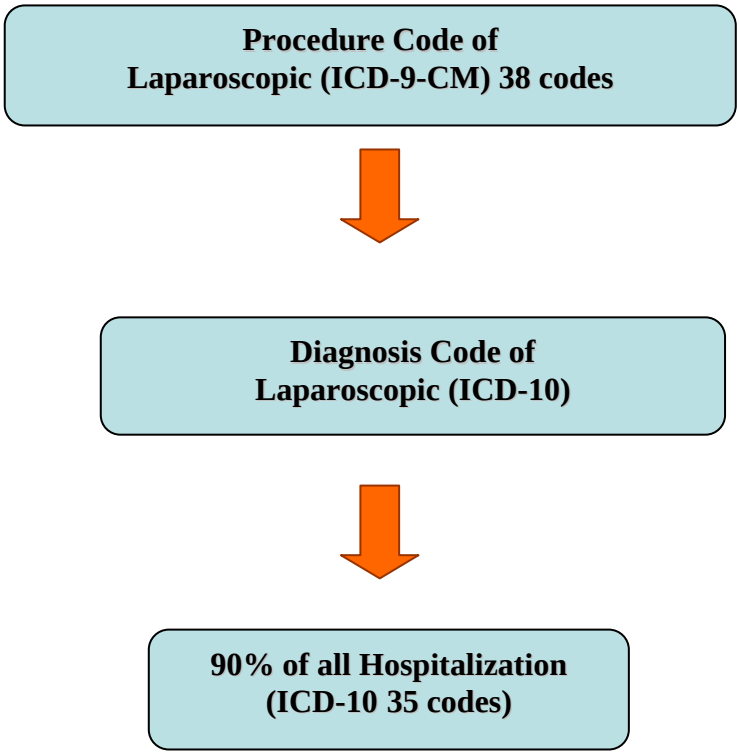


Figure 4 Steps to retrieve the principal diagnosis code of laparoscopic (ICD-10)

Table 3 ICD-9-CM procedure code of laparoscopic surgery (35)

No.	ICD-9 CM	Procedure
1	**4438**	laparoscopic gastroenterostomy
2	**4467**	laparoscopic procedures creation esophagogastric sphincteric competence
3	**4468**	laparoscopic gastroplasty
4	**4495**	laparoscopic gastric restrictive procedure
5	**4496**	laparoscopic revision of gastric restrictive procedure
6	**4497**	laparoscopic removal of gastric restrictive devices
7	**4498**	laparoscopic adjustment size adjustable gastric restrictive
8	**4701**	laparoscopic appendectomy
9	**4711**	laparoscopic incidental appendectomy
10	**5025**	laparoscopic ablation liver lesion tissue
11	**5123**	laparoscopic cholecystectomy
12	**5124**	laparoscopic partial cholecystectomy
13	**5421**	laparoscopy
14	**5451**	laparoscopic lysis peritoneal adhesions
15	**5534**	laparoscopic ablation renal lesion tissue
16	**5903**	laparoscopic lysis perirenal periureteral adhesions
17	**5912**	laparoscopic lysis perivesical adhesions
18	**6501**	laparoscopic oophorotomy
19	**6513**	laparoscopic biopsy ovary
20	**6514**	laparoscopic diagnostic procedures on ovaries
21	**6523**	laparoscopic marsupialization ovarian cyst
22	**6524**	laparoscopic wedge resection ovary
23	**6525**	laparoscopic local excision or destruction of ovary
24	**6531**	laparoscopic unilateral oophorectomy
25	**6541**	laparoscopic unilateral salpingooophorectomy
26	**6553**	laparoscopic removal of both ovaries at same operative episode
27	**6554**	laparoscopic removal of remaining ovary
28	**6563**	laparoscopic removal both ovaries and tubes at same operative episode
29	**6564**	laparoscopic removal remaining ovary tube
30	**6574**	laparoscopic simple suture ovary
31	**6575**	laparoscopic reimplantation ovary
32	**6576**	laparoscopic salpingo-oophoroplasty
33	**6581**	laparoscopic lysis adhesions ovary fallopian tube
34	**6831**	laparoscopic supracervical hysterectomy (LSH)
35	**6841**	laparoscopic total abdominal hysterectomy
36	**6851**	laparoscopically assisted vaginal hysterectomy
37	**6861**	laparoscopic radical abdominal hysterectomy
38	**6871**	laparoscopic radical vaginal hysterectomy (LRVH)

Table 4 Principal Diagnosis code (ICD-10) of laparoscopic surgery

No.	ICD-10	Diseases
1	**C187**	Malignant neoplasm of colon, sigmoid colon
2	**C20**	Malignant neoplasm of rectum
3	**C221**	Intrahepatic bile duct carcinoma
4	**C56**	Malignant neoplasm of ovary
5	**C61**	Malignant neoplasm of prostate
6	**D250**	Submucous leiomyoma of uterus
7	**D251**	Intramural leiomyoma of uterus
8	**D252**	Subserosal leiomyoma of uterus
9	**D259**	Leiomyoma of uterus, unspecified
10	**D27**	Benign neoplasm of ovary
11	**D391**	Neoplasm of ovary
12	**K350**	Acute appendicitis with generalized peritonitis
13	**K359**	Acute appendicitis, unspecified
14	**K409**	Unilateral or unspecified inguinal hernia, without obstruction or gangrene
15	**K565**	Intestinal adhesions [bands] with obstruction
16	**K566**	Other and unspecified intestinal obstruction
17	**K800**	Calculus of gallbladder with acute cholecystitis
18	**K801**	Calculus of gallbladder with other cholecystitis
19	**K802**	Calculus of gallbladder without cholecystitis
20	**K803**	Calculus of bile duct with cholangitis
21	**K804**	Calculus of bile duct with cholecystitis
22	**K805**	Calculus of bile duct without cholangitis or cholecystitis
23	**K810**	Acute cholecystitis
24	**K811**	Chronic cholecystitis
25	**K828**	Other specified diseases of gallbladder
26	**N701**	Chronic salpingitis and oophoritis
27	**N736**	Female pelvic peritoneal adhesions
28	**N800**	Endometriosis of uterus
29	**N801**	Endometriosis of ovary
30	**N803**	Endometriosis of pelvic peritoneum
31	**N809**	Endometriosis, unspecified
32	**N831**	Corpus luteum cyst
33	**N832**	Other and unspecified ovarian cysts
34	**N858**	Other specified noninflammatory disorders of uterus
35	**O001**	Tubal pregnancy

4. Statistical methods

4.1 Descriptive analysis

To compare the utilization of LS among patients under health insurance schemes in Thailand, the database from the CHI from January 1, 2005 to December 31, 2007 were used in the analysis. The Statistic Package for Social Science (SPSS version 17.0 for windows software) was used for data analysis.

4.2 Binary logistic regression models

Binary logistic regression analysis was constructed to determine the factors associated with the provision of LS in most common diseases. Most common diseases were top 10 of the provision of LS in 2005. The selected criteria of top 10 diseases were defined as the proportion of CSMBS patients undergoing LS more than 10% and more than 10 persons in the same diseases (see Table 5). Ten Diseases were divided into 3 groups by ICD-10 code as follows.

- Diseases of Gallbladder and cholecystitis (ICD-10 code : K800, K801, K802, K811 and K828)
- Diseases of Subserosal leiomyoma of uterus (ICD-10 code : D252)
- Diseases of Endometriosis (ICD-10 code : N736, N801, N803 and N809)

Dependent variable was the use of LS and six independent variables included age, gender, type of health insurance coverage, principal diagnosis, admission year and type of hospital. Logistic regression models were used to investigate the factors associated with the use of LS. All binary logistic regression models was tested the goodness of fit using Hosmer and Lemeshow test**.** A p–value less than 0.05 was considered as significant level. The SPSS version 17.0 for windows software was used for data analysis.

Table 5 Top 10 diseases of the provision of laparoscopic surgery in 2005

Year	2005					
Scheme	CSMBS[#]			UC**		
	Laparoscopic surgery		Total Admission	Laparoscopic surgery		Total Admission
ICD-10	No. of Admission	Proportion		No. of Admission	Proportion	
K801	530	53.54	990	398	18.54	2,147
K828	15	50.00	30	9	14.29	63
K802	1,009	46.86	2,153	2,082	28.58	7,285
N736	24	44.44	54	43	36.44	118
N803	37	37.76	98	30	15.00	200
N801	176	34.24	514	70	8.30	843
K811	64	33.33	192	95	13.46	706
N809	42	14.33	293	42	5.71	735
K800	82	14.21	577	109	4.27	2,552
D252	24	10.08	238	4	0.93	431

[#]CSMBS**:** Civil Servant Medical Benefit scheme
[**]UC: Universal Coverage scheme

Part II Economic Evaluation of Hysterectomy

1. Study design

This study was performed the cost-utility analysis based on economic model to compare TAH**,** which is the current standard treatment for hysterectomy patients, and LAVH. A decision tree model was used to estimate the relevant costs and health outcomes during one year time horizon**.**

2. Perspective

Cost-utility analysis was performed based on the societal and governmental perspective.

3. Target population

Study population was the women who required a hysterectomy, with or without bilateral salpingo-oophorectomy and non-malignant conditions.

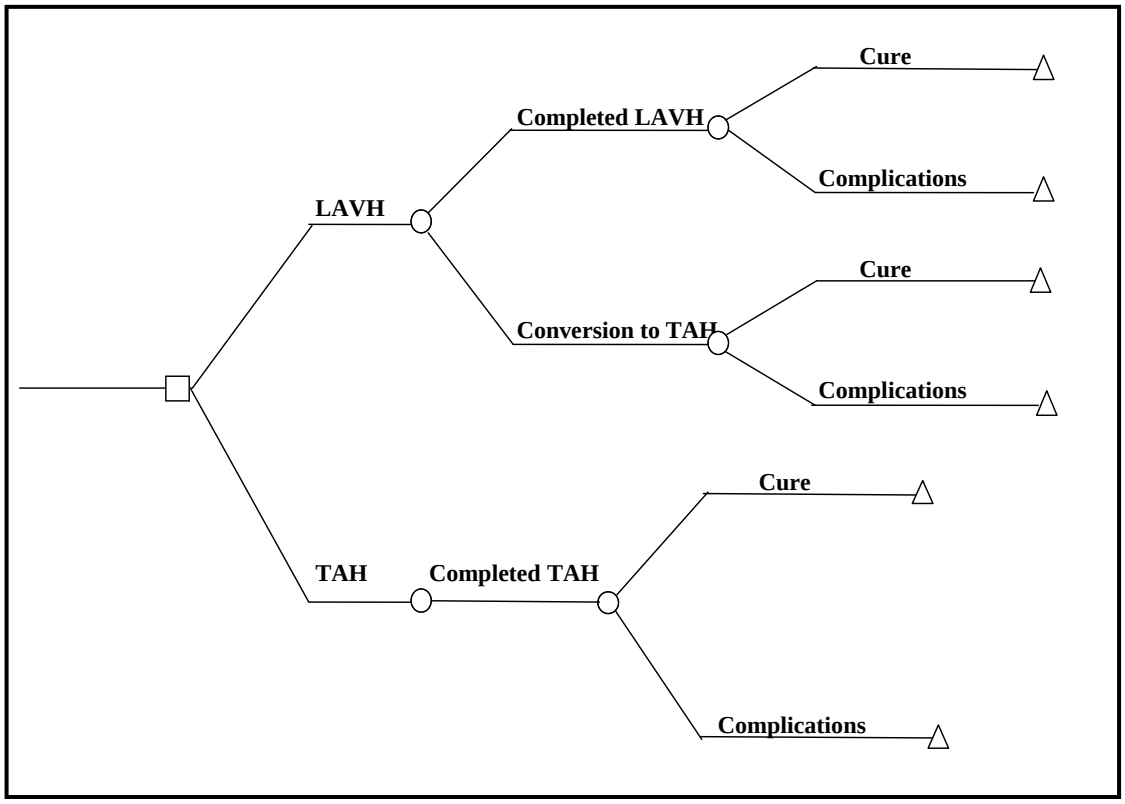
4. Intervention

Total abdominal hysterectomy (TAH), the current standard treatment for hysterectomy patients, was compared to laparoscopically assisted vaginal hysterectomy (LAVH).

5. Economic evaluations

5.1 Model structure

Figure 5 illustrates a structure of decision tree model that was used to estimate the relevant costs and health outcomes during one-year time horizon. The study compared two procedure options: TAH and LAVH.



LAVH : laparoscopically assisted vaginal hysterectomy

TAH : total abdominal hysterectomy

Figure 5 Schematic diagram of the decision tree model

From the decision tree model, the patients were treated by two options (i.e., LAVH and TAH). At the starting point of decision tree, all women who require a hysterectomy, with or without bilateral salpingo-oophorectomy and non-malignant conditions were eligible. All patients were directly assigned either LAVH or TAH. Only those undergoing LAVH, the result might be either successful or unsuccessful (conversion from LAVH to TAH). The final outcome was either cure or having complications.

5.2 Model assumptions

Based on clinical information, the reasonable assumptions of model were needed for analyses. First, both LAVH and TAH had the same mortality rate. Second, the uterine size of patients did not exceed that equivalent to 14 weeks of pregnancy (18, 21). Next, patients had no cardiac or pulmonary disease, no contraindication for gas insufflations, no lithotomy position and no extensive adhesion in the pelvis (18, 21). Finally, patients with obstetric hysterectomy and acute conditions were excluded.

5.3 Transitional probabilities

All parameters (i.e. complication rate, conversion rate) for the model were obtained from nationwide inpatients database in 2007 (CHI database). The inpatient data were identified hysterectomy procedures using codes from the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) (35). Hysterectomy types were identified as follows: TAH (68.4), LAVH (68.51) and laparoscopy (54.21). The “conversion rate” was defined as the number of conversions (i.e., both laparoscopy and TAH codes were presented in the same admission) divided by the number of LAVH cases plus the number of conversions. Surgical and medical complications were identified by using International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) Version for 2007 (36) which were injury, poisoning and certain other consequences of external causes (S00-T98), complications of medical and surgical care (Y40-Y84).

The complication rate of TAH, LAVH and LAVH conversed to TAH were 2.25%, 4.63% and 2.17%, respectively. The conversion rate was 14.07%. (Table 6)

Table 6 Number of admissions with complications and conversion of Hysterectomy in Thailand year 2007

Complications	TAH	LAVH		Total
		LAVH	Conversion	
No	17,417	268	45	17,730
Yes	401	13	1	415
Total	17,818	281	46	18,145
Complication rate	2.25%	4.63%	2.17%	
Conversion rate			14.07%	

LAVH : laparoscopically assisted vaginal hysterectomy

TAH : total abdominal hysterectomy

6. Time Horizon

The costs and health outcomes were estimated during one year time horizon.

7. Ethical Concern

This study was applied for ethical approval and was approved by Mahidol University Institutional Review Board (MU-IRB), Mahidol University and the Ethics Committee of Institute for the Development of Human Research Protections (IHRP), Ministry Public Health, Thailand.

8. Cost measurement

8.1 Direct medical costs

The direct medical costs of surgery (i.e. LAVH and TAH) were derived from the reimbursed charge of CHI database during year 2007. The charge per patient per year was adjusted to cost using the cost to charge ratio of 0.8 (37). The cost values were adjusted to the cost value in 2009 using the consumer price index (CPI) (38). The direct medical cost of LAVH in one year, the patients had the higher than patients undergoing TAH. The average costs of LAVH and TAH were estimated to be 25,967 THB (Standard Error, SE = 609) and 17,877 THB (SE = 55), respectively. (Table 7)

8.2 Direct non-medical and indirect costs

All of direct non-medical and indirect costs were collected from the hyterectomy patients and caregivers' interview at the Department of Obstetrics and Gynecology, Pranungkloa Hospital Hospital during March and June 2010. According to societal perspective, both direct non-medical (i.e. cost of transportation, food, personal facilities, informal care, and time loss due to receiving treatments) and direct medical costs incurred outside hospital were collected and included. Moreover, indirect costs including only morbidity costs were calculated from the productivity loss due to sick leave, while mortality costs were excluded. (Table 7)

Table 7 Direct medical costs, direct non-medical and indirect costs of Hysterectomy in Thailand year 2009 (THB)

Variable	Mean	SE	Ref.
Direct medical care Cost of LAVH	25,967	609	CHI database
Direct medical care Cost of TAH	17,877	55	CHI database
Direct medical care cost of conversion from LAVH to TAH	33,642	845	CHI database
Direct medical care cost of LAVH and treatment complications after laparoscopic surgery	32,495	2,122	CHI database
Direct medical care cost of TAH and treatment complications after open surgery	30,832	1,145	CHI database
Direct medical care cost of treatment complications after conversion from LAVH to TAH	28,569	28,569	CHI database
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing LAVH	426	277	Patients and caregivers interview
Direct non-medical care cost for patients undergoing LAVH (complete)	7,223	1,028	
Indirect cost for patients undergoing LAVH (complete)	5,284	1,085	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing TAH (complete)	267	108	
Direct non-medical care cost for patients undergoing TAH (complete)	7,110	827	
Indirect cost for patients undergoing TAH (complete)	10,584	2,018	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing LAVH (Conversion)	85	85	
Direct non-medical care cost for patients undergoing LAVH (Conversion)	9,775	2,016	
Indirect cost for patients undergoing LAVH (Conversion)	15,258	9,484	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing LAVH (with complication)	100	100	
Direct non-medical care cost for patients undergoing LAVH (with complication)	44,447	31,855	
Indirect cost for patients undergoing LAVH (with complication)	26,804	22,680	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing TAH (with complication)	293	87	
Direct non-medical care cost for patients undergoing TAH (with complication)	16,839	9,935	
Indirect cost for patients undergoing TAH (with complication)	14,278	4,638	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing LAVH (Conversion with complication)	2,400	2,400	
Direct non-medical care cost for patients undergoing LAVH (Conversion with complication)	12,213	12,213	
Indirect cost for patients undergoing LAVH (Conversion with complication)	12,371	12,371	

LAVH : laparoscopically assisted vaginal hysterectomy

TAH : total abdominal hysterectomy

CHI database : the Central office for Healthcare Information (CHI) from January 2007 to December 2007

SE : Standard Error

9. Health outcomes

The health outcome was QALY, the multiplication of utility weight and Life Years (LYs). The utility weights of all treatments were derived from systematic review. A systematic literature search was performed, using both PubMed and Center of Reviews and Dissemination (CRD). Keywords used were {("Quality of life"[Mesh] OR "Quality-Adjusted Life Years"[Mesh] OR "Utility") AND ("laparosc*" OR "abdominal") AND "hysterectomy"}.Inclusion criteria were the QoL presented in utility index (0=death and 1=full health) and measured by time trade-off (TTO), standard gamble (SG), or EQ-5D instruments. Only one eligible study reported that

the incremental QALYs over one year between 573 women were randomized to laparoscopic hysterectomy and 286 to abdominal hysterectomy, using EQ-5D instruments. The EQ-5D is a generic measure of health status, where health is characterized on five dimensions (mobility, self care, ability to undertake usual activities, pain, and anxiety/depression) (39). Bases on women's responses to the EQ-5D at baseline and at three points (six weeks, four months, and over one year) during up to 52 weeks follow up, this study used regression methods adjusted for the differences in baseline EQ-5D utility in estimating mean QALYs in each group.

Table 8 Health outcomes measured in trial comparing different methods of hysterectomy: responses to EQ-5D and quality adjusted life years (QALYs) (8)

	Vaginal trial				Abdominal trial			
	Laparoscopy (n=324)		Vaginal (n=163)		Laparoscopy (n=573)		Abdominal (n=286)	
	Mean	Median (IQR)	Mean	Median (IQR)	Mean	Median (IQR)	Mean	Median (IQR)
EQ-5D utilities								
Baseline	0.746	0.760 (0.725-1)	0.758	0.796 (0.691-1)	0.716	0.760 (0.691-0.848)	0.690	0.725 (0.689-0.812)
Six weeks	0.875	0.907 (0.812-1)	0.852	0.863 (0.76-1)	0.832	0.869 (0.76-1)	0.833	0.883 (0.76-1)
Four months	0.911	0.971 (0.848-1)	0.918	0.959 (0.848-1)	0.886	0.959 (0.812-1)	0.866	0.888 (0.796-1)
One year	0.920	1 (0.881-1)	0.917	1 (0.861-1)	0.897	0.929 (0.848-1)	0.892	0.959 (0.822-1)
QALYs over one year*	0.899		0.897		0.870		0.862	
Differential QALYs over one year† (95% CI)‡	0.0015 (−0.015 to 0.018)				0.007 (−0.008 to 0.023)			

*Adjusting for baseline EQ-5D utility.
†Laparoscopic minus standard.
‡95% non-parametric confidence interval based on 1000 bootstrap replications.

The incremental QALYs for each woman over one year period were small and 95% confidence interval crossed zero. Mean QALYs per patient were higher in patients with laparoscopic hysterectomy (8, 20). The Life Years of LAVH patients and TAH patients were equal to one year.

10. Uncertainty analysis

One way sensitivity analysis and probabilistic sensitivity analysis (PSA) were conducted to examine the effect of uncertainty about parameters in the model using second order Monte Carlo simulation. PSA is a more powerful approach in dealing with uncertainty stemming from several parameters. The values of each

parameter were selected depending on the defined data distribution. Table 9 presents data distribution patterns commonly used for cost- and effectiveness-related parameters.

Table 9 Data distribution for cost and effectiveness parameters

Parameter	Distribution	Nature of data	Posible range
Probability	Beta	Proportion	0 - 1
Utility	Beta	Proportion	0 - 1 (0=death, 1=Full health)
Efficafy or Relative Risk	Log-normal	Ratio	0 - 1, 1 - Positive numbers
Cost	Gamma	Very skew	Positive numbers

In this study, probability distributions were assigned to all parameters such as beta distribution for all probability parameters, gamma distribution for cost parameters and normal distribution for incremental QALYs and cost parameters (Table 10). It should be noted that a normal distribution as assumed for conventional parametric statistic plays a limited role in PSA since most real-world economic and health data do not have normal distribution (40).

The analysis was carried out using Microsoft Office Excel 2003 (Microsoft Corp., Redmond, WA) with macro function. Using simulation by sampling from the distribution of each variable with 1,000 iterations, the analysis was provided the feasible values series of total costs, health outcomes, and incremental cost–effectiveness ratio (ICER) in THB per QALY gained. Consequently, all of them were averaged and expressed in the term of probabilistic value.

In addition, the study was used a net monetary benefit (NMB) to determine the intervention giving the maximum expected NMB for each value of ceiling ratio (i.e., the value of society would be willingness to pay (WTP) for intervention giving one QALY gained). In Thailand, the WTP per QALY gained thresholds for implementing health technology and intervention for policy decision makers (i.e., the Subcommittee for Development of the National List of Essential Drugs and the Subcommittee for Development of the Benefit Packages) are 100,000 THB and 300,000 THB per QALY gained or the one time and three times of the gross domestic

product (GDP) per capita (41, 42). Eventually, the results of the PSA were presented as a cost-effectiveness acceptability curves.

Table 10 Input parameters used in economic model

Parameters	Distribution	mean	se	Ref.
Transitional probability				
probability of conversion from LAVH to TAH	Beta	0.1407	0.0192	
probability of complications among patients undergoing LH	Beta	0.0463	0.0125	
probability of complications among patients conversed from LH to AH	Beta	0.0217	0.0213	
probability of complications among patients undergoing TAH	Beta	0.0225	0.0011	
Cost parameters (calculated in 2009 THB.)				
Direct medical care Cost of LAVH	Normal	25,967	609	CHI Database
Direct medical care Cost of TAH	Normal	17,877	55	
Direct medical care cost of conversion from LAVH to TAH	Normal	33,642	845	
Direct medical care cost of LAVH and treatment complications after laparoscopic surgery	Normal	32,495	2,122	
Direct medical care cost of TAH and treatment complications after open surgery	Normal	30,832	1,145	
Direct medical care cost of treatment complications after conversion from LAVH to TAH	Gamma	28,569	28,569	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing LAVH	Gamma	426	277	
Direct non-medical care cost for patients undergoing LAVH (complete)	Gamma	7,223	1,028	
Indirect cost for patients undergoing LAVH (complete)	Gamma	5,284	1,085	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing TAH (complete)	Gamma	267	108	
Direct non-medical care cost for patients undergoing TAH (complete)	Gamma	7,110	827	
Indirect cost for patients undergoing TAH (complete)	Gamma	10,584	2,018	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing LAVH (Conversion)	Gamma	85	85	
Direct non-medical care cost for patients undergoing LAVH (Conversion)	Gamma	9,775	2,016	
Indirect cost for patients undergoing LAVH (Conversion)	Gamma	15,258	9,484	Patients and caregivers interview
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing LAVH (with complication)	Gamma	100	100	
Direct non-medical care cost for patients undergoing LAVH (with complication)	Gamma	44,447	31,855	
Indirect cost for patients undergoing LAVH (with complication)	Gamma	26,804	22,680	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing TAH (with complication)	Gamma	293	87	
Direct non-medical care cost for patients undergoing TAH (with complication)	Gamma	16,839	9,935	
Indirect cost for patients undergoing TAH (with complication)	Gamma	14,278	4,638	
Direct medical care cost (outside Pranungkloa hospital) for patients undergoing LAVH (Conversion with complication)	Gamma	2,400	2,400	
Direct non-medical care cost for patients undergoing LAVH (Conversion with complication))	Gamma	12,213	12,213	
Indirect cost for patients undergoing LAVH (Conversion with complication)	Gamma	12,371	12,371	
Utility parameter				
Incremental QALYs of case with completed LAVH vs.TAH(assuming the disutility is only for a year)	Normal	0.007	0.0079	[8]

CHAPTER IV
RESULTS

The results of this study were divided into two parts as follows:

Part I Nationwide Data Analysis

1. The utilization of LS
2. Factor associated with the access to LS

Part II Economic Evaluation of Hysterectomy

1. Cost-utility analysis
2. Uncertainty analysis

Part I Nationwide Data Analysis

1. The utilization of laparoscopic surgery

1.1 The utilization of LS versus other procedure

Based on the analysis, the total of 24,175 hospitalizations (3.52%) was operated with LS. The proportion of CSMBS patients undergoing LS (7.8%) was higher than that of UC patients (2.68%). The mean age of patients undergoing LS (49 years) was higher than that of patients undergoing other procedure (44 years). Females were 2 times more than males to perform LS. During 2005-2007, the proportion of hospitalization of patients undergoing LS each year was similar. LS were performed the most at university hospital (9.9%). The provision of LS was significantly associated with age, gender, principal diagnosis, admission year, type of hospitals and type of health insurance coverage (χ2-test: p-value < 0.05). (Table 11)

Table 11 Characteristic of patients undergoing laparoscopic versus other procedure from 2005 to 2007

Variables	Admissions due to laparoscopic procedure (%)	Admissions due to other procedure (%)	p-value
1. Health insurance			0.000
CSMBS[§]	8,815 (7.8)	104,176 (92.2)	
UC*	15,360 (2.7)	558,202 (97.3)	
2. Gender			0.000
Male	6,293 (2.1)	299,793 (97.9)	
Female	17,882 (4.7)	362,585 (95.3)	
3. Mean Age (years)	48.89 (SD=16.3)	44.33 (SD=16.3)	0.000
4. Admission year			0.000
2005	7,188 (3.3)	208,331 (96.7)	
2006	8,545 (3.7)	223,591 (96.3)	
2007	8,442 (3.5)	230,456 (96.5)	
5. Type of hospitals			0.000
Regional hospital	1,242 (0.8)	151,417 (99.2)	
General hospital	8,261 (3.6)	223,917 (96.4)	
Center hospital	6,267 (3.4)	180,228 (96.6)	
University hospital	5,432 (9.9)	49,638 (90.1)	
Private hospital	235 (1.9)	12,378 (98.1)	
Other hospital	2,738 (5.8)	44,800 (94.2)	
6. Principal diagnosis (ICD-10)	See detail in Appendix C (Table C-1)		0.000

[§]CSMBS: Civil Servant Medical Benefit Scheme, *UC: Universal Coverage Scheme

1.2 The utilization of LS among patients under CSMBS compared with those under UC.

The proportion of CSMBS patients undergoing LS (7.8%) was higher than that of UC patients (2.7%). The mean age of CSMBS patients undergoing LS (53 years) was higher than that of UC patients (46 years). All CSMBS and UC patients, female were 3 times than male to perform LS. (Appendix C)

From figure 6, most common diseases (i.e., defined as patients undergoing LS > 10%) among CSMBS patients were 6 diseases related to gallbladder (ICD-10: K801, K828, K802, K811, K800 and K804) and 9 diseases related to gynecology (ICD-10: N736, N803, N801, N701, N809, D27, N832, N831 and D252). Moreover, most common diseases (i.e., defined as patients undergoing LS > 10%) among UC patients were 4 diseases related to gallbladder (ICD-10: K802, K828,

K801 and K811) and 2 diseases related to gynecology (ICD-10: N736 and N803). (Appendix C)

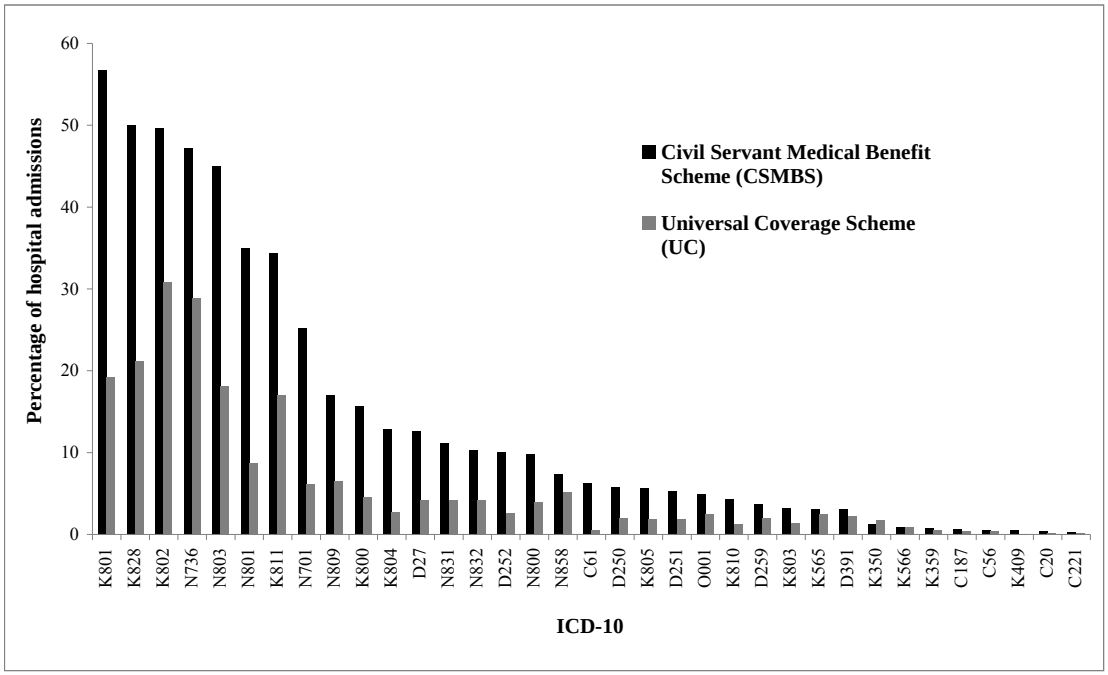
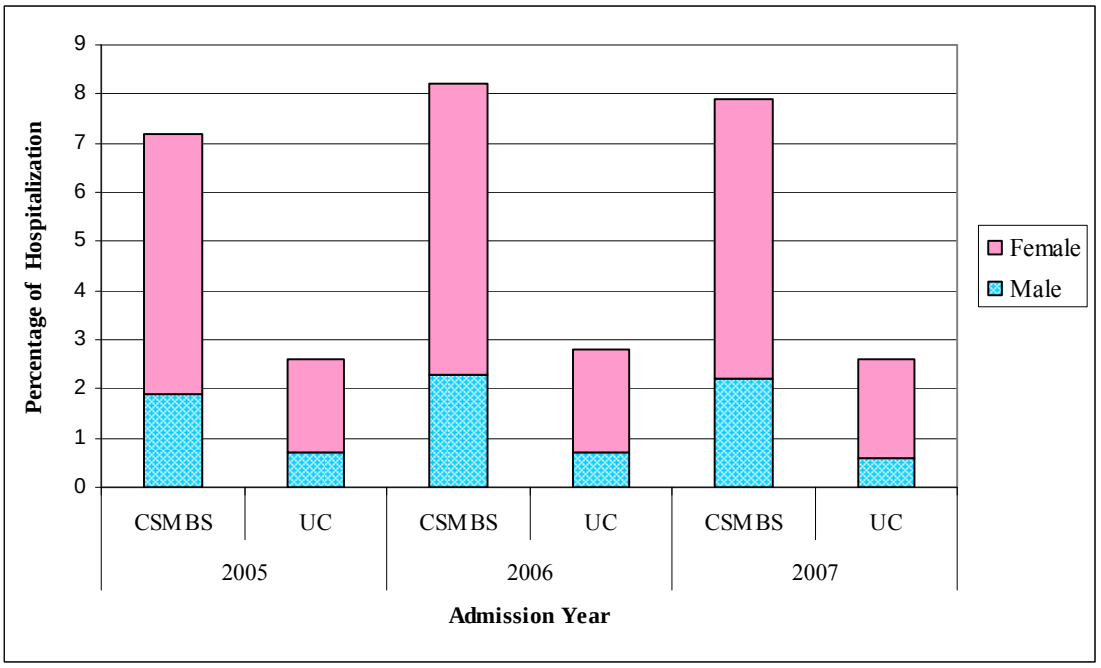


Figure 6 Percentage of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery from 2005 to 2007 performing per ICD-10 category

During 2005-2007, the proportion of hospitalization of CSMBS patients undergoing LS was higher than that of UC patients and female was more likely than male to perform LS in every admission year. Between admission years 2005-2007, the proportion of hospitalization of patients undergoing LS with the same health insurance was similar (Figure 7). Mean age of CSMBS and UC patients undergoing LS were increased (Figure 8).



CSMBS: Civil Servant Medical Benefit Scheme, UC: Universal Coverage Scheme

Figure 7 The percentage of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery in 2005-2007

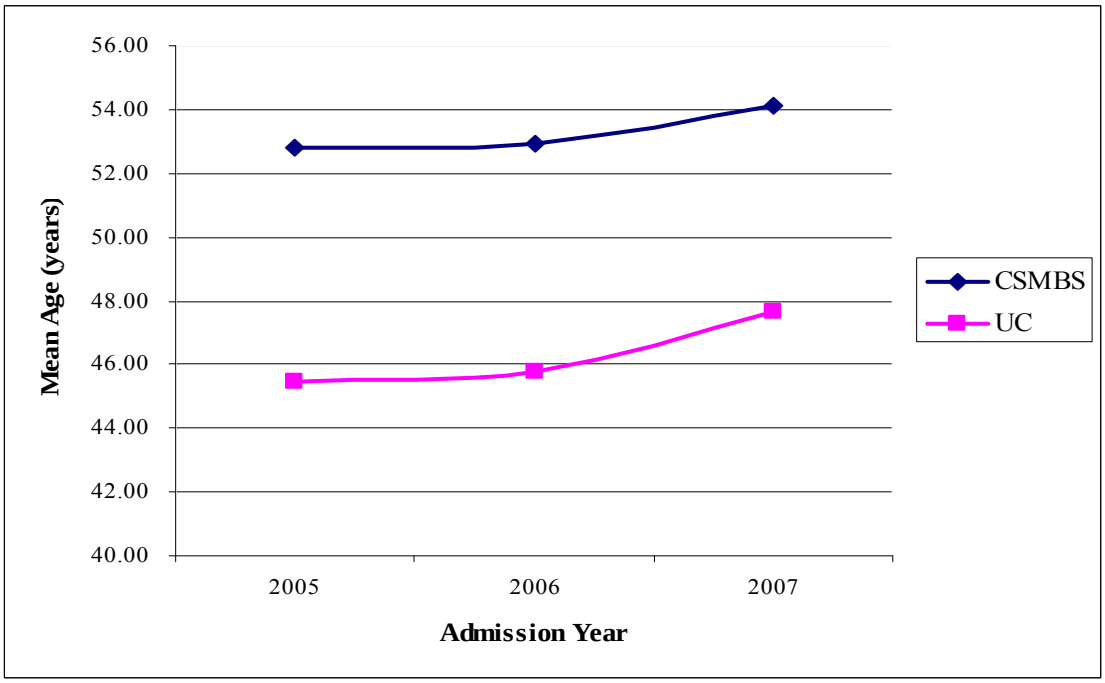


Figure 8 Mean age (years) of CSMBS and UC patients undergoing laparoscopic surgery in 2005-2007

2. Factor associated with the access to laparoscopic surgery in most common diseases

Binary logistic regression analysis was constructed to determine the factors associated with the provision of LS in most common diseases.

Most common diseases were top 10 of the provision of LS in 2005. Ten diseases were divided into 3 groups by ICD-10 code such as

- Diseases of gallbladder and cholecystitis (ICD-10 code : K800, K801, K802, K811 and K828)
- Diseases of subserosal leiomyoma of uterus (ICD-10 code : D252)
- Diseases of endometriosis (ICD-10 code : N736, N801, N803 and N809)

Dependent variable including the use of LS and six independent variables including age, gender, health insurance types, principal diagnosis, admission year and hospital characteristics were used in the logistic regression models.

Results of logistic regression analysis were divided into 3 groups by diseases such as

2.1 The factors associated with the provision of LS in diseases of gallbladder and cholecystitis

The total of 14,955 hospitalizations (27.8%) was operated with LS. The proportion of CSMBS patients undergoing LS (45.4%) was higher than that of UC patients (22.7%). Female was 2.5 times than male to perform LS. Patients with 41-60 years old were highest to perform LS (33.1%). University hospital was highest to perform LS (59.4%). (Table 12)

Table 12 Numbers and the proportion of hospitalizations with factors associated with the provision of laparoscopic surgery in diseases of gallbladder and cholecystitis between 2005-2007

Factor		Laparoscopic surgery	
		No (%)	Yes (%)
Health insurance type	CSMBS[#]	6,674 (54.6)	5,540 (45.4)
	UC[§]	32,102 (77.3)	9,415 (22.7)
Gender	Male	13,411 (76.6)	4,100 (23.4)
	Female	25,365 (70.0)	10,855 (30.0)
Age range	0-20 years	641 (84.2)	120 (15.8)
	21-40 years	5,776 (70.8)	2,383 (29.2)
	41-60 years	15,356 (66.9)	7,614 (33.1)
	61-80 years	14,805 (76.2)	4,624 (23.8)
	> 80 years	2,198 (91.1)	214 (8.9)
Hospital type	Regional hospital	8,559 (98.5)	134 (1.5)
	General hospital	15,717 (73.8)	5,571 (26.2)
	Center hospital	9,782 (68.0)	4,607 (32.0)
	University hospital	1,985 (40.6)	2,910 (59.4)
	Private hospital	1,065 (92.5)	86 (7.5)
	Other hospital	1,668 (50.3)	1,647 (49.7)
Total		38,776 (72.2)	14,955 (27.8)

[#]CSMBS: Civil Servant Medical Benefit Scheme, [§]UC: Universal Coverage Scheme

Dependent variable including the use of LS and three independent variables including age, gender, and health insurance types were identified for logistic regression model. A p–value of Hosmer and Lemeshow test greater than 0.05 (0.069) was considered as the goodness of fit for this model (Table 13).

There were significant differences in age, gender and health insurance types (p-value < 0.05). CSMBS patients were more likely to perform LS than UC patients (OR=3.21, p-value < 0.05}. Females were more likely than males to perform LS (OR=1.47, p-value < 0.05). Patients with 21-40 years, 41-60 years and 61-80 years were more likely to perform LS than those with 0-20 years (OR=2.12, 2.28 and 1.32, p-value < 0.05, respectively). However, patients with older than 80 years were less likely than those aged 0-20 years to perform LS (OR=0.37, p-value < 0.05)

Table 13 Factors associated with the provision of laparoscopic surgery in gallbladder and cholecystitis diseases

Factors	Odds Ratio (OR)	95% CI for OR		p-value
		Lower	Upper	
Civil Servant Medical Benefit Scheme	3.21	3.07	3.35	0.000
Age range: 21-40 years	2.12	1.73	2.59	0.000
41-60 years	2.28	1.86	2.78	0.000
61-80 years	1.32	1.08	1.61	0.000
>80 years	0.37	0.29	0.48	0.000
Gender: Female	1.47	1.41	1.53	0.000

2.2 The factors associated with the provision of LS in diseases of subserosal leiomyoma of uterus

The total of 2,303 hospitalizations (4.5%) was operated with LS. The proportion of CSMBS patients undergoing LS (8.4%) was higher than that of UC patients (2.0%). Patients with 21-40 years old were the highest to perform LS (9.5%). University hospital was the highest to perform LS (11.2%). (Table 14)

Dependent variable including the use of LS and four independent variables including age, hospital type, admission year and health insurance types were applied to the logistic regression model. A p–value of Hosmer and Lemeshow test greater than 0.05 (0.069) was regarded as goodness of fit for this model (Table 15).

There were no significant differences in age, type of hospitals and admission year (p-value > 0.05). CSMBS patients were more likely than UC patients to perform LS. (OR=2.28, p-value < 0.05)

Table 14 Numbers and the proportion of hospitalizations with factors associated with the provision of laparoscopic surgery in diseases of subserosal leiomyoma of uterus between 2005-2007

Factor		Laparoscopic surgery	
		No (%)	Yes (%)
Health insurance type	CSMBS[#]	825 (91.6)	76 (8.4)
	UC[§]	1,374 (98.0)	28 (2.0)
Gender	Female	2,199 (95.5)	104 (4.5)
Age range	0-20 years	2 (100)	0 (0.0)
	21-40 years	570 (90.5)	60 (9.5)
	41-60 years	1,584 (97.5)	41 (2.5)
	> 60 years	43 (93.5)	3 (6.5)
Hospital type	Regional hospital	173 (97.2)	5 (2.8)
	General hospital	412 (98.3)	7 (1.7)
	Center hospital	778 (98.5)	12 (1.5)
	University hospital	554 (88.8)	70 (11.2)
	Private hospital	46 (97.9)	1 (2.1)
	Other hospital	236 (96.3)	9 (3.7)
Total		2,199 (95.5)	104 (4.5)

[#]CSMBS: Civil Servant Medical Benefit Scheme, [§]UC: Universal Coverage Scheme

Table 15 Factors associated with the provision of laparoscopic surgery in subserosal leiomyoma of uterus diseases

Factors	Odds Ratio (OR)	95% CI for OR		p-value
		Lower	Upper	
Civil Servant Medical Benefit Scheme	2.28	1.32	3.92	0.003
Hospital Type: General hospital	0.54	0.17	1.76	0.31
Center hospital	0.50	0.17	1.48	0.21
University hospital	2.38	0.87	6.52	0.09
Private hospital	0.83	0.09	7.45	0.871
Other hospital	0.87	0.27	2.75	0.808
Age range: 21-40 years	1.114E+08	0.000	.	0.999
41-60 years	2.818E+07	0.000	.	1.000
> 60 years	9.767E+07	0.000	.	0.999
Admission Yea: 2006	1.26	0.71	2.22	0.429
2007	1.63	0.95	2.83	0.079

2.3 The factors associated with the provision of LS in diseases of endometriosis

The total of 9,137 hospitalizations (16.7%) was operated with LS. The proportion of CSMBS patients undergoing LS (31.5%) was higher than that of UC patients (10.0%). Patients with age between 21-40 years old were the highest to perform LS (19.8%). University hospital was the highest to perform LS (44.4%). (Table 16)

Table 16 Numbers and the proportion of hospitalizations with factors associated with the provision of laparoscopic surgery in diseases of endometriosis between 2005-2007

	Factor	Laparoscopic surgery	
		No (%)	Yes (%)
Health insurance type	CSMBS[#]	1,958 (68.5)	899 (31.5)
	UC[§]	5,653 (90.0)	627 (10.0)
Gender	Female	7,611 (83.3)	1,526 (16.7)
Age range	0-20 years	369 (91.6)	34 (8.4)
	21-40 years	4,894 (80.2)	1,208 (19.8)
	41-60 years	2,297 (89.1)	281 (10.9)
	> 60 years	51 (94.4)	3 (5.6)
Hospital type	Regional hospital	1,147 (98.6)	16 (1.4)
	General hospital	2,557 (91.6)	235 (8.4)
	Center hospital	2,236 (85.8)	370 (14.2)
	University hospital	931 (55.6)	742 (44.4)
	Private hospital	160 (96.4)	6 (3.6)
	Other hospital	580 (78.7)	157 (21.3)
Total		7,611(83.3)	1,526 (16.7)

[#]CSMBS: Civil Servant Medical Benefit Scheme, [§]UC: Universal Coverage Scheme

Dependent variable including the use of LS and five independent variables including age, hospital type, admission year, principal diagnosis (ICD-10) and health insurance types were identified for logistic regression model. A p–value of Hosmer and Lemeshow test greater than 0.05 (0.062) was regarded as goodness of fit for this model (Table 17).

There were significant differences in age, principal diagnosis, admission year, type of hospitals and type of health insurance coverage (p-value < 0.05). CSMBS patients were more likely than UC patients to perform LS (OR=2.1, p-

value < 0.05). University hospitals were more likely than regional hospitals to perform LS (OR=37.56, p-value < 0.05). Patients with age between 21-40 years were more likely than those with 0-20 years to perform LS (OR=1.5, p-value < 0.05). However, patients aged 41-60 and older than 60 years were less likely than those with 0-20 years to perform LS (OR=0.64 and 0.19, p-value < 0.05, respectively). Patients in admission year 2006 and 2007 were more likely than those in admission year 2005 to perform LS (OR=1.18 and 1.23, p-value < 0.05, respectively). Endometriosis of ovary (N801), Endometriosis of pelvic peritoneum (N803) and Endometriosis unspecified (N809) were less likely than Female pelvic peritoneal adhesions (N736) to perform LS (OR=0.24, 0.59 and 0.22, p-value < 0.05, respectively)

Table 17 Factors associated with the provision of laparoscopic surgery in endometriosis diseases

Factors		Odd Ratio (OR)	95% CI for OR		p-value
			Lower	Upper	
Civil Servant Medical Benefit Scheme		2.1	1.83	2.41	0.000
Hospital Type:	General hospital	5.74	3.42	9.61	0.000
	Center hospital	9.1	5.45	15.18	0.000
	University hospital	37.56	22.36	63.08	0.000
	Private hospital	2.86	1.10	7.48	0.032
	Other hospital	14.78	8.65	25.28	0.000
Admission Year:	2006	1.18	1.00	1.36	0.047
	2007	1.23	1.06	1.44	0.007
Principal diagnosis:	N801	0.24	0.20	0.30	0.000
	N803	0.59	0.45	0.76	0.000
	N809	0.22	0.17	0.28	0.000
Age range:	21-40 years	1.50	1.02	2.22	0.040
	41-60 years	0.64	0.43	0.97	0.033
	> 60 years	0.19	0.05	0.70	0.013

Part II Economic Evaluation of Hysterectomy

1. Cost-utility analysis

The cost-utility analysis of hysterectomy based on governmental and societal perspective estimated the one year cost and outcome (i.e. OALYs). Table 7 summarizes all important cost parameter used in the economic evaluation model. The average total direct cost for TAH (25,765 THB per case,) was lower than the average total direct cost for LAVH (36,432 THB per case). However, length of hospital stay and time to full recovery were reduced in patients undergoing LAVH (mean 4 days, SE=0.9 and 16.1 days, SE=3.9) compared to those having TAH (mean 5 days, SE=1.5 and 28.6 days, SE=8.2). Therefore, Patients with LAVH had lower average indirect cost compared to TAH (7,533 THB per LAVH case versus 10,667 THB per TAH case).

Costs and outcome for each treatment are demonstrated in table 18. The costs were lower for TAH in both governmental and societal perspectives. However, the incremental cost between two procedures was smaller for societal perspective.

Mean QALYs of patients with laparoscopic hysterectomy were higher when compared with that those with the abdominal procedure. The difference in QALYs for each woman over one year period were small (8). On the other hand, changing from a cheaper and lower effectiveness procedure (i.e, TAH) to LAVH the incremental QALYs were increased 0.007 QALYs.

When only direct costs were compared, an incremental cost per QALY of LAVH was 1,566,000 THB. The ICER decreased to 1,119,000 THB per QALY when including indirect cost based on a societal perspective. Switching from TAH to LAVH would add a financial burden of 11,000 THB per case to the government but offset the indirect costs of 3,000 THB that is presently shouldered by the households.

Table 18 Deterministic results from the model

	Abdominal hysterectomy	Laparoscopic hysterectomy	Incremental values
Cost using government perspective	26,000	37,000	11,000
Cost using societal perspective	36,000	44,000	8,000
Effectiveness (QALYs)			0.007
Cost per QALY using government perspective			1,566,000
Cost per QALY using societal perspective			1,119,000

Note: the costs and incremental values were given to nearest 1,000 THB price level

2. Uncertainty analysis

2.1 One-way sensitivity analysis

Base on societal perspective, one-way sensitivity analysis results of providing LAVH showed that the direct medical care cost of LAVH and TAH were the most sensitive to the change in the ICER per QALY gained, followed by the change in the incremental utility of cases with completed LAVH to TAH, direct and indirect non-medical care cost for patients undergoing completed TAH, direct and indirect non-medical care cost for patients undergoing completed LAVH, direct medical care cost for patients undergoing TAH with complications, direct medical and indirect non-medical care cost for patients undergoing conversion from LAVH to TAH. However, the direct non-medical care cost for patients undergoing conversion from LAVH to TAH and the direct and indirect non-medical care cost for patients undergoing TAH with complications were less sensitive to the change in the ICER per QALY gained. (Figure 9)

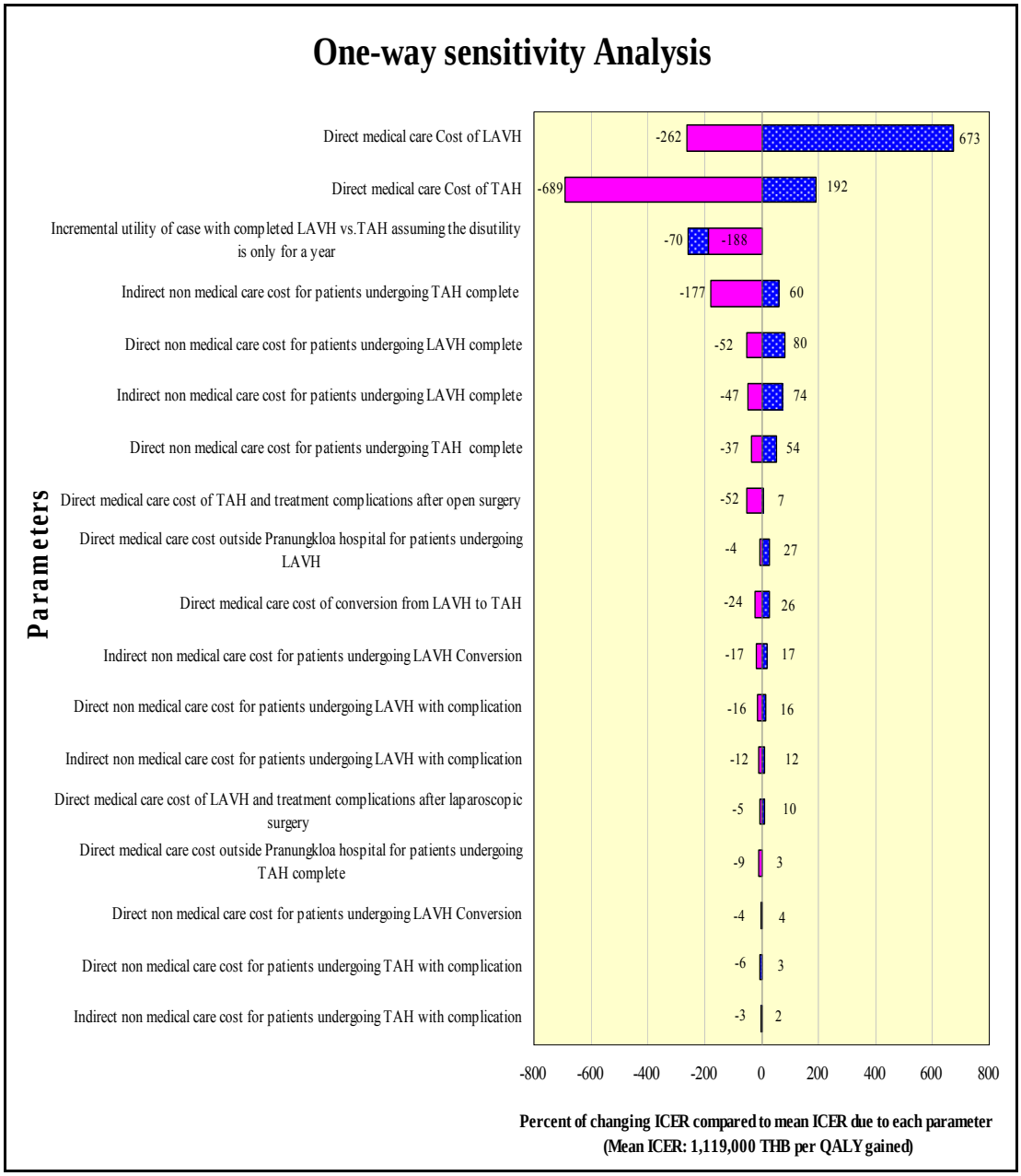


Figure 9 Tornado diagram showing the one-way sensitivity analysis of the ICER in societal perspective

2.2 Probabilistic sensitivity analysis (PSA)

The cost-effectiveness acceptability curve in figure 10 summarizes the robustness of the model regarding uncertainty estimation of the cost and effect for each treatment of hysterectomy. At the zero ceiling ratio, indicating that no further resources would be allocated to healthcare, TAH was a dominant treatment, particularly using a government perspective. When the ceiling ratios were greater than 1,200,000 THB and 1,600,000 THB using and societal and government perspective, respectively, LAVH became a preferable choice, offering a better chance of saving one QALY at a given money. However, the probability that LAVH would be cost-effective was not greater than 80% until the ceiling ratio reached 8,000,000 THB per QALY using both societal and governmental perspectives.

In Thailand, the willingness to pay (WTP) per QALY gained thresholds for implementing health technology and intervention for policy decision makers (i.e., the Subcommittee for Development of the National List of Essential Drugs and the Subcommittee for Development of the Benefit Packages) were 100,000 THB and 300,000 THB per QALY gained or the one time and three times of the gross domestic product (GDP) per capita (41), shown by the vertical dashed lines in figure 10. Eventually, at the willingness to pay of 100,000 to 300,000 THB per QALY, LAVH was cost-ineffective option in Thailand circumstance.

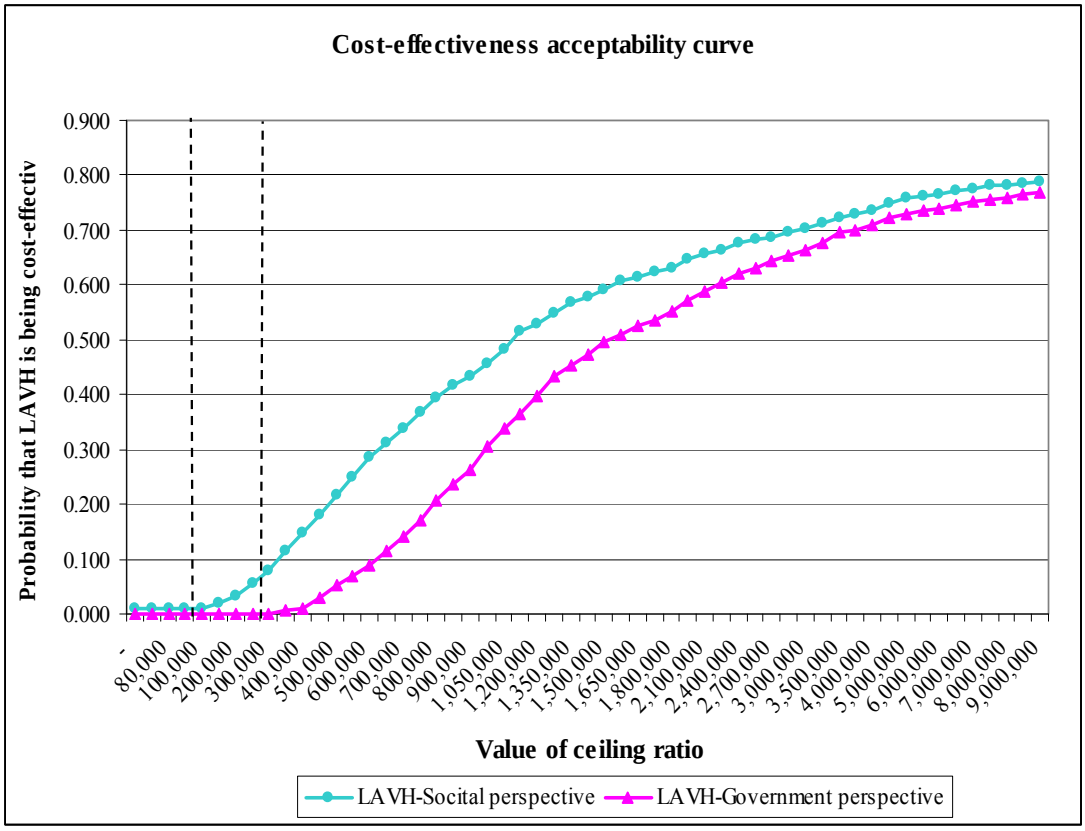


Figure 10 Cost-effectiveness acceptability curve laparoscopically assisted vaginal hysterectomy (LAVH) compared with total abdominal hysterectomy (TAH)

CHAPTER V
DISCUSSION

The discussion is divided into three parts as follows;

Part I Nationwide Data Analysis

Part II Economic Evaluation of Hysterectomy

Part III Limitations of the study

Part I Nationwide Data Analysis

The data of inpatients undergoing laparoscopic surgery (LS) obtained from the Central office for Healthcare Information (CHI) from January 1, 2005 to December 31, 2007 based on procedure codes (ICD-9-CM) and principal diagnosis codes of laparoscopic (ICD-10) were used to determine the access ability of LS between the patients under CSMBS and those under UC. It was found that diseases of gallbladder and cholecystitis, diseases of gynecology were the most common diseases performing LS.

Both of age and gender were significant factors associated with the provision to LS. Females were more likely than males to perform LS because more than 70% of patients who undergoing LS were female and the most common diseases performing LS were gynecology. Moreover, patients with 21-40 years were more likely to perform LS than those with 0-20 years because the most common diseases performing LS were occurred in reproductive age. Patients' health insurance was a significant factor associated with the access to LS. The patients under CSMBS had significantly higher access to LS compared to those under UC because the reimbursement amount and method were different between CSMBS and UC schemes.

LS has not yet included in the benefit package of UC scheme. Under the capitation of the largest public insurance scheme (i.e., UC), open surgery has been

reimbursed, but not LS. The National Health Security Office (NHSO) does not provide higher reimbursement rate in case of LS compared to traditional surgery procedures. This reimbursement system of NHSO does not support hospitals to perform LS, since LS had higher cost but hospitals would get the same reimbursement amount as traditional surgery procedures. Thus, patients who would like to have LS are needed to pay the co-payment up to 8,000-10,000 THB.

The cost-effectiveness analysis of LS in Thailand was obtained from the study in 2005 i.e., the cost-utility of LS versus conventional open cholecystectomy (13). It was found that the incremental cost per QALY was 144,692 Baht under government perspective and 86,464 Baht under a societal perspective. LS would be considered as a cost-effective strategy regarding to a threshold of one to three times of gross domestic product per capita recommended by the subcommittee of the development of benefit package and service system, NHSO.

Based on the results, it was concluded that although LS in cholecystectomy would be cost-effective, the patients under UC still could not appropriately access to LS when compared to patients under CSMBS. In order to increase the access to LS, the NHSO should provide the interventions such as an increase in reimbursement rate of LS compared to open surgery to hospitals by assigning the higher relative weight score or allowing patients under any Thai health insurance schemes pay the co-payment when receiving LS.

Moreover, large hospitals were more likely than small hospitals to perform the laparoscopic procedure since surgeons with expertise in LS and expensive equipments are usually in large hospitals. The initial costs of setting up the equipment to perform LS and the training need for surgical team might have limited the ability to perform LS in some hospitals especially community hospital and these hospitals are likely to continue the status quo unless they have a strong support from Ministry of Public Health.

Part II Economic Evaluation of Hysterectomy

This study was the first to conduct the cost-utility analysis of TAH, the current standard treatment for hysterectomy patients, compared to LAVH in Thailand situation. It was found that the incremental cost per QALY was 1,566,000 THB under a governmental perspective and 1,119,000 THB under a societal perspective. LS would not be a cost-effective strategy regarding to a threshold of one to three times of gross domestic product per capita or 100,000 THB to 300,000 THB per QALY gained recommended by the subcommittee of the development of benefit package and service system, NHSO.

Base on a societal perspective, one-way sensitivity analysis results showed that the direct medical care cost of LAVH and TAH were the most sensitive to the change in the ICER per QALY gained, followed by the change in the incremental utility of patients with completed LAVH to TAH. Switching from TAH to LAVH would add a financial burden of 11,000 THB per case to the government but offset the indirect costs of 3,000 THB that is presently shouldered by the households. From the CHI database, the study founded that LAVH approach had higher charges when compared with TAH. Hospital charges of LAVH were increased although length of hospital stay and time to full recovery were reduced in patients undergoing LAVH compared to those having TAH. Because of the lower average wage of Thai people (43), cost of time lost from work for the patients and their families (indirect cost) were less than the incremental direct medical care cost of LAVH and TAH. Moreover, LAVH was very expansive medical care technique because they use the specific equipment and disposable instruments to perform LS and need a specialist surgeon on this filed.

Moreover, the health outcome of this study was QALY derived from the systematic review. Only eligible study reported that the incremental QALYs over one year. The incremental QALYs of patients with completed LAVH and TAH were very small and 95% confidence intervals crossed zero, none of which reached conventional levels of statistical significance (8). There is an issue of whether QALYs, as measured through the EQ-5D, adequately reflect important differences in QALY between the procedures. However, the value of the QALY is recommended as a comparable

outcome across disease areas and specialties. This 'generic' outcome measure is essential for resource allocation decisions across health problems. As a result, the QALY has been recommended in economic evaluation method guidance in Thailand (42). However, there has been an argument that five dimensions of health-related QoL contained in the EQ-5D, with three response levels per dimension, may fail to register important differences between the trial groups over time. This argument may be supported by the fact that the excess rate and severity of complications in the laparoscopic-assisted groups might not reflected outcome of treatment in terms of QALYs.

However, the results in this study were different compared to previous published literatures (8) submitted to the National Institute for Clinical Excellence (NICE) in 2004 due to differences in perspective and cost component. They estimated one year costs based on the NHS perspective and collected data on the use of resources under several headings (i.e. operative cost, main admission to hospital and follow up). The comparison of laparoscopic with abdominal hysterectomy showed that the cost of laparoscopy was closer to, but still higher than that of conventional hysterectomy. A mean difference of £335 in operative cost reflects longer operative times and use of much more disposable equipments with laparoscopy in the UK. However, the shorter length of admission with laparoscopic hysterectomy offset some of that additional cost, with a mean saving in hotel costs of £144. Overall, laparoscopic hysterectomy cost a mean of £186 more per patient, with 95% confidence intervals crossing zero (−£26 to £375). Mean QALYs per patient were higher with laparoscopic hysterectomy, compared with the abdominal procedure (0.007, −0.008 to 0.023).

For the comparison of laparoscopic hysterectomy and abdominal hysterectomy, this generated an ICER of £26,571. In addition, at a maximum value of £30,000, the probability that laparoscopic hysterectomy was more cost-effective than abdominal hysterectomy reached 56%.

Several previous studies had investigated the effect of surgical approach on cost of hysterectomy. LAVH, with its shorter operating times and hospital stays, has shown to be lower cost in actual reimbursement compared with TAH. Raju et al

(25) found that although resource use related to the operating suite was higher for the LAVH group, overall costs were higher for the TAH group due to longer lengths of stay. This also may be due to increased blood loss and febrile morbidity associated with abdominal hysterectomy. Also, the use of disposable instruments has been implicated as an important factor associated with hospital charges in LAVH (44, 45).

Additionally, in 2004 Lenihan et al (34) found that hospital charges were the highest for LAVH and the lowest for vaginal. This study also investigated the indirect costs of hysterectomy in terms of productivity loss from work for the patients and their families after different types of hysterectomy. Although LAVH was associated with the highest hospital charges, it was also associated with the least amount of time out from work, which presumably would translate into decreased costs for employers. In their randomized trial, Falcone et al (28) also found a faster return to work for LAVH when compared with TAH.

Other studies showed that the LAVH approach was associated with higher overall hospital charges or costs when compared with other surgical approaches (34, 44). In 1996, Dorsey et al (44) noted that there were higher hospital charges and costs for the laparoscopic approach compared with the abdominal or vaginal approach based on a retrospective chart review. Increased operative time and the use of disposable instruments were also implicated in this association.

Part III Limitations of the study

There are a number of limitations to this study that should be mentioned as follows:

1. The CHI database included both CSMBS and UC patients but not those with Social Security scheme (SSS). This study may not represent the utilization of LS between patients under all types of health insurance schemes in Thailand.

2. This analysis did not include some factors that might be associated with the access to LS such as time of learning curve for residency programs, distribution and number of laparoscopic surgeons as well as distribution and number of equipments.

3. The data use in this analysis were retrieved during 2005-2007. The findings might not represent the current situation on the population undergoing LS. It is possible that the number of patients undergoing LS at present will be increased due to the number of surgeons with experiences in LS technique.

4. This study collected indirect cost data and evaluated patients who underwent a hysterectomy at only one tertiary hospital in the middle of Thailand. It might not be able to generalize these findings to patients undergoing surgery in other settings or in other geographic areas.

5. Conversion rate might not represent true situation because there was no ICD-9 code identified the conversion event due to the missing code of TAH cases.

6. There has been no utility score report in Thai study. We used the differential QALYs over one year from the study in UK which was the only eligible study reporting both mean and 95% confidential interval.

CHAPTER VI
CONCLUSIONS

This chapter provides conclusions and recommendations for the future study and policy decision making. In conclusion, the most common diseases for LS in Thailand were diseases of gallbladder and diseases of gynecology. CSMBS patients were more likely to perform LS than UC patients. Female was more likely than male to perform LS. Patients with old age (21-40 years) were more likely to perform LS than those young ages (0-20 years). Large hospital size was more likely to perform LS than small hospital size.

The provision of LS was associated with age, gender, principal diagnosis, admission year, hospital characteristics and health insurance types. Especially, Patients' health insurance scheme, i.e. CSMBS, was the significant factor associated with the provision of LS in all logistic regression models.

The ICER of LAVH versus TAH was 1,119,000 and 1,557,000 THB per QALY gained based on the societal and government perspectives, respectively. The direct medical care cost of LAVH and TAH were the most sensitive to the change in the ICER per QALY gained base on societal perspective. At the willingness to pay of 100,000 to 300,000 THB per QALY indicated by the subcommittee for development of the health benefit package and service delivery of the National Health Security Office, LAVH was cost-ineffective option.

Recommendations for the future study

1. Given that data in this analysis were obtained from during 2005-2007, the further study should include more recent data on the patients undergoing LS. It is possible that an increase in surgeon experience with the LS technique may decrease complications and operative time which leads to lower hospital charges. .
2. Since there has been no utility score report in Thai study and the ICER was sensitive to changes in utility parameter, further study should investigate the utility of Thai women undergoing LAVH compared to traditional surgery procedures.

Recommendations for policy decision making

1. Based on the results, it was concluded that although LS in cholecystectomy would be cost-effective, the patients under UC still could not appropriately access to LS when compared to patients under CSMBS. To increase the access to LS, the NHSO should provide the interventions such as an increase in reimbursement rate of LS compared to open surgery to hospitals by assigning the higher relative weight score or allowing patients under any Thai health insurance schemes pay the co-payment when receiving LS.
2. The Ministry of Public Health should provide financial support for the training on LS to increase the number of surgeons in this field.
3. The current standard procedure of hysterectomy, total abdominal hysterectomy is cheaper and equal effective than the new procedure (i.e. LAVH) in Thailand situation. Therefore, LAVH is an alternative choice of hysterectomy for women who can payable to the co-payment when they need receiving LS.

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APPENDICES

APPENDIX A

Database structure of Inpatients undergoing Laparoscopic surgery in common diseases in Thailand : The Central office for Healthcare Information (CHI) database from January 2005 to December 2007.

HITAP-LAP

โครงสร้างข้อมูลผู้ป่วยใน

สำหรับโครงการประเมินเทคโนโลยีและนโยบายด้านสุขภาพ(HITAP)
งานวิจัย เรื่องความคุ้มค่าและผลกระทบต่อค่าใช้จ่ายของการผ่าตัดผ่านกล้อง (laparoscopic)
เปรียบเทียบกับการผ่าตัดเปิดหน้าท้อง (open surgery) ของระบบประกันสุขภาพไทย

Field	Field name	type	length	Dec	Description
1	CYRDSC	N	4	0	ปีปฏิทินของวันที่จำหน่าย
2	HCODE	C	5	0	รหัสโรงพยาบาล
3	HN	C	9	0	HN (Hospital Number)
4	AN	C	9	0	AN (Admission Number)
5	CPID	C	14	0	เลขที่บัตรประจำตัว/บัตรต่างด้าว/หนังสือเดินทาง กรณีบัตรประชาชน (แปลงแล้ว)
6	DOB	D	8	0	วันเดือนปีเกิด
7	AGEYR	N	3	0	อายุเป็นปี
8	AGEDY	N	3	0	เศษที่เหลือของปี นับเป็นวัน
9	SEX	C	1	0	เพศ 1= ชาย, 2= หญิง
10	DATEADM	D	8	0	วันรับเข้าใน รพ.
11	DATEDSC	D	8	0	วันจำหน่าย
12	LEAVEDAY	N	3	0	จำนวนวันที่ลากลับบ้าน
13	DISCHS	C	1	0	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 separately 8 = Stillbirth 9 = Dead
14	DISCHT	C	1	0	ประเภทการจำหน่าย 1 = With approval 2 = Against advice 3 = Escape 4 = By transfer 5 = Other 8 = Dead autopsy 9 = Dead no autopsy
15	AMOUNT	Y	8	4	จำนวนเงินค่ารักษาพยาบาลรวม
16	AMLIM	Y	8	4	จำนวนเงินค่าห้อง/อาหารและค่าอวัยวะเทียมฯ ส่วนตามสิทธิ์
17	AMOVLIM	Y	8	4	จำนวนเงินค่าห้อง/อาหารและค่าอวัยวะเทียมฯ ส่วนที่เกินสิทธิ์
18	AMREIMB	Y	8	4	จำนวนเงินค่ารักษาพยาบาลอื่นส่วนตามสิทธิ์
19	AMNREIMB	Y	8	4	จำนวนเงินค่ารักษาพยาบาลอื่นส่วนที่เกินสิทธิ์
20	TR1	Y	8	4	ค่าห้องและค่าอาหาร
21	TR2	Y	8	4	ค่าอวัยวะเทียมและอุปกรณ์ในการบำบัดรักษา
22	TR3	Y	8	4	ค่ายาและสารอาหารทางเส้นเลือด ใช้ในร.พ.
23	TR4	Y	8	4	ค่ายาและสารอาหารทางเส้นเลือด ใช้ที่บ้าน
24	TR5	Y	8	4	ค่าเวชภัณฑ์ที่มิใช่ยา
25	TR6	Y	8	4	ค่าบริการโลหิตและส่วนประกอบของโลหิต
26	TR7	Y	8	4	ค่าตรวจวินิจฉัยทางเทคนิคการแพทย์และพยาธิวิทยา
27	TR8	Y	8	4	ค่าวินิจฉัยและรักษาทางรังสีวิทยา
28	TR9	Y	8	4	ค่าตรวจวินิจฉัยโดยวิธีพิเศษอื่นๆ
29	TR10	Y	8	4	ค่าอุปกรณ์ของใช้และเครื่องมือทางการแพทย์

ที่มา: โครงสร้างข้อมูลผู้ป่วยใน โดย สำนักงานกลางสารสนเทศบริการสุขภาพ (สกส.)

HITAP-LAP

Field	Field name	type	length	Dec	Description
30	TR11	Y	8	4	ค่าทำหัตถการและวิสัญญี
31	TR12	Y	8	4	ค่าบริการทางการพยาบาล
32	TR13	Y	8	4	ค่าบริการทางทันตกรรม
33	TR14	Y	8	4	ค่าบริการทางกายภาพบำบัดและเวชกรรมฟื้นฟู
34	TR15	Y	8	4	ค่าบริการฝังเข็มและการบำบัดผู้ประกอบโรคศิลปอื่นๆ
35	PDX	C	6	0	รหัสโรคหลัก
36	SDX1	C	6	0	รหัสโรครอง(ตัวที่1)
37	SDX2	C	6	0	รหัสโรครอง(ตัวที่2)
38	SDX3	C	6	0	รหัสโรครอง(ตัวที่3)
39	SDX4	C	6	0	รหัสโรครอง(ตัวที่4)
40	SDX5	C	6	0	รหัสโรครอง(ตัวที่5)
41	SDX6	C	6	0	รหัสโรครอง(ตัวที่6)
42	SDX7	C	6	0	รหัสโรครอง(ตัวที่7)
43	SDX8	C	6	0	รหัสโรครอง(ตัวที่8)
44	SDX9	C	6	0	รหัสโรครอง(ตัวที่9)
45	SDX10	C	6	0	รหัสโรครอง(ตัวที่10)
46	SDX11	C	6	0	รหัสโรครอง(ตัวที่11)
47	SDX12	C	6	0	รหัสโรครอง(ตัวที่12)
48	SDX13	C	6	0	รหัสโรครอง(ตัวที่13)
49	SDX14	C	6	0	รหัสโรครอง(ตัวที่14)
50	SDX15	C	6	0	รหัสโรครอง(ตัวที่15)
51	SDX16	C	6	0	รหัสโรครอง(ตัวที่16)
52	SDX17	C	6	0	รหัสโรครอง(ตัวที่17)
53	SDX18	C	6	0	รหัสโรครอง(ตัวที่18)
54	SDX19	C	6	0	รหัสโรครอง(ตัวที่19)
55	SDX20	C	6	0	รหัสโรครอง(ตัวที่20)
56	PROC1	C	7	0	รหัสหัตถการ(ตัวที่1)
57	PROC2	C	7	0	รหัสหัตถการ(ตัวที่2)
58	PROC3	C	7	0	รหัสหัตถการ(ตัวที่3)
59	PROC4	C	7	0	รหัสหัตถการ(ตัวที่4)
60	PROC5	C	7	0	รหัสหัตถการ(ตัวที่5)
61	PROC6	C	7	0	รหัสหัตถการ(ตัวที่6)
62	PROC7	C	7	0	รหัสหัตถการ(ตัวที่7)
63	PROC8	C	7	0	รหัสหัตถการ(ตัวที่8)
64	PROC9	C	7	0	รหัสหัตถการ(ตัวที่9)
65	PROC10	C	7	0	รหัสหัตถการ(ตัวที่10)
66	PROC11	C	7	0	รหัสหัตถการ(ตัวที่11)
67	PROC12	C	7	0	รหัสหัตถการ(ตัวที่12)
68	PROC13	C	7	0	รหัสหัตถการ(ตัวที่13)
69	PROC14	C	7	0	รหัสหัตถการ(ตัวที่14)
70	PROC15	C	7	0	รหัสหัตถการ(ตัวที่15)
71	PROC16	C	7	0	รหัสหัตถการ(ตัวที่16)
72	PROC17	C	7	0	รหัสหัตถการ(ตัวที่17)
73	PROC18	C	7	0	รหัสหัตถการ(ตัวที่18)
74	PROC19	C	7	0	รหัสหัตถการ(ตัวที่19)
75	PROC20	C	7	0	รหัสหัตถการ(ตัวที่20)

หมายเหตุ: TR1-TR15 เป็นค่าใช้จ่ายส่วนที่เบิกเท่านั้น

ที่มา: โครงสร้างข้อมูลผู้ป่วยใน โดย สำนักงานกลางสารสนเทศบริการสุขภาพ (สกส.)

APPENDIX B

Questionnaire for collecting data for direct non-medical costs, indirect costs, and direct medical costs incurred outsides hospitals of hysterectomy patients and caregivers

เอกสารชี้แจงผู้เข้าร่วมการวิจัย

(Participant Information Sheet)

ในเอกสารนี้อาจมีข้อความที่ท่านอ่านแล้วยังไม่เข้าใจ โปรดสอบถามหัวหน้าโครงการวิจัย หรือผู้แทนให้ช่วยอธิบายจนกว่าจะเข้าใจดี ท่านจะได้รับเอกสารนี้ 1 ฉบับ นำกลับไปอ่านที่บ้านเพื่อปรึกษาหารือกับญาติพี่น้อง เพื่อนสนิท แพทย์ประจำตัวของท่าน แพทย์ท่านอื่น หรือผู้อื่นที่ท่านต้องการปรึกษา เพื่อช่วยในการตัดสินใจเข้าร่วมการวิจัย

ชื่อโครงการ การประเมินเทคโนโลยีด้านสุขภาพของการผ่าตัดผ่านกล้องสำหรับประเทศไทย: กรณีศึกษาการผ่าตัด มดลูก

ชื่อผู้วิจัย ผศ.ดร.ภญ.อุษา ฉายเกล็ดแก้ว และภญ.วชิรานี วงศ์ก้อม

สถานที่วิจัย โรงพยาบาลพระนั่งเกล้า

สถานที่ทำงาน หน่วยวิจัยเภสัชสังคมและการบริหาร ภาควิชาเภสัชกรรม คณะเภสัชศาสตร์ มหาวิทยาลัยมหิดล เขตราชเทวี กทม. 10400

หมายเลขโทรศัพท์ที่ติดต่อได้ทั้งในและนอกเวลาราชการ 081 729 8659

โครงการวิจัยนี้ทำขึ้นเพื่อ ประเมินต้นทุนอรรถประโยชน์ของการผ่าตัดมดลูกทางช่องคลอดผ่านกล้องเปรียบเทียบกับการผ่าตัดมดลูกทางหน้าท้อง ซึ่งจะมีประโยชน์ที่คาดว่าจะได้รับคือ เพื่อนำผลจากการศึกษาที่ได้ไปเป็นข้อมูลพื้นฐานประกอบการตัดสินใจของผู้บริหารในการกำหนดนโยบายเรื่องการผ่าตัดมดลูกทางช่องคลอดผ่านกล้อง โดยเฉพาะอย่างยิ่งการพิจารณาว่าควรบรรจุการผ่าตัดมดลูกทางช่องคลอดผ่านกล้องในชุดสิทธิประโยชน์หรือไม่

ท่านได้รับเชิญให้เข้าร่วมการวิจัยนี้เพราะ ท่านเป็นผู้ป่วยที่ได้รับการรักษาโดยการผ่าตัดมดลูกออกทั้งหมด ซึ่งการผ่าตัดมดลูกเป็นการผ่าตัดที่มีความสำคัญและทำกันอย่างแพร่หลายทางสูตินรีเวช สำหรับประเทศไทยการผ่าตัดมดลูกทางหน้าท้องเป็นการผ่าตัดมาตรฐาน แต่ในปัจจุบันมีการผ่าตัดมดลูกทางช่องคลอดผ่านกล้องเพิ่มมากขึ้น เนื่องจากสามารถลดความเจ็บปวด ลดเวลาในการนอนโรงพยาบาล และผู้ป่วยสามารถกลับสู่ภาวะปกติได้เร็วขึ้นกว่าการผ่าตัดทางหน้าท้อง แต่ก็มีค่าใช้จ่ายที่สูงกว่าการผ่าตัดแบบเดิม การวิจัยนี้จึงทำการประเมินความคุ้มค่าทางเศรษฐศาสตร์ของการผ่าตัดมดลูกระหว่างการผ่าตัดมดลูกทางช่องคลอดผ่านกล้องเปรียบเทียบกับการผ่าตัดมดลูกทางหน้าท้อง

จะมีผู้เข้าร่วมการวิจัยนี้ทั้งสิ้นประมาณ 25-30 คน ระยะเวลาที่จะทำวิจัยทั้งสิ้น 2 เดือน

หากท่านตัดสินใจเข้าร่วมการวิจัยแล้ว จะมีขั้นตอนการวิจัยดังต่อไปนี้คือ

-ผู้วิจัยจะขอสัมภาษณ์ท่านเกี่ยวกับต้นทุนในผู้ป่วยผ่าตัดมดลูก ประกอบด้วยคำถาม 2 ส่วน ใช้เวลาในการตอบ 10 - 15 นาที ดังนี้

ส่วนที่1 ข้อมูลทั่วไปจำนวน 12 ข้อ

ส่วนที่ 2 ข้อมูลด้านต้นทุนของผู้ป่วยจำนวน 19 ข้อ

ความเสี่ยงที่อาจเกิดขึ้นจากการวิจัย คือ ในระหว่างการสัมภาษณ์ ท่านอาจรู้สึกอึดอัด ไม่สบายใจอยู่บ้างกับบางคำถาม และไม่ต้องการตอบคำถาม ท่านมีสิทธิที่จะไม่ตอบคำถามนั้นได้ หรือยุติการให้สัมภาษณ์ได้ทันทีโดยไม่ต้องแจ้งเหตุผล

หากท่านไม่เข้าร่วมในโครงการวิจัยนี้ ท่านก็จะได้รับการตรวจเพื่อการวินิจฉัยและรักษาโรคของท่านตามวิธีการที่เป็นมาตรฐานเช่นเดิม

การเข้าร่วมการวิจัยนี้ท่านจะไม่ได้รับค่าตอบแทนและไม่มีค่าใช้จ่ายใดๆทั้งสิ้น

หากผู้เข้าร่วมวิจัยมีข้อสงสัยเกี่ยวกับการวิจัยนี้ ท่านสามารถติดต่อสอบถามได้ที่ ภญ.วชิรานี วงศ์ก้อม สถานที่ติดต่อ หน่วยวิจัยเภสัชสังคมและการบริหาร ภาควิชาเภสัชกรรม คณะเภสัชศาสตร์ มหาวิทยาลัยมหิดล เขตราชเทวี กทม. 10400 ในวันและเวลาราชการ หรือ โทรศัพท์ 081 729 8659

หากมีข้อมูลเพิ่มเติมทั้งด้านประโยชน์และโทษที่เกี่ยวข้องกับการวิจัยนี้ ผู้วิจัยจะแจ้งให้ทราบโดยรวดเร็วไม่ปิดบัง

ข้อมูลส่วนตัวของผู้เข้าร่วมการวิจัยจะถูกเก็บรักษาไว้ ไม่เปิดเผยต่อสาธารณะเป็นรายบุคคล แต่จะรายงานผลการวิจัยเป็นข้อมูลส่วนรวม ข้อมูลของผู้เข้าร่วมการวิจัยเป็นรายบุคคลอาจมีคณะบุคคลบางกลุ่มเข้ามาตรวจสอบได้ เช่น ผู้ให้ทุนวิจัย, สถาบัน หรือองค์กรของรัฐที่มีหน้าที่ตรวจสอบ, คณะกรรมการจริยธรรมฯ เป็นต้น

ผู้เข้าร่วมการวิจัยมีสิทธิ์ถอนตัวออกจากโครงการวิจัยเมื่อใดก็ได้ โดยไม่ต้องแจ้งให้ทราบล่วงหน้า และการไม่เข้าร่วมการวิจัยหรือถอนตัวออกจากโครงการวิจัยนี้ จะไม่มีผลกระทบต่อการบริการและการรักษาที่สมควรจะได้รับแต่ประการใด

โครงการวิจัยนี้ได้รับการพิจารณารับรองจาก คณะกรรมการจริยธรรมการวิจัยในคนของมหาวิทยาลัยมหิดล ซึ่งมีสำนักงานอยู่ที่ สำนักงานอธิการบดีมหาวิทยาลัยมหิดล ถนนพุทธมณฑล สาย 4 ตำบลศาลายา อำเภอพุทธมณฑล จังหวัดนครปฐม 73170 หมายเลขโทรศัพท์ 02-849-6223-5 โทรสาร 02-849-6223 และการพิจารณารับรองจากคณะกรรมการจริยธรรมการวิจัยในมนุษย์ของสถาบันพัฒนาการคุ้มครองการวิจัยในมนุษย์ (สคม.) อาคาร 8 ชั้น 7 กรมวิทยาศาสตร์การแพทย์ กระทรวงสาธารณสุข จังหวัดนนทบุรี 11000 หมายเลขโทรศัพท์ 02-591-3876, 02-591-3541โทรสาร 02-591-4125 หากท่านได้รับการปฏิบัติไม่ตรงตามที่ระบุไว้ ท่านสามารถติดต่อกับประธานคณะกรรมการฯ หรือผู้แทน ได้ตามสถานที่และหมายเลขโทรศัพท์ข้างต้น

ข้าพเจ้าได้อ่านรายละเอียดในเอกสารนี้ครบถ้วนแล้ว

ลงชื่อ.....ผู้เข้าร่วมวิจัย

(.....)

วันที่.....

หนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัยโดยได้รับการบอกกล่าวและเต็มใจ

วันที่.....เดือน.....พ.ศ. 2553

ข้าพเจ้า.....อายุ.....ปี อาศัยอยู่บ้านเลขที่ .....ถนน.....ตำบล/แขวง.....อำเภอ/เขต .....จังหวัด.....รหัสไปรษณีย์.....โทรศัพท์ .....

ขอแสดงเจตนายินยอมเข้าร่วมตอบแบบสอบถามในโครงการวิจัยเรื่อง **"การประเมินเทคโนโลยีด้านสุขภาพของการผ่าตัดผ่านกล้องสำหรับประเทศไทย: กรณีศึกษาการผ่าตัดมดลูก"**

ข้าพเจ้าได้รับทราบรายละเอียดเกี่ยวกับจุดมุ่งหมายในการทำวิจัย รายละเอียดขั้นตอนต่างๆที่จะต้องปฏิบัติหรือได้รับการปฏิบัติ ประโยชน์ที่คาดว่าจะได้รับของการวิจัย โดยได้อ่านข้อความที่มีรายละเอียดอยู่ในเอกสารชี้แจงผู้เข้าร่วมการวิจัยโดยตลอด อีกทั้งยังได้รับคำอธิบายและตอบข้อสงสัยจากหัวหน้าโครงการวิจัยเป็นที่เรียบร้อยแล้ว

ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้

หากข้าพเจ้ามีข้อข้องใจเกี่ยวกับขั้นตอนของการวิจัย ข้าพเจ้าสามารถติดต่อกับ ภญ.วชิรานี วงศ์ก้อม หมายเลขโทรศัพท์ 081 729 8659

ข้าพเจ้าได้ทราบถึงสิทธิ์ที่ข้าพเจ้าจะได้รับข้อมูลเพิ่มเติมจากการเข้าร่วมการวิจัย และสามารถถอนตัวหรือถอดเข้าร่วมการวิจัยได้ทุกเมื่อ โดยจะไม่มีผลกระทบต่อการบริการและการรักษาพยาบาลที่ข้าพเจ้าจะได้รับต่อไปในอนาคต ข้าพเจ้ายินยอมให้นักวิจัยใช้ข้อมูลส่วนตัวของข้าพเจ้าในการทำวิจัย ซึ่งจะไม่เผยแพร่ต่อสาธารณะเป็นรายบุคคล แต่จะนำเสนอเป็นข้อมูลโดยรวมจากการวิจัยเท่านั้น

หากข้าพเจ้าได้รับการปฏิบัติไม่ตรงตามที่ได้ระบุไว้ในเอกสารชี้แจง ข้าพเจ้าจะติดต่อกับคณะกรรมการจริยธรรมการวิจัยในคนของมหาวิทยาลัยมหิดล ซึ่งมีสำนักงานอยู่ที่ สำนักงานอธิการบดี มหาวิทยาลัยมหิดล ถนนพุทธมณฑล สาย 4 ตำบลศาลายา อำเภอพุทธมณฑล จังหวัดนครปฐม 73170 หมายเลขโทรศัพท์ 02-849-6223-5 โทรสาร 02-849-6223 หรือคณะกรรมการจริยธรรมการวิจัยในมนุษย์ของสถาบันพัฒนาการคุ้มครองการวิจัยในมนุษย์ (สคม.) อาคาร 8 ชั้น 7 กรมวิทยาศาสตร์การแพทย์ กระทรวงสาธารณสุข จังหวัดนนทบุรี 11000 หมายเลขโทรศัพท์ 02-591-3876, 02-591-3541โทรสาร 02-591-4125

ข้าพเจ้าเข้าใจข้อความในเอกสารชี้แจงผู้เข้าร่วมการวิจัย และหนังสือแสดงเจตนายินยอมนี้โดยตลอดแล้ว จึงลงลายมือชื่อไว้

ลงชื่อ.....ผู้เข้าร่วมงานวิจัย/ผู้แทนโดยชอบธรรม

(.....) วันที่.....

ลงชื่อ.....ผู้ให้ข้อมูลและขอความยินยอม/หัวหน้าโครงการวิจัย

(.....) วันที่.....

ในกรณีที่ข้าพเจ้าไม่สามารถอ่านหนังสือได้ ผู้ที่อ่านข้อความทั้งหมดแทนข้าพเจ้า คือ .....จึงได้ลงลายมือชื่อไว้เป็นพยาน

ลงชื่อ.....พยาน

(.....) วันที่.....

แบบสอบถามต้นทุนในผู้ป่วยผ่าตัดมดลูก

ชื่อโครงการ “การประเมินเทคโนโลยีด้านสุขภาพของการผ่าตัดผ่านกล้องสำหรับประเทศไทย: กรณีศึกษาการผ่าตัดมดลูก”

ผู้สัมภาษณ์: อธิบายวัตถุประสงค์ของการศึกษาวิจัยแก่ผู้ถูกสัมภาษณ์

ชื่อผู้สัมภาษณ์ .....

วัน เดือน ปี (พ.ศ.) ที่สัมภาษณ์ □□/□□/ □□□□

CODE ผู้ป่วย.....

ผู้ให้ข้อมูล □ 1. ผู้ป่วย □ 2. ญาติ มีความสัมพันธ์กับผู้ป่วยโดยเป็น ..... ของผู้ป่วย

ส่วนที่ 1: ข้อมูลทั่วไปของผู้ป่วย

1. อายุ.....ปี

2. สถานภาพสมรส □ 1.โสด □ 2.คู่ □ 3.หย่า □4. หม้าย

3. อาชีพหลัก

□ 1.ข้าราชการ □ 2.พนักงานรัฐวิสาหกิจ □ 3.พนักงานบริษัทเอกชน

□ 4.ค้าขาย/เจ้าของกิจการ □ 5.เกษตรกรรม (ทำนา, ไร่ , สวน) □ 6.แม่บ้าน

□ 7.เกษียณ □ 8.ผู้ใช้แรงงาน/รับจ้างทั่วไป □ 9.ไม่ได้ประกอบอาชีพ

□ 10.อื่นๆ ระบุ .....

4. รายได้จากอาชีพหลัก ..... บาทต่อเดือน

5. ปัจจุบันที่อยู่อาศัยของผู้ป่วยอยู่บริเวณใด

□ 1.อยู่ในเขตกรุงเทพฯ □ 2. ต่างจังหวัด ระบุ.....ในเขตเทศบาล

□ 3.ต่างจังหวัด ระบุ.....อยู่นอกเขตเทศบาล

6. ระดับการศึกษาสูงสุด

□ 1.ไม่ได้เรียนหนังสือ □ 2.ประถมศึกษา □ 3.มัธยมศึกษาหรือเทียบเท่า

□ 4.อนุปริญญา/ประกาศนียบัตร □ 5.ปริญญาตรีหรือเทียบเท่า □6. ปริญญาโทหรือเทียบเท่า

□ 7.อื่นๆ ระบุ .....

7. สิทธิการรักษา

□ 1.ประกันสุขภาพถ้วนหน้า □ 2.ประกันสังคม □ 3.ข้าราชการ/รัฐวิสาหกิจ

□ 4.ทหารผ่านศึก □ 5.ประกันสุขภาพบริษัทเอกชน

□ 6.ชำระค่าใช้จ่ายเอง □ 7.อื่นๆ ระบุ .....

8. โรคที่ได้รับการวินิจฉัย ☐1.ไม่ทราบ ☐2. เยื่อบุมดลูกเจริญผิดที่ ☐3. เนื้องอกในมดลูก ☐4. ประจำเดือนมามากผิดปกติ(มาไม่หยุด) ☐5. อื่นๆ ระบุ……

9. จากข้อ 8 ระยะเวลานับจากการวินิจฉัยว่าเป็นโรค.....ปี.....เดือน (อธิบายเพิ่มเติม)

10. วิธีการรักษา ☐ 1. การผ่าตัดมดลูกทางช่องคลอดผ่านกล้อง ☐ 2. การผ่าตัดมดลูกทางหน้าท้อง

11. จากข้อ 10 ระยะเวลานับจากการได้รับการรักษา .....เดือน.....สัปดาห์ (อธิบายเพิ่มเติม)

12. นอกจากโรคในข้อ 8 ผู้ป่วยมีโรคประจำตัวใดอีกบ้าง (ตอบได้มากกว่า 1 ข้อ)

☐ 1.ไม่มี ☐ 2.โรคความดันโลหิตสูง ☐ 3.โรคหัวใจ

☐ 4.โรคตับอักเสบ ☐5.โรคหอบหืด ☐6.โรคปอด

☐ 7.โรคลมชัก ☐ 8.โรคเบาหวาน ☐ 9. อื่นๆ ระบุ .....

ส่วนที่ 2: ข้อมูลด้านต้นทุนของผู้ป่วย

2.1 ต้นทุนของผู้ป่วยนอก

13. ในช่วงระยะเวลา 6 เดือนที่ผ่านมา ผู้ป่วยต้องมารับการรักษาโรคที่โรงพยาบาลนี้เป็นจำนวน ..... ครั้ง

14. ระยะเวลาที่ใช้ในการมารับการรักษาโรคในครั้งนี้ (เช่น 3 ชั่วโมง 1 วัน).....

15. การมารับการรักษาโรคในครั้งนี้ ผู้ป่วยเสียค่าใช้จ่ายด้านที่พักหรือไม่

☐ 1.ไม่เสียค่าใช้จ่าย ☐ 2.มีค่าที่พักคิดรวมเป็นจำนวนเฉลี่ย ..... บาท

16. ค่าใช้จ่ายในการเดินทางไป-กลับของผู้ป่วย ระหว่างที่พักและโรงพยาบาลเพื่อมารับการรักษาโรคในครั้งนี้ เป็นจำนวนเฉลี่ย ..... บาท (ดูคำอธิบายเพิ่มเติม)

17. ค่าอาหารที่เพิ่มขึ้นในการมาโรงพยาบาลของผู้ป่วยเพื่อมารับการรักษาโรคในครั้งนี้ เป็นจำนวนเฉลี่ย ..... บาท (ดูคำอธิบายเพิ่มเติม)

18. ค่ารักษาพยาบาลที่ต้องจ่ายเพิ่มเติมจากสิทธิการรักษาในครั้งนี้เป็นจำนวนเฉลี่ย.....บาท

19.การมารับการรักษาโรคในครั้งนี้ ผู้ป่วยต้องมีญาติเพื่อพามารับการรักษาที่โรงพยาบาลหรือไม่

☐ 1.ไม่มี ☐ 2.มี จำนวน ..... คน โปรดระบุรายละเอียดค่าใช้จ่าย

	จำนวน (ในครั้งนี้)		
	คนที่ 1	คนที่ 2	คนที่ 3
อายุ			
เพศ			
ระยะเวลาที่ใช้ทั้งหมดเพื่อพาผู้ป่วยมารับการรักษา เช่น 2 ชั่วโมง			
ค่าที่พัก			

ค่าเดินทางไป-กลับ			
ค่าอาหาร(ที่เพิ่มขึ้น)			
อื่นๆ ระบุ.....			

20.ในช่วงเวลาระยะเวลา 1 เดือนที่ผ่านมา นอกเหนือจากผู้ป่วยมารับการรักษาโรคที่โรงพยาบาลนี้แล้ว ได้ไปรับการรักษาจากสถานที่อื่นที่หรือไม่

☐ 1.ไม่ ☐ 2.ใช่ โปรดระบุรายละเอียด

สถานที่	จำนวนครั้ง	จำนวนเงินเฉลี่ยที่จ่ายต่อครั้ง
☐ โรงพยาบาลอื่นๆ ระบุ		
☐ คลินิก		
☐ ศูนย์บริการสาธารณสุข		
☐ อื่นๆ ระบุ		

21.ในช่วงเวลาระยะเวลา 1 เดือนที่ผ่านมา ผู้ป่วยได้ซื้อยา ผลิตภัณฑ์สมุนไพร หรือผลิตภัณฑ์เสริมอาหารเองเพื่อการรักษา หรือบรรเทาอาการที่เกิดจากโรคเองหรือไม่

☐ 1.ไม่ ☐2. ใช่ โปรดระบุรายละเอียด

รายการ	ชื่อหรือชนิดของยาหรือผลิตภัณฑ์เสริมอาหาร	ระยะเวลาที่ใช้ยาหรือผลิตภัณฑ์เสริมอาหาร	ราคา
1			
2			
3			
4			
5			

22.ในช่วงเวลาระยะเวลา 1 เดือนที่ผ่านมา ผู้ป่วยต้องอาศัยญาติในการทำกิจกรรมการดูแลอย่างไม่เป็นทางการหรือไม่ (อธิบายเพิ่มเติม)

☐ 1.ไม่ (ข้ามไปทำข้อ 24) ☐ 2.ใช่ โปรดระบุรายละเอียด

	จำนวน		
	คนที่ 1	คนที่ 2	คนที่ 3
อายุ			

เพศ			
ความถี่ของการช่วยเหลือ (เช่น ทุกวัน สัปดาห์ละ...ครั้ง)			
ระยะเวลาต่อครั้ง (เช่น 2 ชั่วโมง)			
เป็นระยะเวลาต่อเนื่องนานเท่าใด (เช่น 1 สัปดาห์)			

23.จากข้อ 22 ญาติของผู้ป่วยพักอยู่บ้านเดียวกับผู้ป่วยหรือไม่

☐ 1.ใช่

☐ 2.ไม่ และต้องเสียค่าใช้จ่ายในการเดินทางไป-กลับเป็นจำนวนเฉลี่ย..... บาทต่อการมาบ้านผู้ป่วย 1 ครั้ง

2.2 ต้นทุนของผู้ป่วยใน

24. ผู้ป่วยเข้ารับการรักษาตัวในโรงพยาบาลเป็นเวลา.....วัน
ตั้งแต่วันที่.....ถึงวันที่.....

25. ค่ารักษาพยาบาลที่ต้องจ่ายเพิ่มเติมจากสิทธิการรักษาเป็นจำนวนเฉลี่ย.....บาท

26.ในการเข้ารับการรักษาตัวในโรงพยาบาล ผู้ป่วยต้องมีญาติเพื่อมาดูแลระหว่างนอนโรงพยาบาลหรือไม่

☐ 1.ไม่มี ☐ 2.มี จำนวน..... คน โปรดระบุรายละเอียดค่าใช้จ่าย

	จำนวน		
	คนที่ 1	คนที่ 2	คนที่ 3
อายุ			
เพศ			
ความถี่ของการช่วยเหลือ (เช่น ทุกวัน สัปดาห์ละ...ครั้ง)			
ระยะเวลาต่อครั้ง (เช่น 2 ชั่วโมง)			
ค่าที่พัก			
ค่าเดินทางไป-กลับ			
ค่าอาหาร(ที่เพิ่มขึ้น)			
อื่นๆ ระบุ.....			

27. ในช่วง 1 เดือนที่ผ่านมาหลังได้รับการผ่าตัด ท่านเคยมีอาการป่วย หรืออาการข้างเคียงที่รุนแรง ที่เกิดจากการผ่าตัดหรือไม่

☐ 1. ไม่เคย ☐ 2. เคย ระบุ.....โดยที่

☐ 1. ต้องกลับมาพักรักษาตัวโรงพยาบาล.....วัน ☐ 2. มาพบแพทย์และกลับไปรักษาตัวที่บ้าน

28. ในช่วง 1 เดือนที่ผ่านมาหลังได้รับการผ่าตัด ท่านเคยมีอาการป่วย จนต้องได้รับการดูแลเป็นพิเศษที่บ้านหรือหยุดงานเพื่อพักรักษาตัวที่บ้านหรือไม่

☐ 1.ไม่เคย ☐ 2.เคย จำนวน .....วันในรอบ 1 เดือนโดยที่

☐ 1. มีคนคอยดูแลทุกวัน ☐ 2. ไม่ได้มีคนคอยดูแลทุกวัน จำนวนวันที่มีคนคอยดูแล.....วัน

29. ตั้งแต่ผู้ป่วยเกิดโรค ผู้ป่วยหรือญาติจัดหาสิ่งต่อไปนี้หรือไม่ โปรดระบุรายละเอียด

☐ 1.ไม่ ☐2. ใช่ โปรดระบุรายละเอียด

รายการ	จำนวนเงิน
☐ ผู้ดูแลผู้ป่วย (ระบุอัตราจ้างต่อเดือน)	
☐ ผู้ดูแลทำงานบ้านหรือคนรับใช้ เนื่องจากการเจ็บป่วยของผู้ป่วยทำให้ไม่สามารถทำเองได้ (ระบุอัตราจ้างต่อเดือน)	
☐ ผู้ดูแลบุตรหรือบุพการีของผู้ป่วยเนื่องจากการเจ็บป่วยของผู้ป่วยทำให้ไม่สามารถทำเองได้ (ระบุอัตราจ้างต่อเดือน)	
☐ อื่นๆ (เช่น รถเข็น) ระบุ	

30.ในปัจจุบันผู้ป่วยได้รับเงินช่วยเหลือ จากการเจ็บป่วย หรือไม่

☐ 1.ไม่ได้

☐ 2.ได้ โปรดระบุแหล่งที่มา.....

จำนวน …….....บาทต่อเดือน

31. ท่านสามารถกลับมาทำงาน หรือใช้ชีวิตตามปกติหลังการผ่าตัดเป็นเวลา.....เดือน .....สัปดาห์.....วัน

ข้อคิดเห็น:

……

……

…….....

APPENDIX C

Table C-1 Number of hospitalization of patients undergoing laparoscopic surgery in year 2005-2007

No	ICD-10	Laparoscopic		No laparoscopic		Total number of Admission
		Number of Admission	Proportion	Number of Admission	Proportion	
1	C187	57	0.51	11,191	99.49	11,248
2	C20	68	0.24	28,327	99.76	28,395
3	C221	60	0.19	31,338	99.81	31,398
4	C56	116	0.42	27,214	99.58	27,330
5	C61	300	3.19	9,091	96.81	9,391
6	D250	167	2.91	5,581	97.09	5,748
7	D251	379	2.96	12,425	97.04	12,804
8	D252	128	5.56	2,175	94.44	2,303
9	D259	785	2.37	32,292	97.63	33,077
10	D27	300	5.91	4,777	94.09	5,077
11	D391	133	2.39	5,432	97.61	5,565
12	K350	892	1.75	50,056	98.25	50,948
13	K359	1,385	0.63	217,172	99.37	218,557
14	K409	97	0.15	65,664	99.85	65,761
15	K565	136	2.56	5,175	97.44	5,311
16	K566	359	0.93	38,170	99.07	38,529
17	K800	701	6.64	9,852	93.36	10,553
18	K801	3,024	30.59	6,861	69.41	9,885
19	K802	10,574	34.97	19,667	65.03	30,241
20	K803	56	1.75	3,153	98.25	3,209
21	K804	107	4.55	2,246	95.45	2,353
22	K805	214	2.74	7,596	97.26	7,810
23	K810	481	1.71	27,713	98.29	28,194
24	K811	563	20.44	2,192	79.56	2,755
25	K828	94	31.65	203	68.35	297
26	N701	56	9.20	553	90.80	609
27	N736	206	33.88	402	66.12	608

Table C-1 Number of hospitalization of patients undergoing laparoscopic surgery in year 2005-2007

No	ICD-10	Laparoscopic		No laparoscopic		Total number of Admission
		Number of Admission	Proportion	Number of Admission	Proportion	
28	N800	449	5.79	7,304	94.21	7,753
29	N801	840	18.04	3,817	81.96	4,657
30	N803	231	26.52	640	73.48	871
31	N809	277	9.23	2,724	90.77	3,001
32	N831	87	5.21	1,582	94.79	1,669
33	N832	508	5.20	9,265	94.80	9,773
34	N858	102	5.67	1,696	94.33	1,798
35	O001	243	2.68	8,832	97.32	9,075
Total		**24,175**	**3.52**	**662,378**	**96.48**	**686,553**

Table C-2 Number of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery in year 2005-2007

Scheme / ICD-10	Total number of Admission	CSMBS#						UC##					
		Laparoscopic			No laparoscopic			Laparoscopic			No laparoscopic		
		Number of Admission	Gender		Number of Admission	Gender		Number of Admission	Gender		Number of Admission	Gender	
			M*	F**		M*	F**		M*	F**		M*	F**
C187	11,248	26	12	14	4,209	2,530	1,679	31	13	18	6,982	3,575	3,407
C20	28,395	39	22	17	8,219	5,135	3,084	29	10	19	20,108	10,857	9,251
C221	31,398	24	18	6	6,847	4,379	2,468	36	17	19	24,491	15,942	8,549
C56	27,330	39	-	39	6,607	-	6,607	77	-	77	20,607	-	20,607
C61	9,391	274	274	-	4,114	4,114	-	26	26	-	4,977	4,977	-
D250	5,748	75	-	75	1,213	-	1,213	92	-	92	4,368	-	4,368
D251	12,804	212	-	212	3,736	-	3,736	167	-	167	8,689	-	8,689
D252	2,303	91	-	91	810	-	810	37	-	37	1,365	-	1,365
D259	33,077	233	-	233	5,979	-	5,979	552	-	552	26,313	-	26,313
D27	5,077	128	-	128	881	-	881	172	-	172	3,896	-	3,896
D391	5,565	23	-	23	722	-	722	110	-	110	4,710	-	4,710

#CSMBS : Civil Servant Medical Benefit Scheme
##UC : Universal Coverage scheme
**M : Male*
***F : Female*

Table C-2 Number of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery in year 2005-2007 (cont.)

Scheme / ICD-10	Total number of Admission	CSMBS#						UC##					
		Laparoscopic			No laparoscopic			Laparoscopic			No laparoscopic		
		Number of Admission	Gender		Number of Admission	Gender		Number of Admission	Gender		Number of Admission	Gender	
			M*	F**		M*	F**		M*	F**		M*	F**
K350	50,948	65	29	36	4,831	2,593	2,238	827	421	406	45,225	23,790	21,435
K359	218,557	169	71	98	19,949	9,713	10,236	1,216	568	648	197,223	91,632	105,591
K409	65,761	57	54	3	10,795	10,067	728	40	38	2	54,869	51,622	3,247
K565	5,311	26	13	13	799	419	380	110	65	45	4,376	2,784	1,592
K566	38,529	46	19	27	4,777	2,634	2,143	313	195	118	33,393	21,533	11,860
K800	10,553	305	127	178	1,639	735	904	396	111	285	8,213	3,087	5,126
K801	9,885	1,702	583	1,119	1,297	570	727	1,322	334	988	5,564	1,936	3,628
K802	30,241	3,293	991	2,302	3,330	1,220	2,110	7,281	1,733	5,548	16,337	4,893	11,444
K803	3,209	22	10	12	665	323	342	34	12	22	2,488	1,139	1,349
K804	2,353	53	23	30	357	166	191	54	20	34	1,889	762	1,127
K805	7,810	98	40	58	1,631	803	828	116	42	74	5,965	2,614	3,351
K810	28,194	167	71	96	3,669	1,781	1,888	314	110	204	24,044	10,498	13,546
K811	2,755	186	74	112	354	176	178	377	112	265	1,838	705	1,133
K828	297	54	22	32	54	29	25	40	13	27	149	60	89

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Table C-2 Number of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery in year 2005-2007 (cont.)

Scheme / ICD-10	Total number of Admission	CSMBS#						UC##					
		Laparoscopic			No laparoscopic			Laparoscopic			No laparoscopic		
		Number of Admission	Gender		Number of Admission	Gender		Number of Admission	Gender		Number of Admission	Gender	
			M*	F**		M*	F**		M*	F**		M*	F**
N701	609	24	-	24	71	-	71	32	-	32	482	-	482
N736	608	78	-	78	87	-	87	128	-	128	315	-	315
N800	7,753	236	-	236	2,152	-	2,152	213	-	213	5,152	-	5,152
N801	4,657	576	-	576	1,068	-	1,068	264	-	264	2,749	-	2,749
N803	871	122	-	122	149	-	149	109	-	109	491	-	491
N809	3,001	132	-	132	645	-	645	145	-	145	2,079	-	2,079
N831	1,669	27	-	27	215	-	215	60	-	60	1,367	-	1,367
N832	9,773	153	-	153	1,323	-	1,323	355	-	355	7,942	-	7,942
N858	1,798	26	-	26	324	-	324	76	-	76	1,372	-	1,372
O001	9,075	34	-	34	658	-	658	209	-	209	8,174	-	8,174
Total	**686,553**	**8,815**	**2,453**	**6,362**	**104,176**	**47,387**	**56,789**	**15,360**	**3,840**	**11,520**	**558,202**	**252,406**	**305,796**

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***F : Female*

Table C-3 Mean age and the proportion of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery in year 2005-2007

Scheme	CSMBS#								UC##							
	Laparoscopic				No laparoscopic				Laparoscopic				No laparoscopic			
ICD-10	Proportion of Admission	Mean Age	Proportion		Proportion of Admission	Mean Age	Proportion		Proportion of Admission	Mean Age	Proportion		Proportion of Admission	Mean Age	Proportion	
			M*	F**			M*	F**			M*	F**			M*	F**
C187	0.61	63.58	46.15	53.85	99.39	63.66	60.11	39.89	0.44	62.90	41.94	58.06	99.56	59.69	51.20	48.80
C20	0.47	67.87	56.41	43.59	99.53	63.38	62.48	37.52	0.14	59.52	34.48	65.52	99.86	59.70	53.99	46.01
C221	0.35	60.33	75.00	25.00	99.65	63.70	63.96	36.04	0.15	57.19	47.22	52.78	99.85	60.84	65.09	34.91
C56	0.59	52.95	-	100.0	99.41	55.38	-	100.0	0.37	46.42	-	100.0	99.63	50.52	-	100.00
C61	6.24	67.86	100.0	-	93.76	73.71	100.0	-	0.52	67.50	100.0	-	99.48	71.46	100.0	-
D250	5.82	43.68	-	100.0	94.18	45.49	-	100.0	2.06	43.14	-	100.0	97.94	44.59	-	100.0
D251	5.37	44.68	-	100.0	94.63	45.38	-	100.0	1.89	43.82	-	100.0	98.11	44.59	-	100.0
D252	10.10	40.43	-	100.0	89.90	44.27	-	100.0	2.64	43.89	-	100.0	97.36	44.00	-	100.0
D259	3.75	44.92	-	100.0	96.25	45.47	-	100.0	2.05	44.39	-	100.0	97.95	44.84	-	100.0
D27	12.69	40.22	-	100.0	87.31	47.04	-	100.0	4.23	34.95	-	100.0	95.77	40.63	-	100.0
D391	3.09	41.52	-	100.0	96.91	49.51	-	100.0	2.28	39.26	-	100.0	97.72	43.34	-	100.0

#CSMBS : Civil Servant Medical Benefit Scheme
##UC : Universal Coverage scheme
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***F : Female*

Table C-3 Mean age and the proportion of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery in year 2005-2007 (cont.)

Scheme	CSMBS#								UC##							
	Laparoscopic				No laparoscopic				Laparoscopic				No laparoscopic			
ICD-10	Proportion of Admission	Mean Age	Proportion		Proportion of Admission	Mean Age	Proportion		Proportion of Admission	Mean Age	Proportion		Proportion of Admission	Mean Age	Proportion	
			M*	F**			M*	F**			M*	F**			M*	F**
K350	1.33	47.32	44.62	55.38	98.67	46.57	53.67	46.33	1.80	34.57	50.91	49.09	98.20	35.66	52.60	47.40
K359	0.84	39.09	42.01	57.99	99.16	37.89	48.69	51.31	0.61	30.02	46.71	53.29	99.39	31.48	46.46	53.54
K409	0.53	60.63	94.74	5.26	99.47	59.22	93.26	6.74	0.07	57.88	95.00	5.00	99.93	45.14	94.08	5.92
K565	3.15	58.73	50.00	50.00	96.85	60.17	52.44	47.56	2.45	41.49	59.09	40.91	97.55	46.66	63.62	36.38
K566	0.95	63.78	41.30	58.70	99.05	62.92	55.14	44.86	0.93	43.67	62.30	37.70	99.07	50.91	64.48	35.52
K800	15.69	59.36	41.64	58.36	84.31	64.01	44.84	55.16	4.60	51.93	28.03	71.97	95.40	58.94	37.59	62.41
K801	56.75	59.44	34.25	65.75	43.25	62.68	43.95	56.05	19.20	51.45	25.26	74.74	80.80	56.43	34.80	65.20
K802	49.72	56.91	30.09	69.91	50.28	60.86	36.64	63.36	30.83	51.47	23.80	76.20	69.17	53.99	29.95	70.05
K803	3.20	60.91	45.45	54.55	96.80	70.02	48.57	51.43	1.35	62.24	35.29	64.71	98.65	62.56	45.78	54.22
K804	12.93	60.64	43.40	56.60	87.07	69.50	46.50	53.50	2.78	58.39	37.04	62.96	97.22	63.49	40.34	59.66
K805	5.67	61.21	40.82	59.18	94.33	67.23	49.23	50.77	1.91	53.73	36.21	63.79	98.09	61.13	43.82	56.18
K810	4.35	62.55	42.51	57.49	95.65	65.25	48.54	51.46	1.29	55.23	35.03	64.97	98.71	59.23	43.66	56.34
K811	34.44	58.16	39.78	60.22	65.56	63.48	49.72	50.28	17.02	52.50	29.71	70.29	82.98	56.73	38.36	61.64
K828	50.00	50.63	40.74	59.26	50.00	55.52	53.70	46.30	21.16	47.55	32.50	67.50	78.84	52.30	40.27	59.73

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Table C-3 Mean age and the proportion of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery in year 2005-2007 (cont.)

Scheme	CSMBS#								UC##							
	Laparoscopic				No laparoscopic				Laparoscopic				No laparoscopic			
ICD-10	Proportion of Admission	Mean Age	Proportion M*	Proportion F**	Proportion of Admission	Mean Age	Proportion M*	Proportion F**	Proportion of Admission	Mean Age	Proportion M*	Proportion F**	Proportion of Admission	Mean Age	Proportion M*	Proportion F**
N701	25.26	42.58	-	100.0	74.74	39.73	-	100.0	6.23	32.09	-	100.0	93.77	36.48	-	100.00
N736	47.27	37.65	-	100.0	52.73	42.14	-	100.0	28.89	35.63	-	100.0	71.11	36.16	-	100.00
N800	9.88	41.10	-	100.0	90.12	43.95	-	100.0	3.97	38.64	-	100.0	96.03	42.16	-	100.00
N801	35.04	35.18	-	100.0	64.96	38.35	-	100.0	8.76	32.85	-	100.0	91.24	35.65	-	100.00
N803	45.02	34.16	-	100.0	54.98	36.78	-	100.0	18.17	33.44	-	100.0	81.83	36.38	-	100.00
N809	16.99	34.51	-	100.0	83.01	36.83	-	100.0	6.52	32.11	-	100.0	93.48	33.80	-	100.00
N831	11.16	35.85	-	100.0	88.84	31.55	-	100.0	4.20	28.53	-	100.0	95.80	25.98	-	100.00
N832	10.37	40.22	-	100.0	89.63	43.26	-	100.0	4.28	35.60	-	100.0	95.72	37.42	-	100.00
N858	7.43	36.19	-	100.0	92.57	39.66	-	100.0	5.25	34.61	-	100.0	94.75	35.16	-	100.00
O001	4.91	31.50	-	100.0	95.09	31.24	-	100.0	2.49	27.60	-	100.0	97.51	27.81	-	100.00
Total	**7.80**	**53.32**	**27.83**	**72.17**	**92.20**	**53.52**	**45.49**	**54.51**	**2.68**	**46.35**	**25.00**	**75.00**	**97.32**	**42.62**	**45.22**	**54.78**

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***F : Female*

Table C-4 Mean age and the proportion of hospitalization of CSMBS and UC patients undergoing laparoscopic surgery between admission years 2005-2007

Scheme	CSMBS#								UC##							
	Laparoscopic				No laparoscopic				Laparoscopic				No laparoscopic			
Year	Proportion of Admission	Mean Age	Proportion M*	Proportion F**	Proportion of Admission	Mean Age	Proportion M*	Proportion F**	Proportion of Admission	Mean Age	Proportion M*	Proportion F**	Proportion of Admission	Mean Age	Proportion M*	Proportion F**
2005	7.23	52.81	26.90	73.10	92.77	52.74	45.11	54.89	2.55	45.47	25.84	74.16	97.45	42.00	45.56	54.44
2006	8.28	52.95	28.31	71.69	91.72	53.34	45.62	54.38	2.80	45.80	25.52	74.48	97.20	42.57	44.94	55.06
2007	7.88	54.11	28.12	71.88	92.12	54.42	45.71	54.29	2.67	47.66	23.75	76.25	97.33	43.21	45.18	54.82
Total	**7.80**	**53.32**	**27.83**	**72.17**	**92.20**	**53.52**	**45.49**	**54.51**	**2.68**	**46.35**	**25.00**	**75.00**	**97.32**	**42.62**	**45.22**	**54.78**

#CSMBS : Civil Servant Medical Benefit Scheme
##UC : Universal Coverage scheme
**M : Male*
***F : Female*

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PUBLICATION / PRESENTATION	**"**FACTORS ASSOCIATED WITH THE USE OF LAPAROSCOPIC SURGERY IN THAILAND: RESULTS FROM THE 2005-2007 NATIONWIDE INPATIENT DATABASE", Journal of Srinakharinwirot University (Science and Technology), Volume 2 Supplement 1 JAN 2010, p95-105