5.3. Narrow the gap between expectation and reality

Most drug treatments have potential side effects, and likewise there is no medical or surgical intervention with 100% efficacy. A Declaration of Patients Rights was promulgated in 1998 by all professional councils, but physicians are not keen to provide adequate and effective information to patients before medical and surgical interventions. Informed consent is routinely assumed though patients and relatives are in practice inadequately informed. Communication skills among public doctors were rated poorly in a study on consumer satisfaction in hospitals in Bangkok [29]. Health-care professionals must help their patients form a more realistic idea of what to expect. Effective communication skills and public health education can narrow the gap between the patients' expectations and reality.

5.4. Introduce the participation of consumer representatives in professional organisations

The Medical Council, Pharmacy Council, Dental Council and Nursing Council are responsible for entry into the market, and overseeing and controlling professional quality of care and ethical conduct. Their Boards of Governance consist of elected and ex-officio members, but there are no consumer representatives to voice their concerns. Professional organisations should include consumer representatives in their committees in order to improve transparency. The participating consumer can represent the consumer side and simultaneously monitor the roles of professionals on the supply side. This will result in mutual benefits for both parties. The proposed mechanism could contribute to erasing the image of self-protection among the professionals.

5.5. Empower consumer organisations

Although consumer representation in professional councils is important, not least in a symbolic sense, it is not likely to be able to effect a major change in how the Councils operate because of the superior status and influence wielded by professionals. Hence further means of empowering consumers are needed. All regulators must be required to disclose information to the public and consult consumer organisations over particular policy decisions so that consumers' rights will be further strengthened and consumer organisations empowered. However, these organisations are currently quite weak and require strengthening, and must be supported by the public media and related professional organisations such as the Journalist Council. Through working with the civil society movement, consumer organisations can be more effective. The role of research is also important: researchers working within the public and non-profit sectors can feed relevant information to civil society groups, and help counteract the influence of information from biased sources such as the pharmaceutical industry.

5.6. Discourage medical lawsuits and professional insurance

Medical protection insurance is not uncommon in large private hospitals, and insurance companies are penetrating Thai hospital markets. There is a risk of creating the environment of the US where fear of litigation generates unnecessary investigations, overdiagnosis and overtreatment and hence higher health-care costs, and there is a vicious cycle of rising insurance premia and rising health-care costs. One option, which requires urgent investigation, is to establish no-fault compensation for victims to cover all losses related to preventive interventions, diagnostic procedures, treatment and scientific experiments affecting health volunteers or donors. Without having to prove that someone was at fault, this mechanism will reduce the pressure of wariness on the one side and defensiveness on the other side. All relevant stakeholders could establish this fund which might be financed mainly by the state from public taxes, but could also involve contributions from health-care purchasers, pharmaceutical and health-related industries and health-care providers.

The above suggestions, which require strengthening not just regulatory procedures but also the context in which they operate, should help ensure

the healthy development of both public and private health-care sectors in Thailand.

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The regulation of the South African pharmaceutical market

Pharmaceutical policy and regulation have been a central, if contested, element of the wide-ranging health reform programmes discussed since the inauguration of the new South African government in 1994. Unlike many other low- and middle-income countries, South Africa's regulatory framework is in line with most industrialized countries. Legislation of the market authorization process is governed by the Medicines and Related Substances Control Act of 1965. The Act contains the classical regulations concerning safety, quality and efficacy conditions for approvals. The purpose of this study is to map out the major regulations in the South African pharmaceutical market. The study draws on data from official statistics, documentation of regulations and interviews with key informants.

Recently, conduct of the market authorization process shows impairment in terms of an increase in the registration time of most types of drugs. There are small differences in approval times between generics and original products, implying that the former could be handled more efficiently. Drugs aimed at severe disease problems such as the HIV/AIDS epidemic show a similar time for registration. There are also indications that some multi-national pharmaceutical companies first launch their new drugs in the developed markets and then later apply for registration in countries like South Africa.

The system of employing part-time evaluators in the approval process often leads to blockages. Evaluators are not offered enough incentives to encourage them to prioritize their involvement in the process. The regulator is also limited with regard to the use of policing mechanisms, since evaluators can easily opt out. The option of establishing in-house evaluation capacity also entails problems of resources in terms of costs and available competence. The perceived inefficiencies in the approval process have created tension with the industry. To some extent this tension has been reduced through improved processes of communication between the regulator and the regulatees. Inadequate human resources also contribute significantly to the capacity problem.

Comparatively, the regulations of the South African pharmaceutical market do not appear to be controversial. After the court case in 2001 between the pharmaceutical industry and the government, the subsequent revision of the Act in question seems to be accepted by the industry and the feared violation of intellectual property rights turned out to be exaggerated. Still, a closer examination of some of the management and implementation aspects of these regulations show that there are unintended effects of these regulations. Other areas where potential improvement could be made are the encouragement of generic competition in the private market.

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Consumer protection in the health sector in Thailand

In Thailand, the Consumer Protection Act does not extend to cover products and services for which specific regulations are enacted. Regulations on consumer protection in the health sector are fragmented and varied, and have been established under the responsibility of health related organizations namely the Ministry of Public Health and professional bodies. Evidence shows that medical complaints have increased and there is a growing public interest in medical errors. This raises concerns about the appropriateness of having the regulatory function under providers' responsibility as in the case of professional councils. A study to investigate the management mechanism of medical liability, regulatory framework, and involvement of stakeholders, using the cases of organ transplantation and medical complaints as tracers, is providing an insight for further policy recommendations.

Extensive document review, key informant interviews, and focus group discussions were employed. Results show that the regulatory system relating to medical error has been well established and developed over time. However, the regulation cannot be adjusted to cope with recent changes in the health sector, such as growing private involvement and greater consumer expectations. Although the existing regulations are well accepted by providers, they have a low level of enforcement. The evidence of organ trafficking, increasing number of cases pending at the Medical Council, and key stakeholders' responses reflect the system's ineffectiveness. Factors influencing the ineffectiveness are a lack of transparency and time limits in the regulatory process, and poor performance of regulators due to low motivation. Patient interviews also show that consumers have a low level of awareness and accessibility to the regulatory process, and in the case of medical complaints, the compensation system is not well developed. Due to high financial and time costs involved in the process, informal negotiation between the provider and patients is widely in use in which some amount of compensation is agreed and provided in exchange for not pursuing a lawsuit.

In conclusion, results from two case studies share common findings that there is a lack of interest among key players in enforcing the regulations. To avoid a conflict of interest, an independent organization representing patients and a hospital complaints centre should be established in the community in the future to facilitate fair compensation. Alternatively, the short-term recommendation is that the Medical Council should be made more accountable to the public by involving external stakeholders in its governance functions. The Medical Council's ethical sub-committee should function on a full-time basis and with a time limited process to reduce the complainant's financial and time costs.

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Dual practice and economic transformation: the case of China

Private practice in the health sector was re-introduced from 1980 when China began its economic reform from a planned economy to a market economy. Since then, the total number of private sector providers has grown substantially. However from the health policy perspective, little is known about dual practice (DP). The aim of this study is to describe policies and regulations relating to it, the current situation, its possible impact and to provide recommendations for future policies in this area.

This study was conducted in two provinces, Shandong and Sichuan. It involved a combination of key informant interviews, document analyses (including financial records) and questionnaire surveys.

Discussions with doctors indicated that out of those doctors who carried out such activity, it was undertaken, on average, less than 2 times per month and accounted for around 30% of their total income. However, this was seen to be an underestimate according to other stakeholders who argued that such activity amongst medical doctors (particularly surgeons) is much more prevalent. It is likely that this possible under-reporting by doctors is related to the ambiguous legal status of this activity and their reluctance to reveal higher levels of engagement.

Most of the doctors spoken to thought DP is acceptable and that it should be made legal. Many argue that DP helps establish important communication bridges between hospitals. Those doctors who reported that they abstained from DP said they did so because of a lack of time. Awareness of the regulations regarding DP amongst doctors was quite low (24% in our sample reported being familiar with them).

Because of the recent changes in Chinese society and the macro economy – in particular the transformation from a planning to a market-oriented model, the growing phenomenon of dual practice has highlighted some problems for the way in which public hospitals are managed and regulated. From the beginning of the 1990's, the Ministry of Health and provincial government have maintained bans on such activity. Currently, due to the limited financial capacity within the public sector, salary levels of public hospital doctors have fallen relative to the rest of the population. At odds with the bans is the reality that many public hospital doctors do have some experience of DP. Furthermore they feel that such activity has positive benefits for the hospitals in which they are employed and is an important means by which such doctors are able to maintain income levels. Therefore it is heavily supported by medical practitioners and public hospital managers who view it as a means of addressing the financial problems associated with maintaining medical staff. In the near future there are likely to be changes in the regulations regarding DP with growing acceptance by policy makers of the difficulty of enforcing existing bans in the face of overwhelming economic imperatives.

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Dual Practice among Public Medical Doctors in Thailand

In Thailand, as in other countries, the government allows public medical doctors to undertake private practice. Low salaries in the public sector is a significant motivation. Furthermore, there is a strong preference for private services in Thailand and therefore good opportunities in terms of both income generation and prestige associated with it. Previous evidence, however, has shown that dual practice may lead to negative impacts on public health services. Therefore, knowledge of the impact, patterns, behaviour, motivation and regulatory issues around dual practice may provide guidance on forming appropriate policies for solving problems that may result from it.

The study was conducted in five provinces of Thailand (Bangkok, Konkaen, Lopburi, Payao, Songkla) in 2001. Three methodologies were employed, namely, comprehensive document reviews, a survey of 1,808 public medical doctors using anonymous self-administered questionnaires, and in-depth interviews of key informants.

The response rate of the survey was 36 % or 659 completed questionnaires. Results revealed that 69 % of public doctors had dual practices. The main reason for having dual practice was "income from public service is inadequate". A logistic regression analysis showed that factors influencing dual practice engagement were being male medical doctors and medical specialists. The ratio of total monthly income between fully public and dual practice medical doctors was 2.2. In-depth interviews illustrated that implications of dual practice range from public-time corruption, neglecting public patients, poor performance in the public sector due to exhaustion from private work and related to this, differences in the quality of care between public and private. Existing regulations regarding dual practice tend to be indirect with poor enforcement. Responsible organizations such as the Ministry of Public Health and Thai Medical Councils have neither any policy in this area nor intention to regulate it.

As private provision still plays significant roles in the Thai health care system, dual practice performs two useful functions: compensating for the low salary of public medical doctors and increasing access to health care. However, the negative impacts of dual practice require regulations and measures to minimize these consequences. The strengthening of regulatory measures and administrative capabilities, the introduction of new methods for public medical doctor's payment which reflect performance and quality of care, and a reform of employment patterns into part-time and full-time may be options for policy recommendations. Moreover, indirect measures such as good dual practice guidelines, Quality Assurance (QA), and Hospital Accreditation (HA) should be introduced. This will control the adverse consequences of dual practice, and improve consumer choice and patient access to health care.

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Competing interests: JS chaired the working group preparing guidelines on injectable opiate maintenance treatment for the National Treatment Agency and Department of Health (2002/3) and has recently been awarded a research grant for randomised trial of injectable versus oral opiate maintenance treatment.

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Learning from Thailand's health reforms

Adrian Towse, Anne Mills, Viroj Tangcharoensathien

Providing all of Thailand's population with subsidised health care required radical changes in the health system

Thailand took a "big bang" approach to introducing universal access to subsidised health care. In 2001, after years of debate[1–3] and slow progress,[4 5] it extended coverage to 18.5 million people who were previously uninsured (out of a population of 62 million). This move was combined with a radical shift in funding away from major urban hospitals in order to build up primary care. Such an approach has merits but also risks. We discuss the implementation and some of the problems.

Formulating the change

Prime Minister Shinawatra obtained a landslide victory for his Thai-Rak-Thai (Thais love Thais) Party in 2001 on a platform including the "30 baht treat all" scheme for universal access to subsidised health care. Under the scheme, people pay 30 baht (£0.50, €0.7, $0.86) for each visit or admission.

Thailand previously had four public risk protection schemes (box 1) with widely differing benefits and contribution levels. These schemes protected a total 43.5 million people, leaving 18.5 million paying fees for care from public or private providers.

The initial plan was to merge resources from the four schemes into one universal coverage scheme to remove overlaps in coverage and improve equity. This met resistance from government departments running the other schemes and from civil servants and trades unionists benefiting from the two employment based schemes. The government therefore decided to fund the 30 baht scheme by pooling the Ministry of Public Health budgets for public hospitals, other health facilities, and the low income and voluntary health card schemes and providing some additional money. This could be done without legislation, enabling progress to be made while legislation was prepared and debated.

The National Health Security Act was passed by parliament in November 2002, creating new institutions to regulate the quality and financial elements of the scheme. It preserves all benefit entitlements for members of the civil service and social security schemes but places management of their financing with the National Health Security Office, which runs the 30 baht scheme. The act allows for the civil service and social security schemes to be merged into a single universal coverage scheme by decree should that become politically acceptable in the future.

SAEED KHAN/GETTY IMAGES

The Hai healthcare system is dominated by hospitals

Factors required for implementation

In low and middle income countries, government capacity is often a key constraint on the design and implementation of policy change.[6 7] In Thailand, previous experience and investment in health care was essential for implementation of the universal coverage scheme.

Over several decades, comprehensive healthcare coverage had been achieved through developing infrastructure in rural areas, where two thirds of Thailand's

Box 1: Public risk protection schemes

Civil servants medical benefit scheme—introduced in the 1960s for civil servants and their dependants

Low income card scheme—introduced in the 1970s, providing free care to low income families and individuals, elderly people, children under 12 years, and people with disabilities

Voluntary health card scheme—predominantly rural; introduced in the 1980s and funded through equal matching of household and Ministry of Public Health payments

Social security scheme—introduced in the 1990s; it protects workers only and is mandatory for all private firms with more than one employee

P+ *Tables showing the costs of health care are on bmj.com*

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population lives. Although beds (public and private) and doctors are concentrated in Bangkok, successive governments have built up primary care health centres (which do not have doctors or beds) in all subdistricts and community hospitals (10-120 beds) in more than 90% of districts. In addition, an effective administrative system meant that 45 million people could be registered for the universal coverage scheme within four months.

Experience had also been gained in managing insurance schemes, especially relating to payment mechanisms in urban areas where provider choice is available. Although retrospective fee for service payment in the civil service scheme encouraged increased costs, the social security scheme provided a successful capitation model.[8] Employees choose a public or private hospital, which receives an annual capitation payment, and provides care directly or subcontracts to primary care. The capitation approach encouraged the development of competing provider networks and contained costs while still permitting choice of public or private provider (the market share of the public sector fell from 83% in 1991 to 41% in 2001).

The low income card scheme provided experience of resource allocation and of case based payment in rural areas. Under this scheme, a global budget was allocated to provinces based on the numbers of registered beneficiaries, weighted by health needs. A reinsurance premium of 2.5% was deducted from the allocations to pay for cross boundary services and high cost care for patients. Hospitals were paid on a per capita or weighted diagnosis related group basis.

During the 1990s, research capacity in health economics and financing had been systematically built up in the Health Systems Research Institute through doctoral study and workplace training. This provided the basis for formulating an evidence based policy and developed skills in interfacing research and policy. In addition, public health advocates and leaders were active at senior levels of the bureaucracy and were therefore able to take the political imperative and translate it into effective action. It is still unclear, however, whether the scale of the reform undertaken by the Thai government is manageable within its capacity.

Box 2: Key elements of healthcare provision under the 30 baht scheme

- The contractor unit for primary care is contracted by the province to be the main deliverer of health care to its registered population; individuals must register with it
- Primary care units (health centres and units set up in hospitals to provide primary care) are assigned to deliver primary health care
- A typical rural contractor unit network comprises a district hospital with all health centres in the district. In urban areas it is the provincial or tertiary care hospital with several urban health centres
- The contractor unit receives a capitated budget to provide comprehensive primary care services to its registered population
- Patients can access either the health centres or the hospital associated with their contractor unit. Referrals can then take place to other hospitals
- Inpatient care is reimbursed from a provincial budget based on a weight of the diagnosis related group, adjusted for location (eg, community or provincial hospital)
- Patients who do not use their assigned providers must pay the cost themselves

Cost of universal care

Estimating the financial implications of universal care and setting capitation rates has been contentious.[9 10] Some analysts propose a capitation rate as high as 1500 baht.[11] In fiscal year 2002, the government used a per capita rate of 1202 baht (see bmj.com for calculation details). A rate of 1414 baht was set for 2003. A key issue in setting this was compliance—the extent to which patients use their registered provider rather than another (in which case they must pay themselves). The 2003 figure assumed 85% compliance for outpatients and 100% for inpatients. Compliance rates also have implications for the revenue of public hospitals from user fees. Before universal coverage was introduced, public hospitals received 20-50% of their income from user fees. The total health budget for 2002 was 51bn baht. Comparable figures for spending in earlier years are difficult to identify, but spend has not increased to the same extent as the number of people covered.

The per capita allocations for 2002 and 2003 resulted in many provinces and hospitals having deficit budgets. This partly reflected the previous geographical funding imbalance relative to population. Rather than phase in the new formula, a contingency fund of 10% (5bn baht) was set up to relieve hospitals in 2002. However, because of fiscal constraints and evidence of low compliance among universal coverage beneficiaries, no contingency fund is planned for 2003. It is too early to tell if this will give rise to problems. Teaching and other supertertiary hospitals have been particularly affected by the financial redistribution. Although some special provision has been made, a separate stream of funding for teaching and research activities may be required.

If the universal coverage scheme relies totally on general taxation and the capitation rate is not adjusted to reflect costs and usage, the quality of care and confidence in the scheme could deteriorate. Various options are available to manage the financial pressures generated. These include:

- Changing the benefit package (this would be politically difficult)
- Collecting contributions from beneficiaries through higher copayments (for higher income users or for some services) or some kind of social insurance contribution or separate tax (the National Health Security Act provides for this)
- Expanding the social security scheme to include spouses and dependants so reducing the numbers covered by the 30 baht scheme.

Strengthening primary care

The universal coverage scheme combines capitation funding with a shift to delivery led by primary care to help keep costs under control. A typical province will have five to seven district primary care networks, each led by a contractor unit (see box 2) with one or two networks in the provincial city. This is a radical change from the social security scheme, which uses large hospitals (over 100 beds) as the main contractor. When the social security scheme was set up, primary curative care was largely delivered in hospital outpatient departments or by government doctors working out of hours in private clinics.[6]

For the hospital dominated Thai healthcare system, the emphasis on primary care in the universal scheme represents a bold departure. Initial problems included a shortage of doctors to staff primary care units, necessitating use of hospital doctors in rotation, and little attention being paid to preventive and health promotion services. High level policy makers have so far not been prepared to put the necessary staff management mechanisms in place to support redeployment. Little attention has been paid to the role of provinces in purchasing and monitoring quality of care and to the importance of giving people choice of contractor. Very limited private sector participation is allowed, even in urban areas where a large private sector exists.

Will the reform benefit the right people?

Before the latest reforms, the Thai healthcare system was notoriously inequitable. Public expenditure (health, education, and public infrastructure) has favoured middle income over poorer families because of their greater use of public services,[12] the extensive reliance on user fees, and the inequitable pattern of public subsidies.[13] A recent study indicates that expenditure on district hospitals benefits poorer people more than expenditure on provincial and teaching hospitals (P Hanvoravongchai et al, paper presented at Manila meeting, May 2003).

A survey shortly after introduction of universal coverage found that those in the lowest income fifth were spending 7.5% of their income on health compared with an average of 1.6% and 0.1% for those in the social security and civil service schemes.[14] This suggests that the scheme has not yet provided effective financial protection.[14]

Compliance rates are low (see table A on bmj.com). One interpretation is that the scheme is not giving people access to their preferred providers. However, compliance rates are higher than in the early years of the social security scheme and show a satisfactory income gradient, suggesting that richer groups are self selecting out of the universal coverage scheme. Moreover, bypassing primary care to tertiary provincial hospitals has hitherto been routine, and it will take time to gain patient confidence in the quality of primary care. A Ministry of Public Health report has found the ambulatory caseload in tertiary provincial hospitals has decreased since the scheme began.[14]

Conclusions

The Thai policy is a bold reform driven by top level political imperatives and incorporating many innovative features. However, the approach has carried with it many problematic side effects, including driving major reforms in healthcare delivery through changing financing mechanisms. A continued emphasis on monitoring, evaluation, and research will be vital in fine tuning the reforms. Major revisions may need to be considered if the policy is to survive. These include allowing greater patient choice, providing greater opportunity for private sector participation and competition in urban areas, strengthening further the rural district health system with adequate clinical staff, protecting key national functions such as teaching and research, and expanding the sources of finance beyond general taxation.

Summary points

Thailand combined the introduction of universal access to subsidised health care with a radical shift in funding away from urban hospitals to primary care

Implementation was facilitated by strong political imperative and previous experience from existing health schemes

Redirection of funds to primary care left many hospitals with large deficits

Staff need to be redeployed to primary care units, which are still underdeveloped

Patients are used to accessing care from hospitals and choosing their provider

Confidence in primary care needs building, and the scheme may have to be modified to permit more choice and raise more funding

Contributors and sources: This paper was prepared from a review of the relevant literature including Thai documents, talking to key individuals in Thailand, and use of the extensive experience of two of the authors of the Thai healthcare system. AT has worked on health reforms for 10 years. AM has been involved in research on the Thai health system since 1990. VT has been a full time researcher on the Thai health system for many years.

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Geographical Distribution and Utilization of Mammography in Thailand

By

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Abstract

Background: Breast cancer is the second most common cancer among Thai women. Understanding on breast cancer screening programme in order to detect it at an early stage is crucial for the improvement of treatment outcome.

Objective: This study describes resource allocation (in terms of mammograms and human resources) and utilization of mammography for breast cancer screening in Thailand in 2002.

Methods: Data on distribution of mammogram facilities were retrieved from the Department of Medical Science, Ministry of Public Health (MoPH). A self-administered mail questionnaire survey to public and private owners of mammogram facilities was launched to assess the utilization of these mammograms. A brainstorming workshop among experts was conducted to produce standard guidelines for breast cancer screening.

Findings: In 2002, there were 139 facilities for mammograms in 30 out of the total 76 provinces in Thailand. Private providers owned 60%, and public hospitals the remainder. Most mammogram facilities, 50.36%, were concentrated in Bangkok, whereas the lowest 5% were in the north. The allocation indicated an inequitable distribution of mammogram facilities. For instance, for every one million females aged over 35 years, 41.8 mammogram facilities were available in Bangkok, 2.8 in the north and 4.0 in the north-east. The gap in the discrepancy index in Bangkok was 15.1 times in relation to that in the north. The nationwide index was 3.9. One crucial input of the mammography procedure is the number of radiologists. In Thailand, a total 682 radiologists were distributed in 63

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provinces. However, half the number worked in Bangkok. In 2001, the utilization rates per mammogram averaged 1 082 cases per year. Private providers had a very low rate, an average of 344.73 cases per year, but some public hospitals faced high demand, along with the consequent extension in waiting time for patients. Finally, the workshop held to discuss the criteria and guidelines concluded that breast self-examination (BSE) was an important strategy to increase awareness for women aged 20+; an annual clinical breast examination (CBE) by doctors or well-trained nurses was recommended for women aged 35+, and mammography was recommended for the highest-risk women age group of 40+.

Conclusions: A national policy and guidelines should be in place in order to improve access to mammography and early detection of cancer when prognosis is good. Distribution of mammogram facilities, radiologists and the public-private mix must be managed, in order to raise the utilization rates to cost-effective levels. Mobile units might be an appropriate alternative to construction of new centres.

Key Words: Mammography, resource allocation, breast cancer

Introduction

Cancer has, from time to time, ranked as either the second or the third cause of mortality in Thailand since 1977, followed by heart diseoses and accidents.[1] In 1993, the National Cancer Institute (NCI), which is responsible for cancer prevention and control, estimated some 64 000 new cases of cancer. Three of the best-known cancers occurring in men are liver, lung and colo-rectal, whereas in women, the highest-occurring cancers are cervix, breast and liver. These cancers are also a significant burden on public hospitals.

The data collection of cancer incidence rates in Thailand was passive and relied upon notification from hospitals in Bangkok, Chiangmai, Lampang, Khonkaen and Songkhla. Breast cancer was the second most frequent cancer in women, after cervical cancer.[1] The estimated incidence was 16.3 per 100 000 women, rather higher than the rate in 1990. The incidence was the highest in Bangkok, followed by Chiang mai, Lampang, Songkhla and Khonkaen, respectively. Breast cancer was very rare in Thai men. The age-specific incidence showed a rise to the maximum around the age of 50 years, with a plateau or even a small decline in risk at older ages. Changes in the population age-component and lifestyle might have led to the higher incidence of breast cancer.

Although breast cancer ranked second in Thai women and could be predicted and detected early, the concentration of treatment was on management and care systems. Breast self-examinations were and are promoted, but anecdotal observations found that Thailand performed poorly in research and prevention, including primary and secondary prevention of breast cancer. The cancer registry data revealed a high prevalence of late-stage disease at diagnosis, with 56% of patients receiving treatment at

Stages III and IV.[2] Moreover, the majority of resources were allocated to curative care that required a lot of investment, and the poor return in benefits put a heavy financial burden on the public health system.

The poor outcome of breast cancer care was influenced by: the lack of people's self-awareness resulting in their arrival at treatment facility at a late clinical stage; the scarcity of basic screening equipment, and the poor allocation of mammogram facilities. To improve breast cancer care and management in Thailand, it would be very useful to evaluate the feasibility of using mammography screening at the macrolevel.

"Breast screening" is a method of detecting breast cancer at a very early stage. There are three ways: BSE, clinical breast examinations (CBE), and mammography. The best time for BSE is about a week after the end of the period", when breasts are not tender or swollen. If a woman's "periods" are irregular, she performs BSE on the same day every month. A woman or her sex partner often discovers breast lumps. Most are not cancerous, but anything unusual should be reported to a clinician as soon as possible. CBE is an examination of breasts by a health care professional, such as a doctor, nurse practitioner, nurse, or a doctor's assistant. During the CBE, it is a good time for the health care professional to teach breast self-examination to a woman who does not already know how to examine her breasts. A mammogram is an X-ray of the breast, which is taken while carefully compressing the breast. Most women find it a bit uncomfortable and a few find it painful. The mammogram can detect small changes in breast tissue, which might indicate cancers that are too small to be felt either by the woman herself or by a doctor.

An appropriate breast cancer screening programme could improve both the recent prevalence of breast cancer and improve treatment results.[3] Regular screening is an important preventive method in reducing morbidity and mortality from breast cancer. Unfortunately, only 37% of Thai breast cancer patients practise BSE, while 51% of them are aware of breast cancer[2]. The majority of Thai women are unable to perform BSE from shyness. Results show that after BSE instruction, 72.27% are able to perform BSE, 1.85% are unable, and 25.95% are uncertain. Of the total participants, 49.07% practised BSE monthly and 44.44% occasionally. However, it was believed that results of the nationwide BSE programme would reflect in improvements in the 5- and 10-year survival rates of breast cancer patients in Thailand.[4] Improvement in long-term survival depends not only on improvement of the modality of treatment but also on how early the stage is at first treatment. In a retrospective study of 1,176 breast cancer patients from 1977-1985, the incidence of early stage in each of the periods: 1977-1979; 1980-1982, and 1983-1985 were: 44.65%; 46.34%; and 59.24% respectively. The increase in cases of diagnosis in early stages at first treatment reflected the results of public education on cancer and the early detection programme.[5]

This paper aims to assess the geographic distribution of mammogram facilities and their utilization among public and private institutes in Thailand. The

appropriateness of human resources, basic equipment allocation and utilization of mammography in screening breast cancer are also explored.

Methodology

We collected data on distribution of mammogram facilities from the Department of Medical Sciences (DMSc). The DMSc had compiled the data on Mammogram facilities in both public and private providers since 1988. For radiological safety reasons, both public and private medical institutions are required to register radiological medical devices with DMSc.

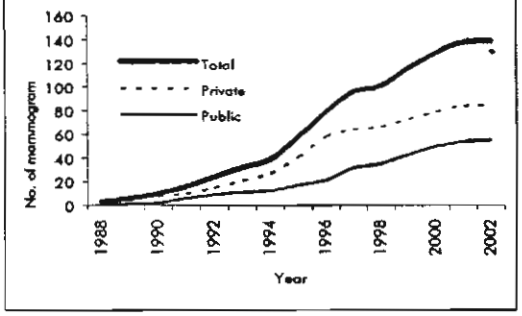
We also compiled the data from the Thai Medical Council database on the number of radiologists registered with the Council. At the same time, a self-administered mail questionnaire survey was launched to all public and private institutions having mammogram facilities. The questionnaire asked about human resources, staff workload, and utilization of mammograms for breast cancer screening for three retrospective years. The questionnaire survey was conducted from October 2001 to September 2002. Open-ended questions were allowed to depict problems in providing service and management. Finally, a workshop among key stakeholders was held on 24-25 June 2003 to set criteria and frame guidelines for national policy on early detection of breast cancer. Baseline data were presented and a small group discussion was organized. The workshop was participated by 36 experts from MoPH, National Cancer Institute, regional cancer centres, provincial hospitals and the university.

Results

1. Distribution of Mammograms and radiologists

Since 1988, 139 mammogram facilities had been installed, with 60% distributed in private hospitals and the remainder in public hospitals. The cumulative number of installed mammogram facilities increased continuously from 1988 until 1997-1998. In 1998, one year after the economic crisis, only five new machines were installed. Since 1999, however, the number of mammogram facilities has risen again, though slightly.

Figure 1 Cumulative number of mammograms during 1988-2002, Thailand



The distribution of facilities was concentrated mainly in Bangkok (50.36% of total mammograms), whereas the lowest was in the north (5.04%). For every one million females aged over 35, 41.8 mammograms were performed, 2.8 in the north and 4.0 in the northeast. As a regional comparison, if an index of 1 is assigned to the lowest ratio of mammogram to million populations in the north, the discrepancy index[1] in Bangkok is

[1]Discrepancy index in this study refers to gap of difference between regions. For example, the mammograms to one million female aged 35+ in the North region was 2.8, then in Bangkok, the 41.8 mammogram per million is then 15.1 times higher than that of the North region.

15.1. In the other words, the gap of discrepancy index in Bangkok was 15.1 times that in the north. The nation-wide index was 3.9 (Table 1).

Mammogram facilities were distributed in only 30 provinces; the other 46 provinces were not provided with a single facility. The top three ranking provinces with mammogram facilities were Bangkok, Chonburi and Songkhla with 70, and five machines each, respectively.

2. Equipment utilization

A structured questionnaire was distributed to all 120 hospitals where a mammogram machine was installed. The response rate was 53%; 64 hospitals returned the questionnaires. Most hospitals had one mammogram machine. Only four hospitals in Bangkok had more than one mammogram machine. Lorad, GE, and Toshiba were the most common brands of mammogram machines used by hospitals; the respective percentages of utilization were: 25.7%; 22.9%, and 11.4%. The average price of 63 mammogram machines was 3.6 million Bahts. The average user fee for public mammography service was 1 411.04 bahts. Private hospitals charged a user fee of 1 700.31 bahts; this was higher than that charged by public hospitals (p-value=0.000).

In terms of utilization, the average case-load per annum was quite stable at 1 029, 1 022, and 1 082 cases in 1999, 2000 and 2001 respectively, with a very large range of case-loads (Table 4). The public hospital case-load was much higher than that for private hospitals.

Table 1. Mammogram diffusion in Thailand, 2002

Region	No. of provinces with mammogram(s) machines	No. of mammogram machines			No. of mammogram machines to one million females aged 35+	Discrepancy index
		Public	Private	Total		
BKK	1	26	44	70	41.8	15.1
Central	13	15	19	34	11.0	4.0
Northeast	7	6	10	16	4.0	1.5
North	4	3	4	7	2.8	1.0
South	5	5	7	12	7.9	2.9
Total	30	55	84	139	10.9	3.9

Table 2. Price of mammogram machines installed by type of hospital, Thailand, 2002

	No. of Mammogram machines	Mean (Bahts)	Median (Bahts)	Standard Deviation
All providers (n=63)	63	3 604 394	2 800 000	300 706
Public providers	36	4 450 624	3 300 000	3 487 283
Private providers	27	2 476 085	2 350 000	1 669 520

Table 3. Mammography service fee by type of hospital, Thailand, 2002

	Mean (Bahts)	Maximum (Bahts)	Minimum (Bahts)	S.D.
All providers (n=63)	1 411.04	2 500	400	478.73
Public providers	1 146.57	2 000	400	415.83
Private providers	1 700.31	2 500	1 000	364.61

Table 4. Average mammography utilization by hospital type, year, Thailand, 2002

Utilization	Year					
	1999		2000		2001	
All providers (n=64)	Mean	(S.D.)	Mean	(S.D.)	Mean	(S.D.)
No. of users (cases)	1,029	(1,762)	1,022	(1,707)	1,082	(1,408)
No. utilized (shots*)	2,091	(6,899)	2,143	(6,822)	2,713	(5,355)
Public providers (n=31)						
No. of users (cases)	1,628	(2,202)	1,570	(2,127)	1,590	(1,647)
No. utilized (shots*)	4,121	(10,269)	3,959	(9,961)	4,762	(7,131)
Private providers (n=33)						
No. of users (cases)	281	(158)	318	(198)	344	(194)
No. utilized (shots*)	513	(369)	643	(592)	705	(699)

*mammography shots mean number of films or positions to take radiation; users usually take four shots each.

3. Human resources

In 2002, there were 682 radiologists (403 general radiologists and 279 diagnostic radiologists) throughout the country. However, half of them worked in Bangkok. There were 63 provinces with at least one radiologist. This meant there were 13 provinces without any radiologist. The capacity of Thai postgraduate training of general and diagnostic radiologists was less than 100 per year in seven training institutes (teaching hospitals). As for main health personnel required for mammography provision including radiologists and technicians, 55 hospitals (90.2%) had full-time radiologists.[2] Full-time technicians were available in 49 hospitals only because some hospitals used other personnel instead of trained technicians, such as nurses or trained assistants. Most part-time radiologists and technicians were in private hospitals.

[2] Full-time radiologist is defined as those who work for that hospital more than 35 hours a week.

4. National guidelines on breast cancer screenings

Finally, at the workshop held in 24-25 June 2003, the main conclusions drawn were: the BSE programme was an important strategy to increase awareness for women aged 20+; CBE was recommended annually for women aged 35+; doctors or well-trained nurses were needed at primary care unit, and mammography was recommended for women in the risk category: age 40+.

Conclusions and discussion

The first mammogram machine was introduced and installed in 1968 at the National Cancer Institute. The number of machines rose significantly between 1995 and 1997.[6] After 1997, the rate of increase of mammogram machines temporary slowed down as a result of the economic crisis, but recovered a few years later. Consequently, the rate of increase in the public sector was higher than in the private sector.[6] Of the total 139 mammogram machines in Thailand, their distribution was concentrated in Bangkok, 50.4 percent, which changed slightly from 1999 with 112 mammograms, 54.5% in Bangkok.[7] The discrepancy index in Bangkok was 15.1 times that in the north. The nationwide index was 3.9. Such indices showed the inequity of technology distribution. However, the data on number and distribution of mammogram machines and radiologists were collected from secondary sources. The study validity depended on official reports, which however could not indicate exactly the number of machines which were still in use or out of order.

It was quite clear that the distribution of both machines and personnel was poor. In addition, problems highlighted by radiologists or heads of mammogram units who responded to our questionnaire indicated that a well-organized system of specialized and regular maintenance of machines was required to maintain the quality of output. All categories of personnel needed continuous training to keep abreast of techniques and medical advancements. High demand for screening and limited services resulted in a long waiting time especially in the public sector, whereas most private providers seemed underutilized because of the high cost of their services, and because they are seldom covered by insurance schemes.

The Civil Servant Medical Benefit Scheme, for instance, is considered one of the most generous health benefit and insurance schemes in the country but does not cover mammography.[8] As a result, unit costs might be high and cost recovery points would not be met. On the other hand, the observed number of shots per patient was much higher in public than in private hospitals; this might reflect the quality of services. On issues of case-load, overload and underutilization, regulations on import and distribution of machines should be implemented in both public and private sectors to encourage efficiency at the macro level. As for policy issues, it is not clear if mammography can decrease mortality rates of breast cancer since diagnosis depends on the processing of mammography and interpretation of images. Further study and randomized clinical trials to determine effectiveness and costs in are needed.

In addition, the barriers to access to mammography should be studied from the patient's point of view, such as awareness and mammography fees, as well as psychological and cultural barriers, such as fear of cancer, fatalistic views on cancer, and culturally-based embarrassment.[9] Positive cues to undergo screening include physicians recommendation, community outreach programmes with the use of lay health leaders and use of culture-specific media.[9] From the provider's side, such issues as overloaded capacity in some providers but underutilization in other providers and break-even point of services should also be explored.

It is not very difficult to rapidly improve the maldistribution of mammogram machines to match the provincial prevalence. A group of neighbouring provinces could share one mammogram machine through efficient referrals. However, it is quite difficult to re-allocate human resources especially radiologists. This requires long-term human resource planning. We recommend improving the current under-utilization of private mammogram facilities, through the purchase of services by public insurance schemes. Increase in public awareness on breast cancer would promote BSE and CBE and ensure early detection and better outcome of breast cancer treatment.

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Designing a reproductive health services package in the universal health insurance scheme in Thailand: match and mismatch of need, demand and supply

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In October 2001 Thailand introduced universal healthcare coverage (UC) financed by general tax revenue. This paper aims to assess the design and content of the UC benefit package, focusing on the part of the package concerned with sexual and reproductive health (SRH). The economic concept of need, demand and supply in the process of developing the SRH package was applied to the analysis.

The analysis indicated that SRH constitutes a major part of the package, including the control of communicable and non-communicable diseases, the promotion and maintenance of reproductive health, and early detection and management of reproductive health problems. In addition, the authors identified seven areas within three overlapping spheres; namely need, demand and supply. The burden of disease on reproductive conditions was used as a proxy indicator of health needs in the population; the findings of a study of private obstetric practice in public hospitals as a proxy of patients' demands; and the SRH services offered in the UC package as a proxy of general healthcare supply.

The authors recommend that in order to ensure that healthcare needs match consumer demand, the inclusion of SRH services not currently offered in the package (e.g. treatment of HIV infection, abortion services) should be considered, if additional resources can be made available. Where health needs exist but consumers do not express demand, and the appropriate SRH services would provide external benefits to society (e.g. the programme for prevention of sexual and gender-related violence), policymakers are encouraged to expand and offer these services. Efforts should be made to create consumer awareness and stimulate demand.

Research can play an important role in identifying the services in which supply matches demand but does not necessarily reflect the health needs of the population (e.g. unnecessary investigations and prescriptions). Where only demand or supply exists (e.g. breast cosmetic procedures and unproven effective interventions), these SRH services should be excluded from the package and left to private financing and providers, the government playing a regulatory role.

Key words: sexual and reproductive health services, health need and demand, universal coverage, health service package, healthcare rationing, Thailand

Introduction

No country in the world can afford to provide health services to meet all the possible needs of the population. The national healthcare package is a key entry point in assuring that highest priority services are not neglected. Governments should ensure adequate access to the national health service package by providing adequate financing, either through general taxation or through social insurance contributions. Where public resources are inadequate, governments may promote more private expenditure on clinical interventions, while focusing mainly on supporting other public health interventions such as immunization or screening of disease. Governments have a responsibility to ensure that the poor are protected from having to pay for essential healthcare services (Bobadilla et al. 1994).

Defining a package of high priority health services can help to clarify the distinction between what should be financed by government and what by private sources. Without such a clear distinction, many governments may try to finance all services, which could lead to all being poorly financed. A well-planned package of services enables governments to concentrate on financing priority services only, leaving the rest to the private sector.

The service package can also help to identify and coordinate the required technical, administrative and educational resources. At the same time, this approach can help to improve the use of specialized resources at a higher level of care, through screening patients at lower levels and ensuring proper referrals are made.

The 1993 World Development Report (World Bank 1993) recommends applying two basic criteria to the design of an essential national package of health services; one, the size of

the burden caused by a particular disease, injury or risk factor, and the other, the cost-effectiveness of interventions. The national package must be designed to address a country's epidemiological profile, and the capacity of the health system to deliver it.

Thailand has recently achieved universal coverage of health services (Tangcharoensathien et al. 2002). As sexual and reproductive health (SRH) services constitute a major part of the package, it is necessary to assess the design and content of SRH in the universal health insurance scheme. We apply the economic concept of need, demand and supply in the process of designing SRH packages.

This is a desk-based study, and does not involve primary data collection. Information from various sources was extensively reviewed, with particular attention to the current context in Thailand. The paper starts with a description of the background to Thailand's health system, and the main features of the universal coverage (UC) scheme. It then reviews the concept of need, demand and supply in healthcare, and analyzes this in relation to reproductive health problems. The burden of disease of reproductive health conditions is used as a proxy of SRH need (Bundhamcharoen et al. 2002). The findings from a study of private obstetric practice in public hospitals are applied as a proxy of patient's demands (Teerawattananon et al. 2003), and the SRH services provided in the package applied as a proxy of healthcare supply.

Background of the health system and the main features of UC

Health expenditure in Thailand has increased significantly from 3.2% of GDP in 1994 to 3.9% in 1997 (Pongpanich et al. 2001). However, in 2000 about 20 million, or 30% of the total 60 million Thai population, remained uninsured (Wibulpolprasert 2000). In October 2001, Thailand introduced the tax-financed UC scheme. A 'capitation contract model'[1] was adopted to purchase ambulatory and hospital services, including personal preventive and promotion services such as annual physical check-ups (Tangcharoensathien et al. 2001b).

The UC replaced the two existing schemes: the Public Welfare Scheme (for the poor, the elderly and children under 12 years), and the Voluntary Health Card Scheme (for borderline poor not eligible for the Public Welfare Scheme). The UC also incorporated the uninsured into the scheme. By 2002, the UC scheme covered 45 million of the population. The scheme is financed by general tax revenue.

Apart from the UC, there are two other public health insurance schemes for public employees and their dependents; the Civil Servant Medical Benefit Scheme, and the Social Security Scheme (SSS) for private sector employees (Table 1).

The Civil Servant Medical Benefit Scheme (CSMBS) covers government employees, retirees and their dependents, including spouse, parents and up to three children under 18 years old. This is the most generous of the three benefit packages. For example, the CSMBS beneficiary is covered for all types of renal replacement therapy such as hemodialysis, peritoneal dialysis and kidney transplantation, while the UC covers neither, and the SSS covers dialysis but not transplantation. The CSMBS is very expensive, and features rapid cost escalation (Tangcharoensathien et al. 1998; Siamwalla et al. 2000), due to the nature of the 'fee-for-service' reimbursement model, in which each medical service is reimbursed separately by the scheme. Providers have the perverse incentive to provide more and sometimes unnecessary services in order to generate more revenue. International evidence also indicates cost-containment problems under fee-for-service schemes (WHO 2000).

Employees in the private sector are covered by the SSS. This scheme applies a capitation contract model, in which the social security office purchases care from competing public and private providers for an annual flat fee to each registered worker (Mills et al. 2000). This scheme is more efficient than the former, and better able to contain its costs. Unlike the fee-for-service model, provider revenue depends on the number of workers enrolled rather than on the volume of services provided. Capitation seeks the efficient use of resources and cost containment. Providers have the incentive to maximize

Table 1. Public health insurance coverage in Thailand, 2003

Scheme	Population coverage	Expenditure per capita per year (£)[i]	Source of finances	Payment mechanism
1. Civil Servant Medical Benefit Scheme	9%	59	General tax	Retrospective reimbursement, fee-for-services
2. Social Security Scheme	13%	22	Social health insurance contribution, 1.5% payroll tax, from employers, employees and government	Capitation contract model
3. Universal healthcare scheme	78%	17	General tax	Capitation contract model

Note: [i] excludes out-of-pocket payment by households, 'Workmen's Compensation Fund' and compulsory motor vehicle accident insurance.

the number of registered members on their list, and to select the healthier members of the population in order to minimize the risk of expenditure. Furthermore, they have the perverse incentive to minimize services provided in order to save costs (Normand and Weber 1994). This may result in poor quality of care if efficient monitoring is not in place.

The UC also applies a flat rate capitation to healthcare providers. Previously, a number of studies estimated a budget for providing universal coverage of healthcare in Thailand (Nitayarumphong 1998; Pannarunothai 2001; Siamwalla 2001). Pannarunothai (2001) estimated between 1500 and 2400 Baht (£22 to £35) per capita, while a more recent estimation by the Working Group on Universal Coverage proposes that the per capita budget for UC should be set at 1500 Baht (£22). However, these estimated figures were considered too high, the main arguments being the ignorance of government fiscal constraints by researchers, lower compliance rates[2] at registered providers, and the potential for cost saving through the improvement of efficiency in hospitals (Towse et al. 2003).

For this reason, a task force was appointed at the beginning of FY2002 by the Ministry of Public Health to calculate an annual capitation rate for the UC. The task force proposed a rate of 1202 Baht (£17) for FY2002 and 1414 Baht (£21) for FY2003 (Tangcharoensathien et al. 2001b; Prakongsai et al. 2002). This amount was to cover several key service components: ambulatory care; hospitalization, personal prevention, health promotion services and pre-hospital ambulance services.

The final decision was made by politicians and Parliament through the annual Budget Bill process. Annual capitation for the fiscal years 2002 and 2003 was approved at the same rate for both years; 1202 Baht (£17). This amount, lower than the previous estimates, led to criticism by several experts concerning the financial constraints of the programme.

Need, demand for and supply of SRH services in the UC

Concept of need, demand and supply

The nature of perception of need includes value judgments and is not objective. Need is viewed in a number of different ways. Wright et al. (1998) offer a classification of the different usages of 'need':

- Normative need is a term defined by experts as necessary, e.g. completed childhood vaccinations.
- Expressed need is what can be inferred about need from observing how people use services. In this article, expressed need is considered to be an indicator of demand.
- Comparative need infers that needs arising in one location can be deemed to be similar to those in another location if people have the same socio-demographic characteristics. It is generally measured by inter-regional comparison.
- Felt need is a personal, subjective view of what appears to be a need, problem or concern.

Normative and comparative needs are assessed by looking for gaps between levels or determinants of disease and levels of service provision which are potential responses to those needs. This includes an analysis of health disparities. Felt needs, on the other hand, are normally assessed through qualitative processes such as interviews, meetings, consultative and participatory approaches.

This study focuses mainly on the concepts of normative and comparative need, as these can be measured via national databases and their determination relates to the objective of the research; to inform the purchasing of healthcare services for populations. This means that health needs are assessed in terms of what services may be purchased to address them. The common idea of need in healthcare as defined by experts as 'the capacity to benefit' is then a pragmatic definition (Stevens et al. 1998), based on the idea that there is no point in devoting resources to healthcare if there is little chance that people can benefit. Although this definition is based on healthcare, it implies more than a narrow clinical focus. It includes treatments but also palliation, rehabilitation, preventive measures and health promotion.

'Demand' is what people or patients ask for – the expressed need. It is those needs that doctors encounter in their daily practice. In a system such as the National Health Service in the UK, general practitioners have a key role as gatekeepers in controlling this demand (Shanks et al. 1995). When resources are limited, waiting lists are a surrogate marker, and may imply that rationing is a necessary response to an overall disparity between demand and supply. In addition to need, demand for a service is determined by other socio-economic characteristics. Due to unilateral flow of information between demand and supply, and the imperfect nature of the healthcare market, demand can be induced by supply.

'Supply' refers to the healthcare services provided. The kinds of services provided are determined by the interests of medical professionals, societal priorities and the financial resources available. Analysis of the benefit package is an important tool in assessing the supply of health services by health insurance schemes.

Knowledge gained from studying the concept of health needs and the demand for and supply of healthcare can be applied to identify the unmet needs of a population, and used in designing a programme which accommodates those unmet needs (Murray et al. 1994; Shanks et al. 1995; Robinson and Elkan 1996; Stevens and Gillam 1998). To improve the health of a population, policymakers should look beyond patients who demand and use healthcare services to those who do not express their demand but are badly in need of the services.

Health needs of SRH

The International Conference on Population and Development (ICPD) in 1994 identified the following key reproductive health problems to be addressed by national health programmes: unsafe abortion; maternal mortality and morbidity; reproductive tract infections, including sexually

transmitted diseases (STDs); HIV/AIDS; cancers of reproductive organs; female genital mutilation; sexual and gender based violence; infertility; and other reproductive health conditions. In this section, the ICPD framework is applied in assessing the reproductive health needs of the Thai population.

The Disability Adjusted Life Year, or DALY, is a measure that counts loss of healthy life due to premature mortality and non-fatal conditions. It was intended to represent the potential gap in health improvement, and to reflect the need for an evidence base for priority setting and resource allocation. However, a number of reports have criticized limitations in the use of the DALY, relating both to the method of calculation of the DALY itself, and to its application to the global and local study of disease (Allotey and Reidpath 2002). Some have criticized it on grounds of equity, since 10 DALYs for one person can be equal to one DALY for 10 people (Anand and Hanson 1997; Arnesen and Nord 1999). In addition, the DALY fails to account adequately for the burdens associated with specific conditions especially related to SRH. For instance, complications that cause death and morbidity in pregnant women often result in perinatal mortality, but DALYs are accrued from the moment of a child's birth. In the case of infant death during pregnancy, no DALYs are measured and there is thus no loss attributed (Allotey and Reidpath 2002).

Aware of these restrictions, this analysis uses the DALY, as a proxy of health need, as the starting point for information gathering and analysis. It is currently the only available data source for priority setting across a broad range of fatal and non-fatal health conditions. Since the DALY is a health gap measure and reflects the burden at a particular time, a disease for which there is a successful control programme (e.g. child immunization, maternal care) may not rank highly in terms of burden of disease. The authors will not recommend shifting funding from these existing control programmes but would indicate that little additional health gain could be expected from an expansion of the programme.

In 1999, the Thai Working Group on Burden of Disease and Injuries (Bundhamcharoen et al. 2002) estimated that more than 25% of the burden of disease, as measured by the loss of DALYs among women in Thailand, is attributed to SRH problems. HIV/AIDS is the leading cause of DALY loss in both men and women, accounting for 17% and 9% of total DALY loss, respectively, in 1999. STD ranks fifth in the burden of infectious diseases, and is significantly higher in women than in men.

Perinatal conditions, mainly birth trauma, foetal asphyxia and low birth weight, were the second leading cause of reproductive health problems in Thailand, but rank ninth overall.

Liver cancer is the most common cancer among men and women; cervical and breast cancers come second and third among women, DALY loss due to these cancers ranking 13th and 14th, respectively, in the 30–59 year age group.

Abortion accounts for the largest share (36%) of the maternal burden. Most problems are attributed to infertility following unsafe septic abortion. Based on the National Health Examination Survey 1999, the Working Group estimate a total of 0.3 million abortions are carried out per year. 74% of induced abortions are conducted outside hospitals, and 71% of these are provided by a non-health professional, often by introducing a hypotonic or hypertonic-salt solution. This is due to the fact that abortion, except in rape cases and where pregnancy endangers the mother's health, is still illegal.

To sum up, as measured by DALYs, HIV/AIDS is the leading cause of reproductive ill-health in men and women, while low birth weight and birth trauma/asphyxia are the major causes of DALY loss among children. Cervical and breast cancers still play a major role in the total disease burden among women.

Demand for reproductive healthcare

To assess demand, a study of private obstetric practices in seven public hospitals throughout Thailand (Teerawattananon et al. 2003) was referred to. The study involved a questionnaire interview survey of 1036 consecutive postpartum women, together with in-depth face-to-face interviews with 10 selected obstetricians, to identify patient's and physician's viewpoints on the expectation and perception of quality of care, patient's confidence in obstetric care, and the effects of private obstetric practice in public hospitals.

The study indicated that pregnant women want safe healthcare services provided by qualified professionals. The desire for prompt attention, flexible service hours, a better doctor-patient relationship and comprehensive information were among other findings.

Safety is the greatest concern of respondents in the study. Pregnant women of low socio-economic status were willing to pay extra money privately to obstetricians in public hospitals to ensure that their delivery would be conducted by the obstetrician, of whom they were more confident of the quality and safety of obstetric services than of a trained nurse.

In addition, patients wanted to attend doctors who practice the patient-centred approach, listening to and responding to their patients and developing the doctor-patient relationship in such a way that patients are partners in the process of care. Patients also favoured doctors who provide them with as much information as they want, and who are prompt to answer questions about their illnesses clearly.

On the issue of what services need to be provided, Thailand has nearly a million people living with HIV/AIDS (PLWHA). This puts pressure on the government to provide universal access to antiretroviral therapy for UC beneficiaries. A recent estimation revealed that a quarter of PLWHA will need antiretroviral treatment within the next few years (The Thai Working Group on HIV/AIDS Projection 2001).

Moreover, the National Health Examination Survey

(Ministry of Public Health 2000) demonstrated that there is a demand for abortion as an SRH service. There is also demand for infertility treatment, which is not yet covered by the UC package.

On the other hand, UC beneficiaries are mostly poor, and express their immediate demand for curative rather than preventive services such as breast and cervical cancer screening.

Supply of SRH interventions in the UC package

The UC benefit package has been classified into three components: the curative package; high-cost care; and the preventive and health promotion package. Details of each component in relation to SRH, and methods of financing, are described below.

Curative package

This covers ambulatory and hospitalization services with some limitations, such as cosmetic surgery, infertility treatment, abortion (except in cases of rape and risk to maternal health), private rooms and board. All contractor provider networks are bound to provide these services to registered beneficiaries. The curative component consumes 73% of the total capitation fee. The budget is allocated directly to the provincial health office, which redistributes it to contractors.

High-cost care

Having considered the potential adverse effects of capitation payment, where healthcare providers have an incentive to minimize services in order to save costs and boost their profit margins, a high-cost care package outside the scope of capitation is proposed to ensure that necessary and expensive medical interventions are offered to patients who need them. Providers are paid on a fixed fee schedule. High-cost care includes prosthetic hip replacement, chemotherapy for certain kinds of cancers, and heart surgery. The UC has adopted a similar package to that provided by the SSS in order to standardize packages across the schemes, and earmarks 4% of the curative package budget for this purpose.

However, the high costs of items on the list provokes the criticism that it is neither based on evidence of cost-effectiveness nor reflects the major disease burden (see Table 2).

In addition, due to government fiscal constraints there are two expensive interventions which are explicitly excluded from the UC package: Highly Active Antiretroviral Therapy (HAART) for HIV/AIDS, and renal replacement therapy (dialysis and kidney transplantation) for patients with end stage renal disease. Treatment for infertility is also excluded (Tangcharoensathien et al. 2001a).

In clinical practice there are substantial expensive interventions that are normally covered by the capitation but which may not be offered by healthcare providers, for example expensive diagnostic services such as CT scanning, Magnetic Resonance Imaging and other high-technology special investigations. To date, there is pressure from various stakeholders to include a wider range of interventions on the high-cost care list.

Personal, preventive and promotion package

One of the goals of any health system is to minimize preventable morbidity and mortality. The preventive package of the UC therefore emphasizes health promotion and the prevention of disease. The package comprises personal and family clinical preventive services, such as immunization, annual physical check-ups, premarital counselling, voluntary HIV testing, antenatal care and family planning services. The preventive package is financed by 14% of the total capitation.

Table 3 categorizes the nine components of ICPD SRH services that are covered and not covered by the UC sub-packages (curative services, high-cost care, preventive and promotion services).

Discussion

The design of the benefit package in general, and of SRH services in particular, was implicit, subject to historical and fiscal constraints. Thorough research into the cost-effectiveness of each intervention, on which the design of the package might have been based, was not carried out.

Table 2. Inclusion and exclusion list of expensive healthcare interventions of the UC

Inclusion list	Exclusion list
Chemotherapy for specific cancers	Antiretroviral treatment for patients living with HIV/AIDS
Radiation therapy for specific cancers	Renal replacement for patients with end stage renal disease
Open heart surgery including prosthetic cardiac valve replacement	Organ transplantation
Percutaneous Transluminal Coronary Angioplasty (PTCA)	Cosmetic surgery
Coronary Artery Bypass Grafting (CABG)	Infertility treatment
Stent for treatment of Atherosclerotic Vessels	
Prosthetic hip replacement therapy	
Prosthetic shoulder replacement therapy	
Neurosurgery, e.g. craniotomy	
Antifungal treatments for cryptococcal meningitis	

Table 3. Summary of the nine ICPD sexual and reproductive health services and the UC package coverage

ICPD SRH services	Services covered by UC package			Not covered by UC package
	Preventive and promotion services	Curative services	High cost care	
Unplanned pregnancy and unsafe abortion	Sex education; family planning	Abortion in cases of rape and risk to maternal health; treatment of abortion complications	NA	Safe abortion services for all
Maternal mortality and morbidity	Reduce unwanted pregnancy; antenatal care	Essential obstetric care for the first two children; treatment for complications	NA	
Reproductive tract infections, including STDs	Sex education and promotion of use of condoms; screening for syphilis in high risk groups and in antenatal care	Treatment based on syndromic and laboratory approaches	NA	
HIV/AIDS	Sex education and condoms; premarital and antenatal counselling and HIV testing; opportunistic infection prophylaxis in some provinces; prevention of mother to child transmission among pregnant women	Definitive treatment and care for opportunistic infections, and other palliative care		HAART, but recently adopted as a national programme in 2004 and administered outside UC
Reproductive tract cancers	Pap smear, clinical breast examination	Diagnostic, medical and surgical treatment as well as radiation therapy and other palliative care	Chemotherapy	
Female genital mutilation	NA	NA	NA	NA
Sexual and gender based violence	General counselling services	Medical treatments and other palliative care for victims of violence	NA	
Infertility	Not covered	Not covered	Not covered	All interventions excluded and paid for by beneficiaries
Menopausal services	Not covered	Not covered	Not covered	All interventions excluded and paid for by beneficiaries

In 2001 the UC adopted the legacy of benefit packages that were covered by the Public Welfare Scheme and Voluntary Health Card Scheme.[3] It was necessary at the time to eliminate the inequity in the package, so the UC package was standardized with other public insurance schemes, especially social health insurance, through, for example, the adoption of the high-cost care list. Hemodialysis was covered by the SSS, but the UC package excluded this, due to government fiscal constraints (Tangcharoensathien et al. 2001a). Similarly, fiscal constraints resulted in the exclusion of HAART from the SSS and UC packages. Policymakers emphasized prevention and promotion; a full coverage of these services was included in the UC package, but not in that of the SSS. The list of high-cost care covered by the SSS was not based on evidence of cost-effectiveness, but rather responded to requests by professional associations such as the Royal College of Physicians. The SSS scheme places more emphasis on the scheme's fee schedule.

Analysis of the UC package indicates that the SRH component contributes a major part, including the control of communicable and non-communicable diseases, the promotion and maintenance of reproductive health, and early detection and management of reproductive ill-health.

Healthcare interventions in and outside the UC package are determined by the interaction of three facets; namely the healthcare provider – the supply – and the patients' need and demand. The availability of financial resources plays a crucial deciding role in where demand and supply can match. It is necessary to recognize and address one facet in association with each of the others.

The design of the SRH package has to take into account the three overlapping spheres of Figure 1: need, demand and supply. The central intersection of all three spheres, where need, demand and supply meet, is Area 1. Health interventions that fall into this area are likely to be optimally used by the population. Samples of interventions in this group are the majority of curative services such as essential obstetric care and family planning services. The role of policymakers is to ensure quality, safety and adequate access for beneficiaries. Some high-cost interventions in Area 1 that are scantly provided for under capitation should be removed and funded under the high-cost care and fee schedule category.

In Area 2 is a group of interventions in which the health needs of beneficiaries are expressed as demand, but which are not yet included in the packages; for example, HAART for AIDS patients, safe abortion services for unplanned pregnancies, menopausal services and infertility treatment. Services need to become more flexibly accessible and should provide adequate information to patients and relatives. The expansion of the package to cover Area 2 should be equipped through evidence about the burden of disease and by an economic appraisal of alternative, more cost-effective interventions, and by long-term budget impact analysis, especially in cases of lifelong treatments such as HAART.

Within Area 3 is a group of interventions where patients' health needs match supply. The supplies to improve population health are available, but patients neither express demand nor adequately utilize these services. Such services cover, for example, screening for cervical and breast cancer; sex education; condom promotion; family planning and prevention of unplanned pregnancies; premarital counselling and voluntary HIV testing. These services have positive societal externalities for the control of diseases, but are not realized and expressed as effective demand by patients. Such interventions tend to be under-utilized, even where they are cost effective and have positive externalities. Policymakers must stimulate consumption of these services by providing information and education, as well as creating incentives to providers. Fees for services would send a stronger signal to

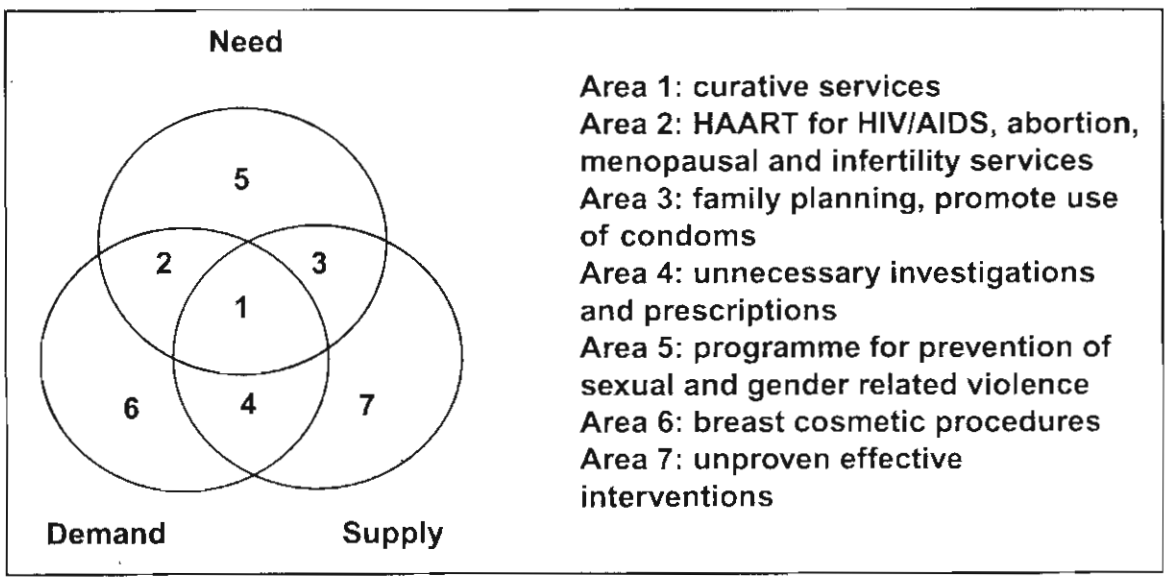

Figure 1. Intersection of need, demand and supply of healthcare, and examples of interventions in each category

service providers than capitation. A bonus payment on the achievement of a target for cervical cancer screening, for example, would be an interesting payment choice.

Area 4 is where a group of interventions offered by healthcare suppliers match demand, but these services do not necessarily reflect the health needs of the population. Services in this area are typically indicated by conventional fee-for-service private health services when healthcare providers are ready to respond to consumer demand for such elements as cosmetic surgery, unnecessary investigations and prescriptions. Moreover, due to unilateral information and an imperfect healthcare market, suppliers can induce demand and stimulate unnecessary consumption in order to generate revenue. In the UC scheme, services falling under Area 4 are not offered in the package. Researchers have a role to play in identifying services provided by the UC package which might fall in this area, and then excluding them from the package. If there is strong pressure to include unnecessary services that do not reflect the health needs of the population, a very high co-payment should be introduced.

In Area 5, health needs exist but are neither expressed by consumers, for their own reasons, nor are they offered in the package. Services in this group include the programme for prevention of sexual and gender-related violence. An approach could be made through the expansion of Area 3, offering services where resources are available. Effort should also be made through the extension of Area 2, by increasing consumer awareness to stimulate demand.

Area 6 presents only demand, e.g. for cosmetic surgery. The financing and provision of interventions in this group should be left to the private sector. The government still has a major role in regulating consumer information, the price and quality of care and procedural safety.

Within Area 7 supply exists without demand, e.g. as some unproven preventive and curative interventions with very high profit margins. These services are mostly driven by for-profit private hospitals, medical institutions and pharmaceutical industries. As with interventions in Area 4, healthcare managers or researchers must identify such services and exclude them from the benefit package.

It is not the objective of this paper to review whether the UC scheme benefits the population, and if so, which section of the population is best served, as it replaces the former public welfare and voluntary health card schemes, and also covers the previously uninsured population. There is no significant change in the UC package, or, in particular, in the SRH package. The scope of the SRH package was adopted from the previous schemes unchanged, but the per capita budget allocation for the UC is much higher than that of the previous public welfare scheme (Tangcharoensathien et al. 2003). A high-cost care reimbursement and adequate UC budget might provide better access to and use of high-cost curative SRH interventions such as for cancer.

Conclusions and policy recommendations

It is difficult to define the theoretical term 'health needs' exactly, since many interpretations are applied in differing contexts. Yet, this topic still desires further explorations. In this study, it has been taken to mean 'the applied health needs of a population based on the desire to provide and implement the benefits of healthcare, and from that point, to improve the health of the population still further'.

The mismatch between need, demand and supply is the result of a number of factors. The lack of information on the cost-effectiveness of interventions does not facilitate a well-thought-out benefit package design. Consumer ignorance about the positive externalities of certain public goods results in unawareness and inadequate utilization. Other economic, social and cultural barriers impede access to and use of services covered by the package. Market failure and unilateral information result in supplier-induced demand, especially for high-profit interventions.

A study of the relationship between health needs, expressed needs and the services offered in the SRH services in the UC provides a useful analytical framework for future fine-tuning of the package. Prioritizing healthcare services on the basis of consumer demand can lead to inefficient use of resources. When resources are used for non-cost-effective interventions, it neglects those interventions which offer external societal benefit but of which consumers are unaware and do not express demand.

In addition to evidence of cost-effective interventions, we recommend that a service package should focus on the primary conditions that contribute to death and illness in a country, and strike a balance between population preference and the resources available. Where resources are available, expansion of Area 3 is recommended, especially of services with positive externality such as cervical cancer screening and prevention of HIV infection through pre-marital counselling. This can be done through increasing the awareness of consumers that they can express these needs and use the services offered in the package. Policymakers should be more cautious in developing the service package in Area 2, especially where there are few positive externalities.

Endnotes

[1] A contract model means that the National Health Security Office contracts to the public and private provider network on a fixed capitation fee per beneficiary. The network promises to provide care for registered beneficiaries for the whole year, according to the benefit package.

[2] Compliance rates refer to the proportion of UC beneficiaries who go to their designated provider; if they go to a different provider they are not covered by the UC scheme, and have to pay their own costs.

[3] In particular, renal replacement therapy was not covered.

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Capacity in Thai Public Hospitals and the Production of Care for Poor and Nonpoor Patients

Vivian Valdmanis, Lilani Kumanarayake, and Jongkol Lertiendumrong

Objective. To assess the capacity of Thai public hospitals to proportionately expand services to both the poor and the nonpoor. This is accomplished by measuring the production of services provided to poor, relative to nonpoor, patients and the plant capacity of individual public hospitals to care for the patient load.

Study Setting. Thai public hospitals operating in 1999, following the economic crisis when public hospitals were required to treat all patients irrespective of ability to pay.

Study Design and Data Collection. Input and output data for 68 hospitals were collected using databases and questionnaire surveys. A distinction was made between inpatient and outpatient services to both poor and nonpoor patients and the data were assessed statistically.

Data Analysis. Congestion and capacity indices to measure poor/nonpoor service trade-offs and capacity utilization were estimated. The analysis was undertaken by data envelopment analysis (DEA), a nonparametric linear programming approach used to derive efficiency and productivity estimates.

Principal Findings. Increases in the amount of services provided to poor patients did not reduce the amount of services to nonpoor patients. Overall, hospitals are producing services relatively close to their capacity given fixed inputs. Possible increases in capacity utilization amounted to 5 percent of capacity.

Conclusions. Results suggest that some increased public hospital care can be accomplished by reallocation of resources to less highly utilized hospitals, given the budgetary constraints. However, further expansion and increase in access to health services will require plant investments. The study illustrates how DEA methodologies can be used in planning health services in data constrained settings.

Key Words. Equity, hospital efficiency, plant capacity, DEA

Pressure to provide health care for the poor in Thailand has increased substantially since 1997. At that time, the Asian economic crisis led both to a rise in the overall number of Thais living in poverty, and to a reduction in government spending on hospital services. The crisis has affected both private and public hospitals. The impact on private providers has included increased debt, reduced demand, and increased costs of production (Lertiendumrong 2003).

Public hospitals face limited availability of resources (both from governmental budgetary constraints and lower consumption power of households), increased demand due to a shift from private to public providers, and also increased costs of production (Lertiendumrong 2003; Wuttipong 1998; Taearruk 1998). In particular, by 1999, the poorest 40 percent of Thais used public outpatient services more than half of the time, and public inpatient services approximately 95 percent of the time. In contrast, the richest 10 percent of Thais used public outpatient services only 26 percent of the time, and public inpatient services only 54 percent of the time (National Statistical Office 1999). One critical issue for Thai public hospitals is the need to balance the social obligation of providing care for the poor with the need to maintain financial viability, primarily driven by revenue generated by reimbursements from nonpoor patients. Given the Thai financial crisis, funding for public hospitals may be precarious.

Resources used in producing public hospital services can be classified into three groups: capital, labor, and operating costs. In Thailand, decisions regarding the amount of capital and labor employed at public hospitals are made centrally at the Ministry of Public Health (MoPH). Most capital investment expenditure and salary costs are allocated from the central government to hospitals via the budgeting system. The revenue earned by the hospital from nonbudgetary income depends on patients' ability to pay and nonbudgetary income is often earmarked to cover hospital operating costs. Faced with economic difficulties, the Thai government, through the MoPH, launched a package of policies known as "Good Health at Low Cost" (Wibulpolprasert, Tangcharoensathien, and Lertiendumrong 1998). These policies aimed to improve the efficiency of Thailand's health system, focusing on public health care providers. In response to the economic crisis and the growing number of people without access to basic health care, the MoPH required public hospitals to continue providing medical treatment to the poor, irrespective of their ability to pay for these services. Policies promoting equity and efficiency, and reforms to health care financing have continued with the current government (elected in January 2001). In April 2001, the government adopted a universal

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coverage policy, known as the 30 Baht policy, with countrywide implementation in April 2002.

Given the existing hospital and budgetary structures in Thailand, two major questions arise with respect to whether the system can increase production of care for the poor. The first is a congestion issue. On the one hand, public hospitals have an obligation to guarantee the provision of health care to the poor. On the other hand, they need to remain financially viable and are dependent on cost recovery to cover operating costs. One way of achieving the latter is by maintaining or increasing treatment levels for nonpoor patients. The poor are a financial burden on public hospitals because revenue generation from the poor is relatively limited—ranging between 40 percent and 55 percent (Srithamrongsawat 2002). However, given set capacity levels, ensuring provision of services to the nonpoor may inhibit hospitals' ability to provide services to the poor, leading to a failure by public hospitals to fulfill the mandate set up by the MoPH, so that they may fall out of favor and face regulatory sanctions. The second, longer-term question is whether, even if it were financially viable to increase services to the poor, public hospitals currently have the capacity to provide increased services to meet the needs of both poor and nonpoor patients.

OBJECTIVES

Two research questions are addressed in this study of public and regional hospitals under the Regional Hospital Division (RHD)[1] of MoPH operating during 1999. First, we empirically investigate whether providing care to one group of patients negatively impacts on access for all groups of patients (determining whether care for both poor and nonpoor patients are economic goods) given the MoPH mandate and set budget for 1999. For this study, the nonpoor are defined as those individuals who have health insurance or can pay for the full cost of their care, whereas poor patients are those that cannot pay for the full cost of their care, for example, because they are uninsured or are covered by a health insurance scheme that does not pay the full amount of the costs incurred. Second, we empirically measure capacity utilization of public hospitals in Thailand looking at:

- Level of hospitals (reflecting variation in technology and complexity of organization); and
- Region of hospitals (reflecting differences in wealth of catchment areas).

Different hospitals have different technical capacities that may affect their ability to care for patients. For example, the regional hospital (type 1) provides the highest available health care technology among the three types of hospitals. Large provincial hospitals (type 2) are more technology-intensive than the smaller provincial hospitals (type 3). We wish to ascertain whether hospitals operating at higher technical levels are better able to make use of basic infrastructure, such as equipment and manpower, than hospitals with lower technology.

In affluent areas, patients have a greater ability to pay for hospital services than patients from poor areas. In Thailand, different regions vary considerably in their level of wealth. For example, the provinces in central and east regions have a higher average income per capita than other regions and the northeast region has the lowest average income per capita (National Statistical Office 1999).

We use extensions of the data envelopment analysis (DEA) techniques that have been utilized in assessing productivity in health care markets (see, for example, Seiford 1996, for a review of the DEA-health care literature) to address these questions. Our study has a two-step process. First, we apply the "congestion" index derived from the DEA to ascertain whether provision of care to the poor and nonpoor are competing objectives. Second, the paper illustrates how DEA techniques can be used to plan service provision, applying the model of plant capacity utilization. Given that some inputs are set by the MoPH, hospitals can only respond to increased demand by working within their existing plant capacity. Expanding capacity seems unlikely given the constraints on government resources following the Thai economic crisis. In the next section we describe the model.

MODEL

Data Envelope Analysis

Data envelope analysis (DEA) is a linear programming technique that estimates relationships between inputs and multiple outputs for a sample of decision-making units (DMUs) such as hospitals (Farrell 1957; Charnes, Cooper, and Rhodes 1978; Färe, Grosskopf, and Lovell 1985, 1994). By solving a series of linear programming problems, this nonparametric approach constructs a "best practice frontier" that estimates the maximum possible outputs for set quantities of inputs among DMUs. Commonly used to assess efficiency, the production frontier is considered best practice as it relies on the relative

performance of hospitals within the sample rather than a predetermined absolute standard of efficiency. All DMUs lie on or within the interior of the frontier. The latter is considered to be inefficient since, given these levels of inputs, *all* outputs could be increased proportionately.

Extensions of the output-based DEA technique are well suited to this sample of Thai hospitals for several reasons. First, hospitals often do not operate as either cost-minimizers or profit-maximizers, therefore, econometrically specified cost or profit functions may lead to biased findings. Second, DEA does not require information on input or output prices; instead natural units or quantities can be employed in determining the production frontier. This is particularly beneficial in analyzing hospitals from low- and middle-income countries, where price data are often unreliable or missing. Third, the resulting DEA efficiency measure has a straightforward interpretation: how much can output be increased, given inputs, for hospitals lying inside the frontier (hospitals lying on the frontier have an efficiency score of 1). Fourth, DEA readily accommodates multiple inputs and outputs and so is relevant for hospitals that produce multiple services. Fifth, the output-based DEA measure can be adapted to test whether reducing the production of one type of patient care (e.g., nonpoor) leads to a reduction in the production of care for other types of patients (e.g., poor). Data envelope analysis approaches can be extended to examine the question of whether there is sufficient capacity among hospitals to increase services to the poor.

The Relationship between Care for the Poor and the Nonpoor: A Congestion Index Approach. Given the MoPH mandate requiring that care be provided for the poor regardless of ability to pay, there may be competing objectives for Thai public hospitals as they also rely on nonpoor patients to generate financial resources. In order to look at the relationship between poor and nonpoor care, DEA techniques can be extended to construct an output "congestion" index. Whereas other outputs may congest the production of care, we focus our study on these patient-based outputs. This index measures whether one type of patient-based output (care for the poor) can be increased without requiring an increase in other types of outputs (care for nonpoor); in other words, whether the ratio of care for the poor to nonpoor may be increased. Technically, congestion is defined as a situation whereby the production of one output hinders the production of another. Congestion could occur when reducing care for the nonpoor (in order to provide care for the poor) would lead to costs to the hospitals in terms of foregone payments, and thereby reduce the capacity to provide care for the poor.

To construct the congestion index, DEA efficiency measures estimated under assumptions of strong and weak disposability of outputs are compared. Mathematical derivation of this index and formal definitions are presented in the Appendix. Strong disposability of outputs means that different outputs may be substituted for one another. *Both* types of output can be increased if the hospital is operating inefficiently (inside the frontier) given inputs. Weak disposability occurs when the reduction of one output leads to the reduction of another output, given constant inputs.

The congestion index (C_I) is defined as the ratio of the efficiency scores derived under the assumption of strong disposability of outputs, E_S, to the efficiency scores derived using the assumption of weak disposability of outputs, E_W. So $C_I = E_S / E_W$. These efficiency scores are estimated assuming variable returns-to-scale technology, as congestion is considered a short-run concept. That is, outputs can be adjusted without any change in fixed inputs. If this index is equal to 1, there is no congestion and both goods can be proportionately increased within the available technology (i.e., given inputs, outputs can be increased if the hospital is not already on the frontier). An index value of less than 1 implies that either care for the poor or care for the nonpoor is congesting production or is not permitting expansion to the frontier, that is, that there are negative marginal products between output types.

Capacity to Provide Increased Services: The Plant Capacity Approach. Once we have looked at the congestion characteristics of these services, our second question is whether care for both the poor and nonpoor can be increased proportionately, given that some inputs are fixed (e.g., those decided by the MoPH). To answer this, we measure the plant capacity of our sample of Thai hospitals, which provides an indication of the current levels of capacity utilization.

The "actual" plant capacity measure is derived by measuring the optimal production of outputs compared to the actual production of outputs (Nelson 1989). This reflects the economic definition of capacity, where the optimal measure of outputs arises at the tangency between the short-run average cost curve and the long-run average cost curve (Nelson 1989; Morrison 1985). However, in this case some inputs are fixed and others are variable, so a measure of short-run performance is required. We adopt Johansen's definition of plant capacity, which is defined as "the maximal amount that can be produced per unit of time with existing plant and equipment without restrictions on the availability of variable production factors" (Johansen 1987). Whereas earlier works have focused on the single-output measure, Segerson and

Squires (1990) and De Borger and Kerstens (2000) have demonstrated that these plant capacity measures can be expanded to multi-output production cases and all outputs can increase proportionately.

To define an output-based efficiency measure (recall that we are only interested in capacity utilization and not technical inefficiency, per se) we first need to factor out any inefficiencies, that is, operating inside the frontier, since we are interested in measuring plant capacity and not inefficient production. Since we assume that all outputs can be increased proportionately, we again use DEA to calculate plant capacity utilization. The plant capacity measure (P_I) is the ratio of the output efficiency where some inputs are variable and others fixed (E_F) to the output efficiency where all inputs are treated as variable (E_V). If $P_I = E_F/E_V = 1$, then the short-run productivity measure equals the long-run measure. If P_I is less than 1, this would indicate unused or underutilized plant capacity, which could be used to treat proportionately more both poor and nonpoor patients. The formal derivation for this index is presented in the Appendix, and uses the methods developed by Färe, Grosskopf, and Kokklenberg (1989), Färe, Grosskopf, and Valdmanis (1989), and Färe, Grosskopf, and Lovell (1994). We arrive at a multi-output measure of plant capacity under restrictions of constant returns to scale. For the plant capacity analysis, we restrict our production function to constant returns to scale because, unlike the analysis determining the disposability of outputs, we are concerned with comparing short-run and long run productivity.

DATA

The sample consists of 68 public general hospitals operating under RHD—representing 7.1 percent of hospitals and 27.4 percent[2] of all beds in Thailand. These hospitals were selected for five reasons. First, they consume a high proportion of the overall MoPH budget (25 percent in the 1999 budget year). Second, they include tertiary-level hospitals and are the main referral centers in rural areas, so their performance will affect services provided to people in rural areas. Third, data for this group of hospitals are relatively easily available, with an established information system in place. Fourth, these hospitals have a high potential to improve performance for both financial and manpower resources compared with other smaller private facilities. Fifth, these hospitals have been mandated by the MoPH to provide services for the poor.

To achieve the aims of study, various datasets from these hospitals were collected for the year 1999. Some datasets were available from the MoPH

database, while others were not. Available datasets were retrieved from the ministry's database and sent back to be verified by appropriate hospital staff. Other data were collected directly from hospitals using a questionnaire survey.[3] From a total of 92 hospitals, complete data were available for 68 hospitals. However, no systematic differences could be noted between responding and nonresponding hospitals.

Data on public hospitals in the MoPH database are reported in a budget year that runs from October 1 to September 30. However, annual data reported from other sources are based on calendar years (January to December). As monthly data were not available for all datasets, it was assumed that there was not much discrepancy in the data between the two periods.

In total, seven inputs and four outputs were included in the study. The inputs were the number of beds, doctors, nurses, and other staff, and allowance expenditures, drug expenditures and other operating expenditures. The first four inputs are classified as *fixed variables* as the levels of capital and labor are set by the MoPH. Due to civil servant regulations, doctors, nurses, and other staff cannot easily move from their place of employment. The last three inputs are variable and can be altered according to patient volume.

The four outputs are number of outpatient visits for poor patients, number of outpatient visits for nonpoor patients, total inpatient cases adjusted with average diagnostic related group (DRG) weighting for poor patients, and total inpatient cases adjusted with average DRG weighting for nonpoor patients. Since the relative weight for each patient was not available, the numbers for inpatient admissions were adjusted with the hospital's average[4] DRG weights instead. Unfortunately, no case-mix adjustments for outpatient visits were available for the study period.

RESULTS

Table 1 presents the descriptive statistics for the input and output variables utilized in 1999.

We found that more outpatient care was provided to the nonpoor (an average of 33 percent more) and there was virtually no difference in the number of adjusted inpatient cases between the poor and nonpoor. The National Socio-Economic survey for 1999 reported that the poor made greater use of public hospitals than the nonpoor (see opening section of this article). However, these findings suggest that the relative utilization of overall services by the poor, particularly outpatient care, is less than the utilization by the

Table 1: Descriptive Statistics of Input and Output Variables, 1999

Year	*Variable*	*Observations*	*Mean*	*Std. Dev.*	*Minimum*	*Maximum*
1999	*Bed*	68	408	194	160	1,082
	Doctor	68	36	28	9	155
	Nurse	68	335	147	148	885
	Other Staff	68	505	256	181	1,390
	Allowance	68	19,500,000	13,400,000	5,091,437	66,700,000
	Drug expense	68	57,400,000	43,400,000	10,900,000	207,000,000
	Other operating expense	68	44,600,000	30,300,000	2,484,917	160,000,000
	OP visit for nonpoor	68	114,807	72,261	19,284	368,975
	OP visit for poor	68	86,587	34,741	26,543	180,863
	IP weight for nonpoor	68	10,578	7,521	1,316	37,687
	IP weight for poor	68	10,565	6,204	2,371	29,736

Note: IP weight is in-patient case adjusted with average DRG relative weight.

nonpoor. Reasons for this difference are not testable because DRG weights for outpatient visits were not available.

In Table 2, the median output congestion ratios for the sample are presented. For both poor and nonpoor services, a comparison is made between the strong and weak disposability specifications. The congestion index equals one for both types of services, indicating that producing less care for the poor does not lead to producing care for the nonpoor, and vice versa. Therefore, both types of treatment can be proportionately increased if the hospitals' production plans lie within the production possibilities frontier.

Since we determined that both types of care can be proportionately increased if a hospital has excess capacity, we explored the second issue, namely, the extent to which capacity is currently utilized and if plant capacity varies by type of hospital or by the region in which the hospital is located. The descriptive statistics of the capacity utilization measures by types and regions, and p-values from the Kruskal-Wallis test for equality of capacity utilization in 1999 by types and regions of hospitals, are presented in Table 3.

In 1999, type 1 hospitals had the highest average capacity utilization. On average, the possible increase in services provided was 2.6 percent, given fixed factors. This means that these types of hospitals operated at nearly full plant capacity. Type 2 hospitals had the lowest capacity utilization among the three types of hospitals, with 5.4 percent unused capacity. However, we did not reject the null hypothesis for sampling variation, so the mean values for each type of hospital are statistically equal (Kruskal-Wallis test $p \sim 0.360$).

Table 2: Descriptive of Output Congestion Index for Poor and Nonpoor Services, 1999

Specification	*Mean*	*Median*	*95th Percentile*	*Std. Dev.*	*Minimum*	*Maximum*
Nonpoor	1.002	1	1.02	0.012	1	1.086
Poor	1.021	1	1.10	0.059	1	1.360

Note: $n = 68$. Weak and strong disposability specifications were compared for all outputs specification to analyze output congestion. Using a Kruskal-Wallis test for statistical significance, we fail to reject the null hypothesis that the rankings are equal at the $p < 0.05$ level.

Table 3: Plant Capacity Utilization

Descriptive Statistics of Capacity Utilization, 1999

Variable	*Type*	*Observations*	*Mean*	*Std. Dev.*	*Minimum*	*Maximum*
1999	1	16	0.974	0.047	0.840	1
	2	37	0.946	0.072	0.760	1
	3	15	0.951	0.082	0.680	1

Descriptive Statistics of Plant Capacity, 1996–1999, by Type of Hospital

Year	*Region*	*Observations*	*Mean*	*Std. Dev.*	*Minimum*	*Maximum*
1999	Central	10	0.965	0.054	0.850	1
	East	6	0.907	0.099	0.760	1
	North	15	0.961	0.054	0.840	1
	Northeast	13	0.989	0.033	0.880	1
	West	10	0.939	0.070	0.790	1
	South	14	0.935	0.091	0.680	1

Descriptive Statistics of Plant Capacity, 1996–1999

Variable	*Observations*	*Mean*	*Std. Dev.*	*Minimum*	*Maximum*
1999	68	0.954	0.069	0.680	1

P-values from Kruskal-Wallis Test for Equality of Populations of Capacity Utilization, 1999, by Types and Regions of Hospitals

Type	0.360
Region	0.065

Looking by region, we find that hospitals in the northeast region have the highest average capacity utilization (98.9 percent). This indicates that, on average, hospitals in this region already produce services near the optimal

Table 4: Plant Capacity Utilization by Sample and Selected Individual Hospitals

Mean	*Standard Deviation*	*Minimum*	*Maximum*
0.954	0.069	0.689	1.00
Individual Hospital	*Hospital Type*	*Statistics Region*	1999
87	3	s	0.68*
34	2	w	0.79*
20	1	e	0.84*
64	2	n	0.86*
91	2	s	0.87*
22	2	e	0.76*
13	2	c	0.85*
25	2	w	0.86*

level with given numbers of beds and personnel. On the other hand, hospitals in the east had the lowest average capacity utilization (90.7 percent). Given our findings and sampling error, we did not reject the hypothesis that capacity utilization of hospitals in different regions had the same mean at the 0.05 significance level.

We also examined the eight hospitals with the lowest level of plant capacity utilization during 1999. Table 4 shows there is no systematic relationship between plant capacity utilization and the region in which the hospital operates. Type 2 hospitals, however, did dominate the majority of the hospitals operating with excess capacity.

Key Findings and Conclusions

This paper used DEA-based models to empirically investigate the performance of Thai public hospitals operating in 1999. The paper tested to see whether regulations regarding supply of services to the poor would lead to an overall reduction in the provision of services to the nonpoor. This paper is the first analysis to use DEA methodology to consider competing objectives for hospitals. By relaxing the strong disposability of output assumption in our model, we were able to test whether reducing care for the nonpoor would lead to a decrease in care for the poor. This is a relevant policy question since if providing care to one group of patients harms access for all groups of patients, then the equity condition is not met (i.e., Pareto Optimality), a central aim of the MoPH reforms. Our results suggest that social welfare *is* optimized since

all types of patients are treated equally by the hospital. The hospital-based statistics did not disclose a dramatic difference in utilization between the poor and nonpoor. However, since the proportion of poor that seek care in public hospitals is greater than for the nonpoor, the question naturally arises as to whether access to hospital care in general among the poor is lacking. Assessing hospital care alone may not be sufficient to underpin statements regarding equity.

Results of the congestion index found that the marginal product of poor and nonpoor services are nonnegative and that the financial incentives related to increased cost recovery from nonpoor services did not affect the extension of services to the poor. This indicates that different patient types are considered as equals in a productive sense. In general, however, there may have been a decrease in the number of nonpoor in Thailand due to the economic crisis resulting in a lack of ability to pay for private health services. Individuals covered by the low-income scheme grew from 17.9 million in 1997 (before the economic crisis) to 21.3 million in 1999. If the demand for public hospital care continues to grow, it is important that hospitals both become more productively efficient and have enough capacity to serve the population in need.

The results from the analysis of plant capacity show that hospitals are generally operating at relatively high capacity (90–95 percent), given levels of fixed inputs. Type 1 hospitals have the highest average capacity utilization and type 2 hospitals have the lowest average capacity utilization. However, there is no significant ($p<0.05$) difference between capacity utilization across the three types of hospitals. This is striking considering the very different services provided by the different hospitals, in particular, type 1 hospitals are more capital/technology intensive. What may be inferred from these findings is that all hospitals could be expanded to some degree to care for the patients admitted, irrespective of type or intensity of services. This may bode well for smaller institutions that can care for a variety of patients' needs but without the expensive technology that is needed at higher-level hospitals. Similarly, hospitals in the northeast region have the highest-capacity utilization, and those of east region the lowest. However, there is no significant difference of capacity utilization across the different regions at $p<0.05$.

Regional variation suggests that hospitals in the east region could provide more services within the current fixed inputs and unconstrained operating expenses. However, the sample size of hospitals in the east is rather small. The high plant capacity in the northeast region is coupled with the fact that this is poorer than the central and east regions. This finding may lead to policy debates over reallocation of resources (from rich to poor) that would

require an infusion of public monies since the poor northeast region may not be able to raise funds from paying patients.

We find that, in general, the public hospitals in our sample are producing outpatient and inpatient services close to their capacity given the MoPH-mandated fixed inputs. Furthermore, with the plant capacity currently in operation, proportionately more poor patients could be treated, and given that no weak disposability between the patient-based outputs existed, care for both the poor and nonpoor could increase.

However, the number of poor patients may continue to grow, especially if more poor people gain access to hospital services, which is likely with the implementation of the 30 Baht scheme. Furthermore, if the MoPH continues to be reliant on the public sector to provide services to a potentially growing number of poor, further expansion or a reallocation of resources to hospitals operating at full capacity from hospitals with less capacity will be necessary. This may make the most sense in a middle-income country with limited budgets for public services.

This paper extends existing DEA methods and considers the question of competing hospital objectives with respect to the poor and nonpoor. It also measures capacity in the public health system. The use of DEA in the Thai setting shows that these methodologies are useful in developing country settings where data can be limited, making it difficult to estimate marginal costs accurately. The specific analysis of plant capacity is a good tool for planning and our analysis illustrates how these methods can be used to identify hospitals where potential capacity utilization improvements can be made.

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APPENDIX
MODELING HOSPITAL BEHAVIOR UNDER THE ASSUMPTIONS OF STRONG VERSUS WEAK DISPOSABILITY

Under the Farrell (1957) framework that was updated by Färe, Grosskopf, and Lovell (1994), production under the assumptions of variables returns to scale (V) and strong disposability of outputs (S) can be modeled as:

$$P(x, y|V, S) = \{y : y \leq z \cdot M, z \cdot K \leq x, z \in -, \sum_{j=1}^{N} z_j = 1\},$$

where y is the individual amount of output produced by a firm, M is the total amount of output produced by the other firms in the sample, x is the amount of input used by the firm, and K is the total amount of inputs employed by the other firms in the sample. The z denotes the intensity parameters that permit the convex combinations of inputs and outputs. The summations of the z parameters equaling one permit variable returns to scale. In order to permit weak disposability of outputs (W), we add the μ parameter, which further constrains the movement along the production possibilities frontier. In other words, the tradeoffs among outputs are no longer allowed.

$$P(x, y|V, W) = \{y : y \leq \mu \cdot z \cdot M, z \cdot K \leq x, 0 \leq \mu \leq 1, z \in -, \sum_{j=1}^{N} z_j = 1\},$$

The difference between the $P(x, y|V, S)$ and $P(x, y|V, W)$ allows us to gauge "desirable" output loss due to production of "undesirable" outputs; called output congestion (Färe et al. 1989). The resulting measures can be determined by solving the following two linear programming problems, where output is maximized given input levels.[5]

$$\begin{aligned} P(x|V, S) &= \max \theta \\ s.t. \theta \cdot y &\leq z \cdot M \\ z \cdot K &\leq x \\ z &\in \mathcal{R}^+ \\ \sum_{j=1}^{N} z_j &= 1, \end{aligned} \tag{1A}$$

$$\begin{aligned} P(x|V, W) &= \max \theta \\ s.t. \theta \cdot y &\leq \mu \cdot z \cdot M \\ z \cdot K &\leq x \\ 0 \leq \mu &\leq 1 \\ z &\in \mathcal{R}^+ \\ \sum_{j=1}^{N} z_j &= 1. \end{aligned} \tag{2A}$$

Once again θ is the maximum radial expansion of outputs but the added constraint μ permits in the weak disposability case, that is, the backward bend in the production possibility curve (and so nonconvexity).

This congestion index is defined as the ratio of the production technology assuming strong and weak disposability of outputs $(P(x|V, S)/P(x|V, W)$, which is the ratio of the solutions from Equations (1A) and (2A). If this ratio equals 1 then there is no weak disposability of outputs and both outputs can be considered economic goods, implying a possible increase in production of poor services does not affect nonpoor services or vice-versa and so movement along the frontier is possible. Any measure less than 1 indicates the percent amount by which total output is reduced due to the imposition of the regulation that poor patients must be treated and the financial reality that a reduction in non-poor patients will lead to a reduction in poor patients and so a movement along the frontier is not possible. In order to gauge whether this is the case, we assess an output based model relaxing the constraint of strong disposability of output. In the first case, we will assess whether care for poor patients is an economic "bad" and in the second case, we will assess whether care for nonpoor patients is an economic "bad." If neither case arises, then reducing one type of output will not reduce production of the other type of output. Assuming that no congestion is present in production, the next step of our analysis is ascertaining if expansion of both goods is possible given constraints (mandated by law) of certain types of inputs. This leads us to describing the second modeling approach used in this paper.

Computationally, it is relatively straight forward to measure the Johansen (1987) definition of plant capacity utilization employing the methods developed by Färe, Grosskopf, and Kokklenberg (1989), Färe, Grosskopf, and Valdmanis (1989), and Färe, Grosskopf, and Lovell (1994). The modeling is presented below.

Since we are assuming that the outputs can all be increased proportionately we again use nonparametric data envelopment analysis (DEA) to calculate plant capacity utilization. This is done by fixing some of the inputs in the model's constraints.

In order to define an output-based efficiency measure (recall that we are only interested in the issue of capacity utilization and not technical inefficiency, per se) we first need to remove any inefficiencies, that is, operating inside the frontier, since we are interested in measuring plant capacity and not inefficient production. This is done by calculating the familiar DEA output-based measure:

$$F_0(x^k, u^k | C, S) = \max_{\theta, z} \theta$$

$$s.t. \theta u_{km} \leq \sum_{k=1}^{K} z_k u_{km}, m = 1, 2, \ldots M$$

$$\sum_{k=1}^{K} z_k x_{kn} \leq x_{kn}, n = 1, 2, \ldots N$$

$$z_k \in \mathscr{R}^+$$

In the second model, we hold certain inputs fixed by adding the constraint where $n \in \hat{a}$ indicate fixed inputs. In this way we have the optimal output that is possible when variable inputs are unrestricted and fixed inputs are restricted, which is consistent with the Johansen definition of plant capacity (Färe, Grosskopf, and Lovell 1994).

$$\hat{F}_o(x_f^k, u^k | C, S) = \max_{\theta z \lambda} \theta$$

$$s.t. \theta u_{km} \leq \sum_{k=1}^{K} z_k u_{km}, m = 1, 2, \ldots M$$

$$\sum_{k=1}^{K} z_k x_{kn} \leq x_{kn}, n = 1, 2, \ldots N$$

$$\sum_{k=1}^{K} z_k x_{kn} = \lambda_{kn} x_{kn}, n \in \hat{a}$$

$$z_k \in \mathscr{R}^+$$

$$\lambda_{kn} \geq 0, n \in \hat{a}$$

Dividing the output-based measure whereby all inputs are allowed to vary by the plant capacity model wherein some variables are held fixed, we arrive at a multi-output measure of plant capacity under restrictions of constant returns to scale. We note here we are restricting our production function to constant returns to scale because unlike the analysis determining the disposability of our two outputs, we are concerned with long-run implications. In other words, we have derived the measure wherein the economic definition of plant capacity is met, that is, that the short-run productivity measure equals the long-run measure of productivity when the plant capacity measure equals one.

Dividing the output-based measure whereby all inputs are allowed to vary by the plant capacity model wherein some variables are held fixed, we arrive at a multi-output measure of plant capacity under restrictions of constant returns to scale. In other words, we have derived the measure wherein

the economic definition of plant capacity is met if the results are less than 1, this would indicate unused or underutilized plant capacity, which could permit treating proportionately more of both nonpoor and poor patients.

NOTES

1. After the structural reform of the MoPH in October 2002, RHD, in charge of 92 regional and provincial hospitals, was merged with the Rural Hospital Division to become the Department of Health Service Support, responsible for 800 district hospitals.
2. In 1999, 72.2% and 60.7% of hospitals and beds, respectively, in Thailand were publicly owned. However, these figures also reflect the fact that a large proportion of beds in private hospitals were not in operation due to the crisis.
3. Two rounds of telephone and mail follow-ups were done before the fieldwork was terminated. The main reasons that hospitals were unable to provide data were changes in staffing, and inadequate records to verify MoPH data or to retrieve the additional required data.
4. In 1999, only average DRG weights for all patients for each hospital were available. These DRG weights were used to adjust numbers of inpatient cases for the poor and nonpoor groups.
5. We used the *OnFront* software package, which is a user-friendly program that easily derives the measures we present in this paper.

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International service trade and its implications for human resources for health: a case study of Thailand

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Abstract

This study aims at analysing the impact of international service trade on the health care system, particularly in terms of human resources for health (HRH), using Thailand as a case study. Information was gathered through a literature review and interviews of relevant experts, as well as a brainstorming session.

It was found that international service trade has greatly affected the Thai health care system and its HRH. From 1965 to 1975 there was massive emigration of physicians from Thailand in response to increasing demand in the United States of America. The country lost about 1,500 physicians, 20% of its total number, during that period.

External migration of health professionals occurred without relation to agreements on trade in services. It was also found that free trade in service sectors other than health could seriously affect the health care system and HRH. Free trade in financial services with free flow of low-interest foreign loans, which started in 1993 in Thailand, resulted in the mushrooming of urban private hospitals between 1994 and 1997. This was followed by intensive internal migration of health professionals from rural public to urban private hospitals.

After the economic crisis in 1997, with the resulting downturn of the private health sector, reverse brain drain was evident. At the same time, foreign investors started to invest in the bankrupt private hospitals. Since 2001, the return of economic growth and the influx of foreign patients have started another round of internal brain drain.

Introduction

In recent years, the growth of trade in the global economy has rapidly increased. The size of international trade in 1996 was estimated at USD 6 trillion, and 20%-25% of this was trade in services [1]. In both developed and developing countries, international trade accounts for an increasing share of gross domestic product (GDP). For example, Thailand's total exports in 2001 were worth 3,386,088 million Baht, or 60% of the GDP of 5,079,018 million Baht [2].

In 1996 the size of the global health services sector was estimated at USD 3 trillion. The figure estimated for 2005 is USD 4 trillion [3]. Most of this is in domestic markets. It was estimated that the value of global health services exported in 2000 amounted to USD 140 billion, less than 5% of the global market, and that this was growing at 6% per year [4]. But this percentage may grow rapidly with more widespread use of information and communications technology – for example, e-health – and as health systems are liberalized and entry barriers are lowered[5].

The World Trade Organization (WTO), established in 1995, aims to reduce unnecessary trade barriers. The main WTO agreements related to health include the Agreements on Technical Barriers to Trade (TBT), the Agreement on Sanitary and Phyto-sanitary Measures (SPS), the Agreement on Trade-Related Intellectual Property Rights (TRIPS) and the General Agreement on Trade in Services (GATS) [6]. Many regional trade agreements follow more or less the same principles as WTO agreements. Among South-East Asia nations, for example, there is the ASEAN Free Trade Area with its ASEAN Free Trade Agreement on Services (AFAS).

Several possible implications of the international trade on health systems are related mainly to social equity[3]. First, the beneficial effects of telemedicine are offset by the required infrastructure and the manpower tradeoff versus basic services for the poor. Second, consumption abroad can result in a dual market structure that siphons scarce health resources from the poor. Third, although a foreign commercial presence can reduce pressure on public resources, it also can lead to a tiered health care system, with flow of providers from the rural public health sector to the urban private health sector. Finally, although movement of health personnel may create opportunities for remittances to developing countries, the resultant brain drain is a serious constraint for national health system development.

Some questions that need to be addressed in the context of a developing country are related to the impact of liberalized trade in health services on the cost, quality, and availability of such services. What should be the policies and strategies adopted by the country to promote exports of health services? What kinds of supporting policies and measures are required to ensure that trade in health services is not at the expense of national priorities and the interests of the poor? How can a public-private balance be maintained in the delivery of health services in the wake of increased commercialization of health services? These are all issues that deserve serious consideration if governments are to take due advantage of the emerging global opportunities in health services while also successfully mitigating the adverse effects of such globalization.

This study attempts to answer some of the above questions. It aims at analyzing the impact of international service trade on the development of the health care system, particularly in terms of human resource for health (HRH). The paper also summarizes Thailand's commitments to GATS and discusses their potential impact on national health systems and HRH. It also explores the national mechanisms and strategies undertaken in trade negotiations. Finally, it attempts to synthesize recommendations to strengthen the negotiation capacity and to propose measures to alleviate negative consequences so that the country will benefit from international service trade.

Methods

Literature review

This involved a review of relevant documents on international service trade, such as international service trade agreements (GATS and other regional agreements), Thai laws, research studies and reports concerning international free trade, economic development, health system development and development of human resources for health.

Semi-structured interviews

Twenty experts in various fields, such as experts on HRH, health care systems, health education systems, private health systems, lawyers, civil service commission and representatives of professional councils were interviewed through a semi-structured questionnaire.

Brainstorming sessions

A half-day seminar in which 50 experienced researchers, administrators, trade negotiators and other stakeholders participated was held to seek their additional opinions and recommendations for future development.

Results

Literature review

The General Agreement on Trade in Services (GATS)

Many of the WTO agreements are binding multilateral agreements. GATS, however, which is one of the binding agreements, imposes only general obligations. Members can voluntarily choose to commit, at any level, to any specific mode and sector of services. However, the commitments must conform to the principles of Most Favored Nation (MFN) and National Treatment (NT). The commitment should progressively be increased in the following round of negotiations (progressive liberalization). Governments may modify or withdraw their commitments three years after their entry into force, subject to negotiated compensation. Governments also maintain the ability to introduce regulations in the pursuit of quality and other domestic policy objectives [6].

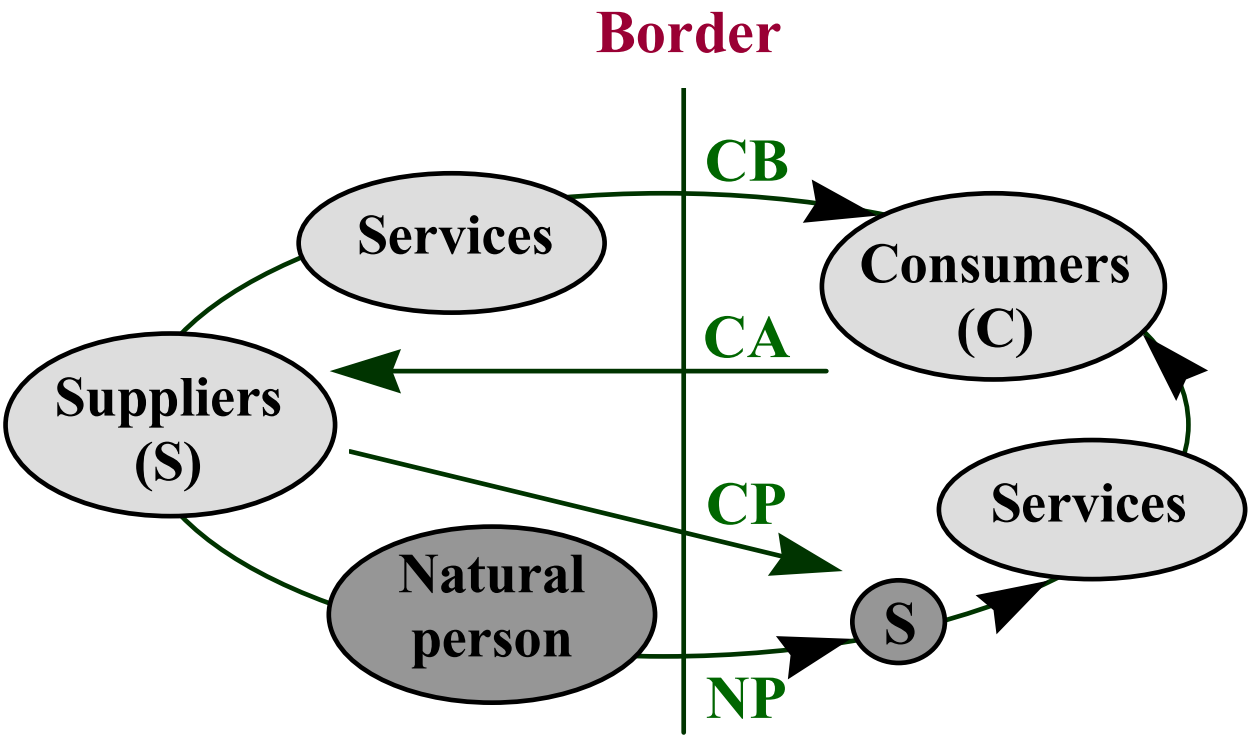

Figure 1
Mode of international trade in services [8]

There are four main modes of international trade in services [7] (Figure 1):

Mode 1: Cross-border supply (CB)
This includes telemedicine, teleconferencing, teleconsultation, tele-education, and subscription to journals and databases on the Internet. This CB has been greatly facilitated through rapid expansion of e-commerce.

Mode 2: Consumption abroad (CA)
This includes travelling abroad, including via health tours, to seek high-technology treatments or cheaper health services

Mode 3: Commercial presence (CP)
This includes foreign investment in hospital operation, medical and dental services and management of health care.

Mode 4: Temporary movement of natural persons (NP)
This includes temporary emigration of doctors from developing to developed countries, and import of specialists from developed countries into facilities invested in by foreign capital in the developing countries.

Of 12 service sectors included in GATS, at least five are directly related to health care systems [8], i.e., the business, distribution, education, finance, and health and social services sectors. The professional services under the business service sector deal with services of health professionals. The distribution service sector relates to services in pharmaceutical retailing. The education service sector involves the training and education of health professionals. The financial sector deals with health insurance and flows of foreign capital for investment in private hospitals. The health and social services sector includes hospital services, medical and dental services, diagnostic services and management of health service facilities.

There are various kinds of barriers to trade in health services [9]. These include entry visas, work permits, professional and premises licenses, investment permits and insurance reimbursement. Commitment to services trade agreements can reduce some or all of these barriers.

Countries' commitment to GATS
Except for the education sector, health has drawn the least commitment among WTO members. Table 1 summarizes the level of commitments on some health-related services [6,10].

Table 1: WTO Members' commitments on some health-related services (3rd quarter 2000)

Services	Number of members committed	% of total WTO members
Medical and dental	54	39.1
Midwives and nursing	29	20.0
Hospital	44	31.9
Other human health services	17	12.3
Health insurance	78	56.5

Note: Many of these commitments, particularly in mode 1, are "unbound", which means no commitment. Sources: Adapted from WHO/WTO, 2002 [6] and Adlung R, Carzaniga A, 2002 [10]

Thailand's commitments to GATS in relation to health

Health is a very sensitive sector, and is usually the last sector in which a country will allow free international trade. The ASEAN Free Trade Agreement on Services, started almost a decade ago, has also not gone very far in terms of trade in health services [11]. In the first round of binding to WTO (1995), Thailand proposed both general (cross industries) and specific national commitments in all sectors except the health and social services sector and other unclassified services sectors [8,11]. Table 2 shows the types of general commitments as well as five service sectors related to health.

It is clear that Thailand chose to commit in some sectors and only a few modes of services. For instance, in the commercial presence mode for cross industries' commitment, market access is allowed for companies for which foreign shares account for up to 49%, but no commitment on other modes. There is no limitation for consumption abroad in the education services sector but no commitment for presence of natural persons. The life and non-life insurance business under the financial sector is open to all four modes at different levels of commitment. There are some limitations for commercial presence and presence of natural persons in this sector, but no limitation for cross-border supply and consumption abroad.

It was also found that most of the Thai commitments to GATS are much below those allowed by its legislation. For example, while there is no commitment to mode 4, the Thai Medical Council allows foreign graduates from recognized medical colleges who have Thai residency to enroll in the licensing examination. Passing the licensing examination results in getting a lifetime practice license in Thailand. This practice of under-commitment to GATS definitely allows some flexibility in the future round of negotiations as well as in future amendment of the legislation.

Potential health implications

Mode 1: Cross-border trade

A private hospital in Thailand tested satellite-based telesurgery with a hospital in the USA in 1998. It was successful but not cost-effective. Cross-border trade has been more evident in education services. For example, many Thai students have registered for the master's degree in public health via distance learning with institutions in the UK and USA. So far the success rate has not been very high, however. Empirical information from some medical practitioners reveals that seeking second opinions through teleconsultation via the Internet or direct contact is on the rise. While increasing the accessibility and quality of services, cross-border trade also imposes some threats on the practices of local health professionals.

Since 1995, the Ministry of Public Health, Thailand, has invested in the internal use of satellite-based telemedicine among distant district hospitals and tertiary public hospitals. This was aimed at increasing accessibility to better-quality health care, but due to its high cost and the economic crisis in 1997, only 18 sites were established. The main use was for teleconferencing and tele-education. An extensive evaluation in 1999 found that the system was not cost-effective [12].

In the era of "outsourcing" to reduce cost, there is an increasing trend in this mode of supply, especially in the area of medical records management and radiological services[13]. Some contacts between US hospitals and Thai radiologists have been initiated but not completed. In addition, there are still several ethical, legal and "gatekeeper" management issues to be seriously considered in this mode of trade [14], particularly the issue of "confidentiality of personal information".

Mode 2: Consumption abroad

Consumption of foreign capital

Between 1989 and 1993 the number of private hospitals and beds increased sharply due to increased demand from economic growth. This phase of investment used mainly internal loans and savings. After the opening of the free

Table 2: Thailand's commitment to GATS in the first round (1995)

Mode of trace in services	General commitments		Specific sector/subsector commitments									
			Business		Distribution		Education		Financial		Related health and social	
			Professional: medical and dental		Retailing (drug dispensaries)		Professional and/ or short course education		Life and non-life insurance		Hospital	
	MA	NT	MA	NT	MA	NT	MA	NT	MA	NT	MA	NT
1. Cross-border supply	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**+**	**U**	**U**	**U**
2. Consumption abroad	**U**	**U**	**U**	**U**	**U**	**U**	**+**	**+**	**+**	**U**	**U**	**U**
3. Commercial presence	**B**	**U**	**U**	**U**	**U**	**U**	**B**	**+**	**B**	**U**	**U**	**U**
4. Presence of natural persons	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**B**	**U**	**U**	**U**

Source: Ministry of Commerce, Thailand Note: MA= market access commitments and NT= national treatment; Three types of commitments: (+) Full commitment; (B) Commitments with limitations: Bound; (U) No commitment: Unbound.

financial market in 1993, there was a massive influx of low-interest foreign loans. These loans were invested in some industries that later became non-performing loans, including some investments in private hospitals. The occupancy rate of for-profit-private hospitals was around 40% in 1997, a 250% excess of bed supply [15].

The mushrooming of private hospitals created a big demand for human resources. With income about 5 to 10 times higher in the private sector, the internal migration of rural physicians to urban private hospitals began in the late 1980s. Figure 2 shows that the difference between the ratio of doctors-to-population in Bangkok and the poorest north-eastern region increased from 8.6 times in 1986 to 13.7 times in 1997.

The bed-to-doctor ratio of rural district hospitals increased from 7.1 beds per doctor in 1988 to 15.3 beds per doctor in 1998. In April 1997, a few months before the economic crisis, 21 rural district hospitals functioned without a single full-time physician. This difference decreased after the economic crisis hit Thailand in 1997, however, due to declining demands in the private sector [16].

This internal brain drain was due partly to rapid economic growth as well as the opening of free international financial trade. It is a good example that the opening of trade in services other than health may affect health systems [17].

Consumption of health services

Providing health services for foreign patients creates heavy investment in advanced health technology for the private sector at the expense of public health. This enhances the existing tiered health care system, with shifting of HRH from the rural public to the urban private services, resulting in increasing inequity.

The Thai health care system is attractive to foreign patients due to its high quality and comparatively low price. Since the 1997 economic crisis, the government and the private health sector have started intensive promotion to attract foreign patients; this has been very successful. In the year 2001, the Department of Export Promotion, Ministry of Commerce, carried out a survey of 20 private hospitals that were known to cater foreign patients. The survey found 470,000 foreign patient visits, a 38% increase from 2000, reported by seven hospitals [18]. One of the most popular hospitals had more than 200,000 visits. Countries with the highest number of inflow patients were Japan, USA, Taiwan, UK and Australia. Moreover, there is an increasing trend of patients from the Middle East and other Asian countries. It was estimated that the total 2001 figure could be around 1 million.

Due to its private nature, the resources needed to provide services to one foreigner may be equivalent to those used to provide service to 4–5 Thais. Thus the workload was equivalent to 3–4 million Thai patients. This was equivalent to around 3% of the total workload of the system in

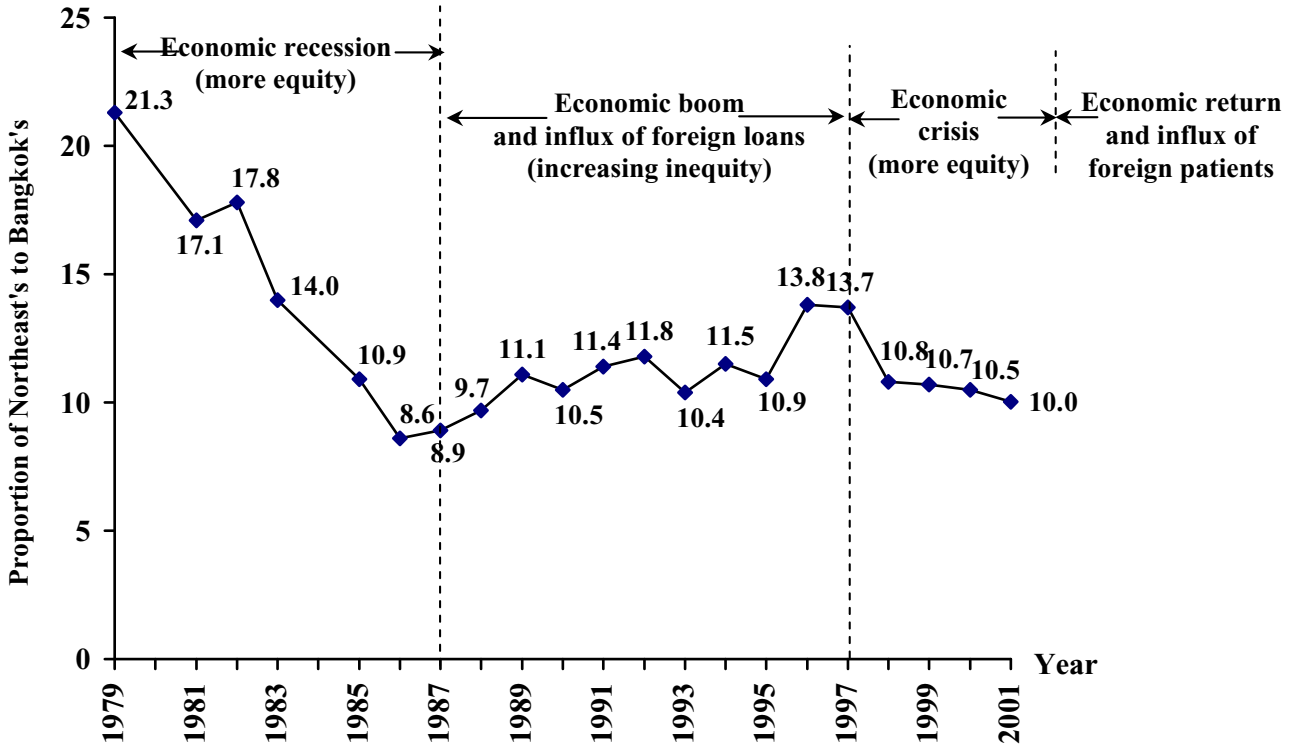

Figure 2
Proportion of Northeast to Bangkok population-to-doctor ratios, 1979–2001 (Source: Bureau of Health Policy and Plan, Ministry of Public Health, Thailand)

2001. If growth continues at the current rate, the workload for serving foreign patients may go up to 12% of the total workload in 5 years. This means a demand of approximately an additional 4,000 full-time-equivalent doctors for urban private hospitals [19].

Commitments to GATS on the Financial Sector, including the portability of health insurance, may facilitate more inflow of foreign patients. Most countries limit their commitment on portability of public health insurance [10]. Nevertheless, there is evidence of increasing movement towards partial or total payment for services received abroad [20]. Currently the Japanese National Health Insurance system allows reimbursement of up to 70% of health care expenses from foreign providers.

This increase in mode 2 trade in health services, in addition to the recovering economy, resulted in a new round of internal brain drain. The number of annual physician losses as compared to the number of new recruits in the MoPH increased from 4.5% and 7.6% in 2000 and 2001 to 32.2% in 2002 [17].

On the other hand, better-off Thais also go abroad for health services, mainly to the western countries. In the last decade, there was an increasing trend to seek health care from Chinese medicine in China. So far there has not been a study on the size and cost of this consumption abroad.

Mode 3: Commercial presence

Most of the commercial presence occurs through joint ventures of foreign providers and investors with local partners in order to ensure access to qualified local health personnel and a supply of paying patients. Foreign patients (mode 2) and foreign commercial presence (mode 3) in medical education or in hospitals may lead to better-quality health care because of increased availability of sophisticated medical technology. At the same time, it may distort the health care market by enhancing tiered health care systems and internal brain drain. The quality of education or health care in the public sector might suffer due to loss of qualified human resources to the private sector.

There are 13 Thai private hospital chains in the stock market that are open to foreign investment. If the foreign investors' share exceeds 49%, permission must be requested from the Ministry of Commerce. After the 1997 economic crisis, many big private hospital chains went bankrupt and loans they made became non-producing loans (NPL) [16]. Foreign investors started to come in looking for low-priced private hospital stocks. According to the Ministry of Commerce registrar, no private hospital has foreign shares above 49%.

A study in 1999 found only 0.57% foreign share of new investment in private hospitals in Thailand between 1992 and 1998 [14]. The survey conducted by the National Statistical Office in 2001 found that to date there are 24 hospitals nationwide (7.36%) with part-foreign ownership, mainly in Bangkok (Table 3). The countries or region involved and their ownership percentages are: Japan (25%), Singapore (19.4%), China (11.1%), Europe (11.1%) and the USA (5.6%).

But empirical evidence found that some of the private hospital chains have already been taken over by foreign investors through so-called "nominee" shareholders. These foreign investors brought in more capital and more efficient management and marketing systems. They also brought in more foreign patients. Thus health services may eventually become like other industries, in which foreign investors benefited from high quality but low-cost labour to be more competitive in export-led industries.

Foreign patients receive services from foreign-owned private hospitals. Consequently, the country may be left with the problem of internal brain drain, while the benefit from foreign patients was finally channeled back to investors' countries. In the future, if mode 4, import of health workforce, is also allowed, more foreign professionals may move in to provide services to foreign patients. In the current round of GATS negotiations, which started in early 2003, Taiwan, China and India have asked Thailand to open mode 4 for some cadres of health professionals [21].

Despite Thailand's not having committed to the distribution sector (Table 2), its law allows partial investment. Some foreign pharmaceutical retailing chains, e.g. Boots, started doing business in Thailand a decade ago. Their expansion has started to have negative impacts on local pharmacies.

Mode 4: Movement of natural persons

Barriers to movement of health professionals include requirements for a work permit, visa and length of stay, residency, investment conditions and licensing for practice. The Thai Medical Council, the national licensing body for physicians, requires graduation from an accredited medical college and permanent residency for foreigners to be eligible to take the licensing examination [22]. From 1946 to 1986, there were 229 Thai-licensed foreign practitioners. Since 1987, after the examination has been given in Thai, only six foreigners succeeded in acquiring the medical practice license (Figure 3).

On the other hand, opening the labour market to the increasing demand in rich countries has created external brain drain and shortages of qualified health professionals in developing countries. In 1960 to 1975, approximately 1,500 Thai medical graduates migrated to the USA in response to the opening of the labour market. Since very few of them returned, the country thus permanently lost those physicians. This accounted for 20% of the total 7,500 Thai medical graduates in 1975; in 1965, half of the new medical graduates also emigrated [23].

The reason behind this massive external migration was the increased demand for doctors in the USA due to the Vietnam War and the initiation of publicly subsidized Medicaid and Medicare. In addition, higher income and opportunities for further education and training enhanced the migration. The income of new medical graduates in Thailand in 1970 was around 2,000–2,500 Baht per month, as compared to 30,000–40,000 Baht per month in the USA, a 15- to 16-fold difference.

This external brain drain has no relation to international trade agreements. Without international trade agreements or commitment to GATS, developed countries can open or close their health professional labour market according to their internal demand.

The external brain drain of medical doctors from African countries is another good example. In Ghana, 65% of new medical graduates emigrated within 10 years [24]. While South African doctors migrated to western countries, in 1996 the government imported 300 Cuban doctors to work in the rural health centres [25]. In England, the first NHS plan targets the employment of 20,000 more nurses and midwives in 2004 than in 2000, while the second plan targets 35,000 additional nurses by 2005 compared to 2001 [26]. Nurses from English-speaking African countries, such as South Africa and Zimbabwe, as well as some Asian countries, such as India and the Philippines, poured into the UK. Very few Thai nurses joined in this migration. Opportunities for continuing education and private practice within the country and inadequate proficiency in foreign languages prevent Thai health professionals from working abroad.

Although health personnel may send remittances back to their home country, which are a substantial source of foreign exchange in some countries, such as the Philippines

Table 3: Current foreign investment in private hospitals in Thailand

Location/Region	Without foreign investment		With foreign investment				
	Number	%	Total	Hospital size (beds)			
				<50	51–100	101–200	>200
Bangkok	48	77.2	14	1	5	3	5
Central	117	95.90	5	-	2	1	2
Northeast	42	93.33	3	-	3	-	-
North	59	96.71	2	-	-	1	1
South	36	100.00	-	-	-	-	-
Total	**302**	**92.64**	**24**	**1**	**10**	**5**	**8**

Source: National Statistical Office in Buddhasri, 2003.

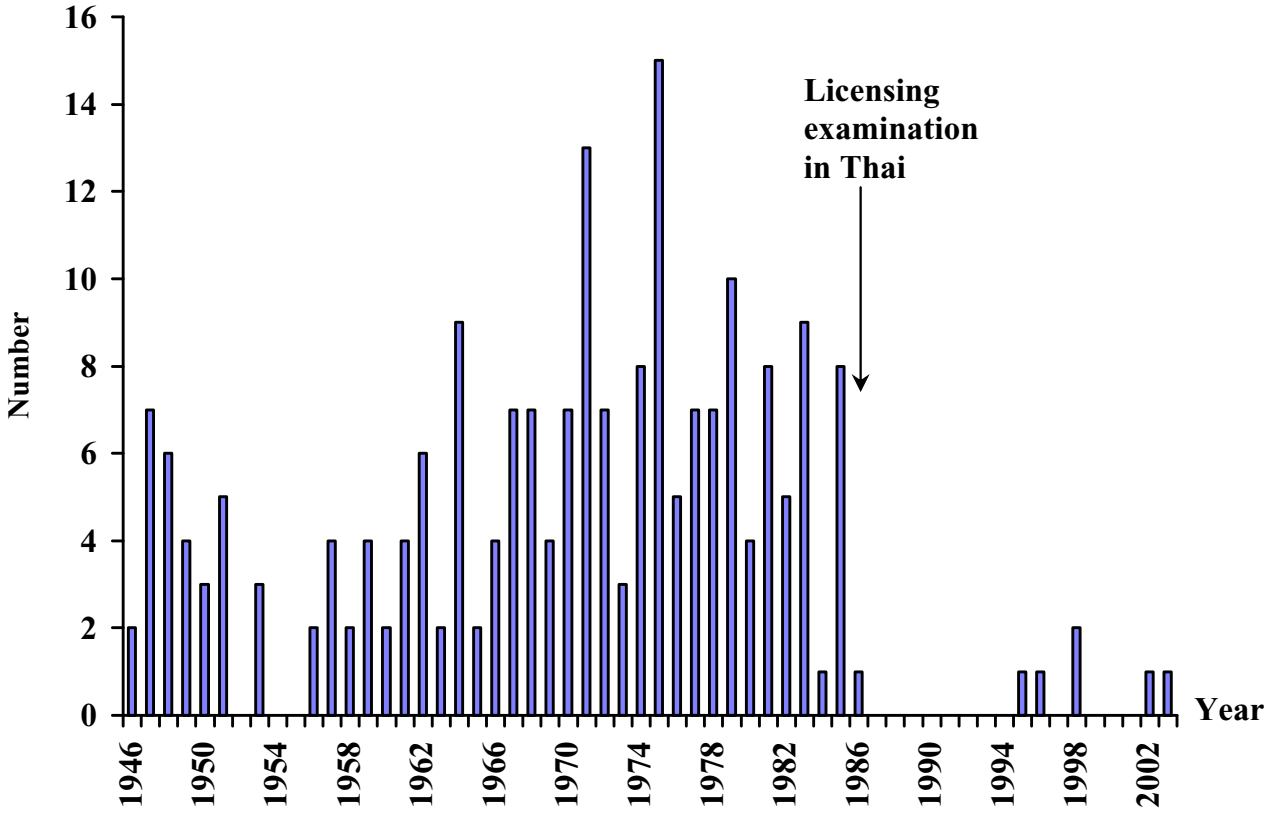

Figure 3
Foreign medical practitioners licensed in Thailand, 1946–2003 (Source: Thai Medical Council)

and India, the public sector itself is not directly compensated. If this type of movement increases without an appropriate regulatory framework, the equity, quality and efficiency of the domestic health system will suffer. Due to massive migration of nurses from African countries, an ethical recruitment code for midwives and nurses was developed by the International Confederation of Midwives and International Council of Nurses [27-29].

Countries in the European Community started free movement of all professionals including those in health in 1998. The effects of this agreement on the flow of health professionals need to be followed closely, and can be a good lesson for other regional trade blocs.

Mechanisms of Thailand to deal with the international services trade and GATS

Thailand has set up a national structure and mechanisms in preparation for negotiations with WTO. All stakeholders, including related ministries, civil societies, researchers and the business sector, are involved. In the Ministry of Public Health itself, a policy-level committee was set up in 2000. Three subcommittees were also set up: one on TRIPS, one on GATS and the other on SPS and TBT.

In mid-2000, the committee agreed that commitment on health services should be unbound in all modes of trade except consumption abroad. There were at least two reasons to support this decision. First, before further commitment to GATS, there is a need to strengthen the supporting mechanisms to establish and implement adequate policies and measures. This is to ensure that international health service trade is not at the expense of national priorities and the interests of the poor. Furthermore, there is a need to strike a public-private balance in the wake of increased commercialization of health services.

In 2002, a meeting among all stakeholders agreed that the Thai trade negotiators, the Ministry of Commerce, should try their best to convince developing countries to allow for portability of their public health insurance. If successful, this would bring in more foreign patients and might have serious implications for the Thai health care system. With the new government policy to support more inflow of foreign patients, a Centre to Promote Trade in Health Services was set up in the MoPH.

Expert interviews and brainstorming sessions

Inadequate knowledge and skill among local experts

It was found that not many health experts understood and knew about international trade and WTO in detail. Those who understand WTO agreements have little knowledge of the health care system, particularly of HRH. More than 40 experts, who were identified as potential resource persons, were approached, but only 20 agreed to be interviewed. Most of those who declined to be interviewed explained that they did not have enough understanding and knowledge of either WTO or HRH. After the interview and the brainstorming session, many experts admitted that this research project was a very good learning process for them.

Other suggestions

• A strong and efficient governance mechanism for the national health care system is required to cope with the increasing complexity and dynamics.

Outcome of interview and brainstorming session

In summary, interviewees and participants reflected their views that the implications of international service trade on HRH components include the following:

HRH planning

• International service trade will create more difficulties for HRH planning because of the high level of complexity and dynamics of demand. However, as the size of the international service trade is still quite small, the HRH plan still depends more on the size of the internal health market.

• Foreign health professionals may not enter to any great extent, due to the Thai-language licensing examination and cultural barriers.

• Strengthening of the HRH planning and management capacity is very important for successful response to the complexity and the dynamics from international service trade.

Education and training

• Language and culture will be the barriers for foreign investment in education and training of HRH.

• Investment in quality educational institutions, which is very capital-intensive, may be a losing proposition in low-income countries.

• If investment in foreign-owned training institutions occurs, they may be more popular than domestic ones due to the greater opportunities for graduates to work domestically and internationally.

Management of HRH

• Internal migration of the health workforce is a bigger problem than external migration. Language proficiency and different culture are barriers to both external migration and the influx of foreign professionals.

• With more international trade in health services, professional ethics may erode. More malpractice lawsuits can be envisaged if professional councils are not strong enough. The rate of malpractice litigation to the Thai Medical Council has increased sevenfold since 1980, particularly after the 1997 economic crisis (Figure 4).

• The regulatory capacity of professional councils and professional associations should be strengthened. Civil society should be involved in controlling, monitoring and accrediting health professionals.

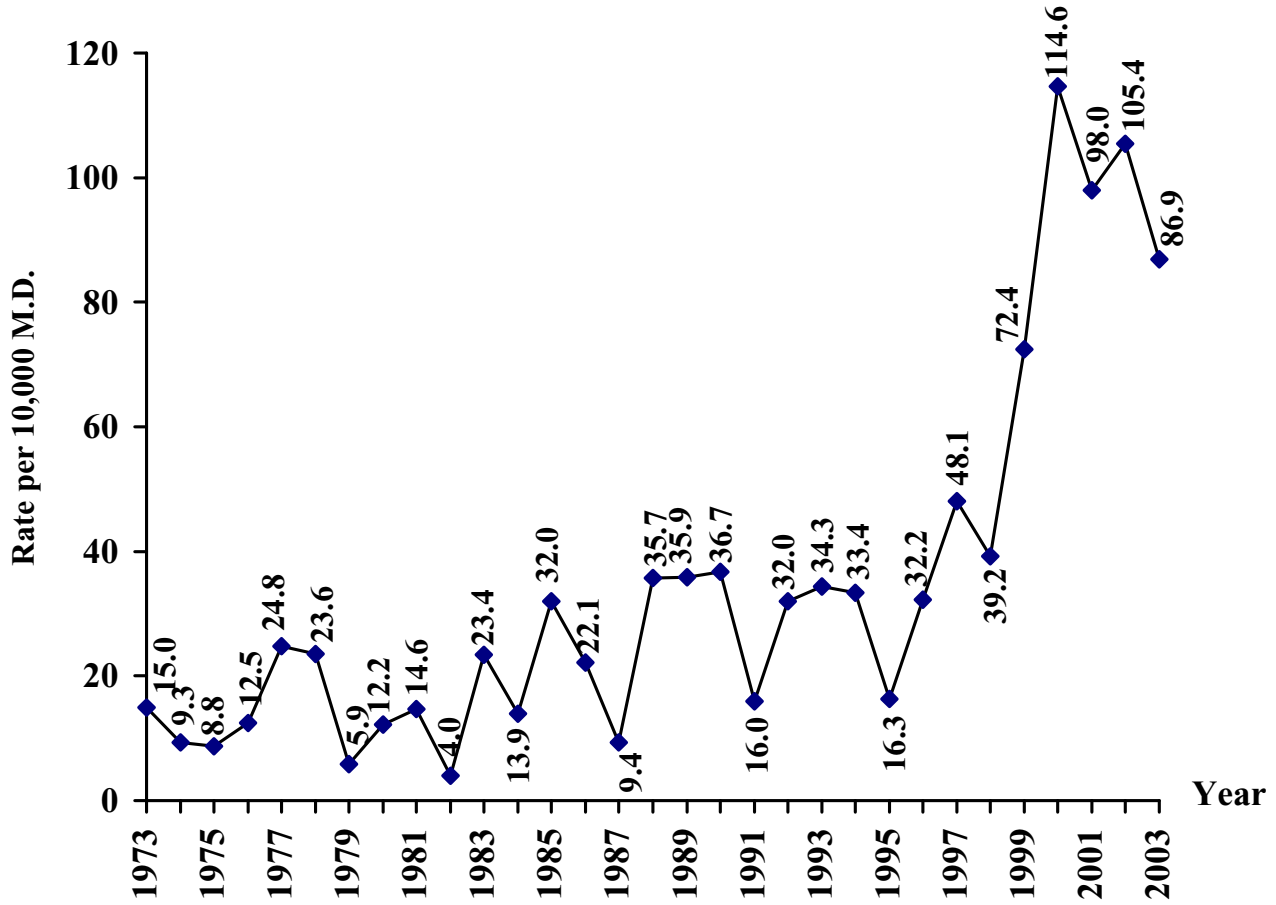

Figure 4
Rate of medical malpractice cases filed with the Thai Medical Council, 1973–2003 Source: Thai Medical Council)

Discussion and recommendations

It is clear from the results of this study that international service trade can have significant negative implications on health care systems, particularly HRH. The main implications include internal and external migration of HRH; inequitable tiered health care systems and erosion of professional ethics, with a wider gap between patients and health professionals. Some countries, such as Canada, for example, campaigned for application of Article 1.3 in GATS to exclude health services from GATS negotiation. Article 1.3 (b) states that "services" under GATS includes any service in any sector except services supplied in the exercise of the government. These countries faced enormous pressure from their trade partners, however [30-32]. Some positive implications include influx of foreign currencies and capital, better opportunity for professional training, improving quality of care and access to high technology equipment. For a developing country like Thailand to benefit optimally and be protected from the negative implications of international service trade, the following recommendations should be seriously considered:

Capacity building and research study

• There is a need for a research package on health system and manpower development, and international trade and health systems. Economists, public health experts, legal experts and social scientists should be encouraged to work together in conducting this research. Important research questions that should be urgently studied are:

❍ The current situation of trade in health services and its future projection, as well as analysis of the areas of comparative advantage;

❍ Implications of international trade in health services on the health care sector, including on HRH;

❍ Policy recommendations to enhance positive implications and alleviate negative implications;

❍ Foreign investment in health services;

❍ Capacity of Thailand in investment in health services.

• National capacity of HRH management and research must be rapidly strengthened.

• Academic institutions should develop training courses covering international trade issues, especially trade agreements under the WTO and their impact on health systems.

• Countries, WHO and international donors should support fellowships for manpower development in this area.

Strengthening national mechanisms for trade negotiation

• The national intersectoral mechanisms for the development of national positions for trade negotiation are a crucial component. The mechanisms should be continuously strengthened and used.

• The Ministry of Public Health should have a permanent body responsible for international trade policy and health systems, with high-calibre technical officers trained in these areas.

Prevention of future negative impacts

A clear national health system reform policy is essential to protect the system from negative implications. Health system reform should be implemented vigorously, especially in the areas of development of capacity to supervise and regulate private facilities, to manage an equitable and efficient health insurance system, in health care system planning and management, and in HRH development. A commission on HRH development should be established with strong secretariat support, preferably under the National Health Systems Reform Committee. The commission would provide continuous wisdom for strategic management of HRH.

In principle, further commitments should be considered only when there are requests from WTO members. Positive and negative impacts should be seriously considered in detail before expanding the commitment to GATS, especially if the commitments are beyond the current national legislative framework. All stakeholders or affected agencies should also be consulted.

Encouraging the health service system to benefit from free trade in services

• Both the public and private sectors should collaboratively prepare a clear proposal focused on expansion of international services trade in member countries based on health wisdom such as traditional massage and traditional medicine. This proposal can be used to negotiate with other member countries.

• Encouraging public health facilities, particularly those in rural areas, to take part in providing health services for foreigners in order to allow more financial incentives and reduce repeated internal brain drain.

Conclusion

It is clear that international trade is growing rapidly. Trade in services is growing faster than trade in goods. International trade in health services is also growing fast, despite that few countries commit seriously to health services trade under GATS. The growing international trade in health services has created several negative implications for health care systems. It promotes commercialization of health care and enhances the existing tiered health care systems. It stimulates external and internal migration of health workforces, both of which result in increasing inequity of health care access. It also enhances the erosion of ethics among health professionals, resulting in an increase in malpractice litigation. In this increasingly complex and dynamic situation, developing countries require strong national mechanisms with adequate capacity to effectively govern their health care systems. This is to ensure that the poor will not be deprived of access to essential health services.

Competing interests

None declared.

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The private demand for an AIDS vaccine in Thailand

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Abstract

A contingent valuation survey of Thai adults revealed that private demand for a hypothetical AIDS vaccine that is safe, has no side effects, and lasts 10 years, rises with income, the lifetime risk of HIV infection and vaccine efficacy, and declines with vaccine price and respondent's age. Demand for both high (95%) and low (50%) efficacy AIDS vaccines is substantial. Nearly 80% of adults would agree to be vaccinated with a free vaccine. Government will have an important role to ensure that those at highest risk of HIV infection with low incomes have access to the vaccine and to reinforce other safe preventive behavior to prevent reductions in condom use.

Keywords: AIDS; AIDS vaccine; Demand; Prevention; Willingness to pay; Risk behavior

1. Introduction

As of the end of 2003, about 40 million people worldwide were estimated to be living with AIDS, almost all of them prime-aged adults and 95% of them living in developing countries [1]. Roughly 3 million people died from AIDS in 2003. Prevention programs have been launched in virtually every country—to provide information, raise condom use, reduce numbers of sexual partners, promote safe sex and injecting practices, and to reduce mother-to-child transmission. Nevertheless, more than 15,000 people become newly infected with HIV every day. Despite the best efforts of scientists, there is still no cure for AIDS. The advent of highly active antiretroviral therapy (HAART) has reduced the mortality rate among patients in high-income countries, although it remains costly, suffers from significant implementation problems (side effects, difficult compliance, and viral resistance) and cannot eradicate the virus from the body. A safe, effective and affordable AIDS vaccine would be a valuable addition to the existing arsenal of prevention strategies.

Thailand has one of the most severe AIDS epidemics in Asia and would benefit significantly from a preventive AIDS vaccine. The engine of the Thai epidemic has been heterosexual spread, primarily through commercial sex workers (CSW), their clients, and subsequently the clients' partners and children. In the

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early 1990s, Thailand launched a national program to prevent AIDS, with widespread public information and a campaign to raise condom use especially in commercial sex workers to 100% [2,3], which has had a major impact on the spread of HIV. Nevertheless, nearly a million of Thailand's population of over 60 million have been infected with HIV since the beginning of the epidemic and an estimated 695,000 are living with AIDS [4]. An estimated 29,000 Thais become newly infected with HIV annually primarily through heterosexual, intravenous drug use, and vertical (mother-to-child) transmission. In the short run, reducing the number of new infections further depends critically on strengthening and extending the outreach of prevention programs to groups like intravenous drug users (IDU) and categories of sex workers with low condom use [5]. In the longer run, a preventive AIDS vaccine is key to further reducing the number of new infections [6].

This paper estimates the private demand of Thai adults for a hypothetical preventive AIDS vaccine. There were two primary motives for conducting this research. First, limited knowledge of the potential market is thought to be a barrier to private investment for AIDS vaccine research and development (R&D), particularly for a vaccine targeting the clades of the virus most common in developing countries [7]. The population in greatest need of an AIDS vaccine lives in developing countries, where the epidemic is most severe but the ability to pay is low.

Second, the efficiency and effectiveness of government AIDS vaccination campaigns will depend critically on private individuals' perceptions of the vaccine, their willingness to be vaccinated, and their ability and willingness to purchase vaccines. Understanding individuals' preferences is important information for both: (1) the design of future vaccination strategies; and (2) the study of volunteer preparedness in AIDS vaccine trials. Thailand will face this issue earlier, as it has and continues to play a key role in large-scale efficacy trials.[1] Tangcharoensathien et al. [8] presented estimates of the potential government demand for a preventive AIDS vaccine in Thailand. The study assumed that for a vaccine that is 100% efficacious and that conveys lifelong protection, the government would target vaccination campaigns to the highest risk individuals because of the substantial positive externalities and impact on the overall epidemic. The authors estimated that the government would need to purchase 532,000 doses initially and would require 15,000 doses annually to maintain vaccination levels for eight target population groups.[2] While a useful start in terms of conceptualizing the government response, this and other estimates of potential public sector demand based on public health "need" [9,10] assume that individuals offered a vaccine will agree to be vaccinated. Yet, AIDS is a highly stigmatized disease in most countries, so it is unlikely that everyone would agree to be vaccinated, affecting the coverage and effectiveness of a vaccination program.

The private demand for an AIDS vaccine has important implications for improving the efficiency and effectiveness of public programs. For individuals at high risk of infection, the private benefits from an AIDS vaccine are large—reduced risk of a disease that is 100% fatal and, up to now, incurable. Their proclivity to independently seek out and purchase an AIDS vaccine when it becomes available could reduce the burden of the government in the difficult and costly task of identifying high-risk groups for vaccination and allow programs to focus on ensuring access to those who cannot pay or on providing other cost-effective interventions. Of equal concern to government is the effect of the availability of an AIDS vaccine on risk behavior in the population. Failure to adhere to safe behavior once vaccinated with a less than completely

[1] Between 2000 and 2003, VaxGen, a US company, and the government of Thailand conducted an efficacy trial of a clade B/E gp120 vaccine (AIDSVAX) administered in seven doses among 2500 IDU in Bangkok and found that there was no statistically significant difference in HIV incidence between case and control groups. In 2003, the largest efficacy trial of prime boost combinations of canary pox HIV/E + gp120/E (ALVAC + AIDSVAX) was launched under the Department of Communicable Disease Control of the Ministry of Public Health, the Tropical Medicine Department of Mahidol University, and US Armed Forces Research Institute of Medical Sciences (AFRIMS). The trial will recruit 16,000 HIV-negative volunteers, both male and female, between 20 and 30 years of age.

[2] Target population groups were direct (brothel-based) CSW, indirect (non-brothel-based) CSW, IDU in and out of treatment, male sexually transmitted disease (STD) patients, transport workers, military conscripts and prisoners. If the unit cost of the vaccine were US $15, this would imply an initial public investment of US$17.5 million, excluding the costs of delivering the vaccine.

effective vaccine could eliminate or reverse the potential benefits from a public vaccination program [6].

To date, only two studies have attempted to measure the private demand for an AIDS vaccine in developing countries. The first of these, in the city of Guadalajara, Mexico, used a payment card approach[3] to elicit individuals' willingness to pay (WTP) for an AIDS vaccine that provided 100% efficacy with lifetime protection [11]. Guadalajara is one of the urban centers in Mexico hardest hit by AIDS, with perhaps as many as 7500 AIDS cases between 1984 and 1999 [11]. Median WTP for a vaccine among 234 uninfected adults age 18–60 recruited from plazas, shopping malls, and other public places in the four main districts in Guadalajara was 3000 pesos (US$ 316) [11] and about 80% of respondents were willing to pay a non-zero price (D. Whittington, personal communication). These results, though not representative of the population, suggest that there may be a substantial private market for an AIDS vaccine in middle income developing countries such as Mexico (per capita GNP of US$ 3840), even with a much less severe AIDS epidemic than Thailand (0.3% of adults infected in Mexico, compared to 1.8% in Thailand). The second study, of 890 respondents aged 18–55 in Nairobi and rural Thika, Kenya, used a different payment card approach[4] to ask the respondent the most was that he/she would be willing to pay for a vaccine for him/herself [12]. HIV infection levels in these study areas were high—34% of pregnant women in Thika and 16% in Nairobi were HIV positive. Sixty-eight and sixty-four percent of respondents were willing to be vaccinated with 100 and 50% effectiveness vaccine, respectively. Of the people who would agree to be vaccinated, 21% of respondents were unwilling to pay at any price while more than a fifth were willing to pay more than US$ 7 per vaccine. Private demand did not respond to vaccine efficacy.

In this study, the private demand for a hypothetical preventive AIDS vaccine in Thailand is estimated based on the results of a population-based survey of 2524 Thai adults aged 18–60. The hypothetical AIDS vaccine was described to survey respondents as safe, with no side effects, conveying 10 years of protection from HIV infection, and with an efficacy of either 50 or 95%. The vaccine would convey no benefit to people already infected with HIV.[5] The next section describes the survey and methodology used. This is followed by a presentation of the descriptive and multivariate results on: (a) the demand for a vaccine of different levels of efficacy and at different prices; (b) the willingness to be vaccinated with a free vaccine; and (c) the likely impact of vaccination on condom use. The study concludes by discussing the significance of these results for Thailand and developing countries more generally, in terms of the private market for an AIDS vaccine and public sector vaccination strategies.

2. Methods

2.1. Sample and data sources

The household sample for this study was selected from among households previously interviewed by the 2000 Socioeconomic Survey (SES) of Thailand, conducted by the National Statistical Office (NSO) from February 2000 to January 2001 in some 30,000 households in all 76 provinces of the Kingdom. The SES collects detailed household income and expenditure, plus a few summary variables on members of the household and the household head. The SES sampling frame covers private, non-institutional households residing

[3] The authors showed respondents a list of prices for a hypothetical AIDS vaccine, ranging from very low prices (US$ 0) to very high prices (US$ 8898 or 100,000 pesos), and asked them two questions: (1) the highest price on the list that they were absolutely certain that they *would* pay for the AIDS vaccine (a lower bound); and (2) the lowest price that they were absolutely sure they would *not* pay for the vaccine (an upper bound).

[4] The respondents were asked to select 1 of 36 cards (with different prices ranging from US$ 0 to US$ 360 (Ksh 25,000)) that indicated the highest vaccine price they would be willing to pay for. The interviewer then picked up the card with the next higher value and asked the respondent whether he/she would be willing to pay this higher amount. If the answer is no, the bidding process stopped. If respondents were willing to pay, the interviewer chose card with the next higher price and asked for respondent's willingness to pay again. If the person said yes, the highest price was recorded as his/her WTP. If the answer is no, the next lower price was the WTP.

[5] Vaccines are also under development that would reduce the infectiousness and the rate of disease progression in vaccinated HIV-infected individuals. However, this study assesses demand for a vaccine that would prevent primary HIV infection among HIV-negative adults.

Table 1
Distribution of sample provinces by HIV prevalence and estimated number of households and individuals

Region	Province	1999 HIV prevalence among women at antenatal clinics (%)	Number of households		Individuals	
			Selected[a]	Interviewed (response rate)[b]	Selected	Interviewed (response rate)
Low HIV prevalence (<1%)						
Central	Nakhon Sawan	0.57	85	80 (94.1%)	189	161 (85.2%)
Northeast	Kalasin	0.37	109	99 (90.8%)	251	213 (84.9%)
Middle HIV prevalence (1–2.99%)						
North	Chiang Mai	2.12	160	149 (93.1%)	334	297 (88.9%)
Northeast	Khon Kaen	1.28	157	138 (87.9%)	342	286 (83.6%)
South	Nakhon Si Thammarat	1.99	133	131 (98.5%)	299	282 (94.3%)
Bangkok	Bangkok	2.3	541	411 (76.0%)	1322	811 (61.3%)
High HIV prevalence (≥3%)						
South	Phangnga	5.79	69	66 (95.7%)	152	143 (94.1%)
North	Phayao	4.55	90	89 (98.9%)	179	173 (96.6%)
Central	Ang Thong	4.11	79	72 (91.1%)	179	158 (88.3%)
Total			1423	1235 (86.8%)	3247	2524 (77.7%)
Total (w/o Bangkok)			882	824 (93.4%)	1925	1713 (89.0%)

[a] The number of households interviewed by the SES teams and that had household members 18–60.
[b] The number of households in which at least one household member 18–60 was interviewed.

permanently in municipal areas and non-municipal areas (sanitary districts and villages).[6]

The current study attempted to interview all adults aged 18–60[7] in 1423 households interviewed by the SES in eight provinces and Bangkok during the months of July–October 2000. The provinces were selected to assure geographic variation and variation in HIV infection rates: two adjacent provinces with different HIV infection levels were selected in each of four geographic regions. The ninth area selected was Bangkok, the capital and major metropolitan area in Thailand. The selected provinces, their characteristics, and the size of the intended and actual samples are in Table 1. The total population of the selected provinces represents roughly one-sixth of the population of Thailand.[8] HIV prevalence among pregnant women in these provinces in 1999 ranged from less than 1% to more than 5% [14]. By re-interviewing the same households as the SES, the research team was able to link the results from the vaccine demand survey to the measures of household assets, consumption expenditure, and other variables collected by the SES in the same households.

2.2. Elicitation of vaccine demand

The survey elicited private demand—the willingness to purchase an AIDS vaccine for one-

[6] The SES uses a sample stratified at two stages. The primary sampling units (PSU) in municipal areas are blocks and in non-municipal areas are villages. The PSUs are selected separately and independently in each municipal and non-municipal area by using probability proportional to the total number of households in that block or village. The secondary sampling unit is households, which are randomly selected from a list of private households in every sampled block/village of the NSO sampling frame. A systematically random sample of 15, 9, and 7 private households is then selected from each of sample blocks, sample villages in sanitary districts, and sample villages, respectively.

[7] Adults aged 18–60 were interviewed because they represent the sexually active population most likely to benefit from a preventive AIDS vaccine and they have the purchasing power and independence to make decisions on purchase of a vaccine for themselves. Another section of the questionnaire—not analyzed here—also enquired about purchase of vaccines for children.

[8] The sample is representative of these eight provinces and Bangkok, but not necessarily representative of the entire country. In particular, nearly a third of respondents to this survey (32.1%) were from Bangkok, while only 15% of adults 18–60 nationally live in Bangkok [13].

self at a pre-determined price—for a hypothetical preventive AIDS vaccine using contingent valuation methods (CVM) [15–19], labeled as such because the respondent is asked to state his or her preferences in a hypothetical situation or market.

The elicitation method followed three steps. In the first step, the interviewer reminded the respondent that AIDS is a fatal disease and provided information on: (a) the ways that AIDS is transmitted, using a laminated chart with pictures demonstrating each mode of transmission in Thailand; and (b) the ways to prevent HIV. This was important to clear up any misconception that the respondents might have had about AIDS and to remind him/her of the ways of preventing HIV absent a vaccine.

In the second step, the interviewer described the key characteristics of the hypothetical AIDS vaccine and demonstrated the concept of vaccine efficacy. The hypothetical vaccine was described as safe, having no side effects, effective for 10 years, of a predetermined efficacy (either 50 or 95%) and providing no protection to those already infected with HIV. This list of vaccine characteristics was printed on a laminated card and left in front of the respondent. Vaccine efficacy was demonstrated using a plastic tray, more than 100 small rubber figures, and a pliable plastic loop. The interviewer first scattered 105 of the rubber figures, each representing an individual, on a tray in front of the respondent. She then removed five dolls and placed them outside the tray, explaining that the 100 individuals in the tray were vaccinated and those not in the tray were not. The interviewer then separated the figures in the tray into two groups. When demonstrating 50% efficacy, she separated them into two equal groups and placed the plastic ring around one of the groups. The 50 within the ring received the vaccine and were protected from HIV, while the 50 outside the ring and in the tray received the vaccine but were not protected: they had the same probability of becoming infected as they had before vaccination (those five dolls outside the tray). In demonstrating 95% efficacy, 95 figures were encircled by the plastic ring and 5 were outside the ring and in the tray. The complete description of the vaccine scenario and demonstration are in Appendix A.

Respondents' understanding of the demonstration of vaccine efficacy was tested by asking them to identify: (a) the persons vaccinated (the 100 figures in the tray); (b) those vaccinated and protected (the 50 or 95 figures in the tray, inside the plastic ring); and (c) the number vaccinated but not protected (the 50 or 5 individuals outside of the ring, but in the tray). If the respondent failed to answer all three 'check' questions correctly, the demonstration was repeated and the check questions were asked again. No more than two demonstrations were performed and all respondents continued with the questionnaire, even if they failed the second set of check questions.

In the third and final step, each respondent was asked to suppose that the hypothetical vaccine would be available in limited supply, that those who wanted a vaccine would have to pay for it out of their income, that it would be available at a specified price, and that health insurance would not pay for the vaccine. The respondent was also informed that not everyone would probably want such a vaccine—some would and some would not. This was done to reduce the likelihood that the respondent would agree to purchase the vaccine to please the interviewer. The respondent was then asked, "Suppose the price of the AIDS vaccine were [pre-assigned price]. Would you be willing and able to pay for the vaccine for yourself?" An efficacy of either 50 or 95% and one of eleven prices (from 200 to 60,000 Baht, or US$ 5 to US$ 1500) were printed on the questionnaires (a total of 22 different versions of the questionnaire), which were randomly assigned to each household. All individuals in the same household received the same efficacy-price scenario. The interviewers recorded responses of "yes", "yes, if I had the money", "no", and "don't know/not sure".[9] The dependent variable that measures the demand in this study equals one if the respondent replied "yes"; in the other three cases, it is set to zero. Respondents who said they were unwilling and unable to purchase a vaccine were asked whether they would agree to be vaccinated if the vaccine were free of charge. It has been assumed in this analysis that those who were willing to purchase the vaccine would agree to be vaccinated with a free vaccine.

[9] There were additional questions eliciting the respondent's willingness to pay and the household demand for an AIDS vaccine, but these are not analyzed here.

2.3. Demand model

The individual demand for an AIDS vaccine is assumed to derive from the demand for health. We posited that the respondent would be willing to purchase an AIDS vaccine if it maximized his/her utility relative to the alternative, no vaccine, where utility is defined over health and other consumption goods. His/her indirect utility is a function of relevant prices (the vaccine and alternatives, including their characteristics), household income, and tastes, conditioned on objective measures of the likelihood of becoming infected with HIV and the respondent's understanding of the consequences of HIV and of the vaccine. Consequently, the dependent variable in this study is a measure of the respondent's demand, i.e., whether or not the respondent was willing and able to purchase the described vaccine for him/herself if it were available at a predetermined price. The demand for the AIDS vaccine is stipulated to be a function of the following explanatory variables:

Vaccine price and efficacy: We anticipated that demand will decline with price but will be higher for a more effective vaccine, controlling for price.

Demographic characteristics: We included age, gender, and education to proxy for tastes. These were all measured by dichotomous variables for female gender, different age groups, and different levels of completed education. The comparison groups for these variables were male respondents, those aged 18–19, and those with no formal education, respectively. We had no priors on the effect of gender and age on demand, but to the extent that age is also a proxy for the risk of exposure to HIV, we expected demand to decline with age.

Household ability to pay: This variable was proxied by monthly household consumption expenditure per capita and expressed in logarithmic form. If an AIDS vaccine is a 'normal' good, then controlling for price we expected that demand would rise with this proxy for income. In addition, variables measuring household ownership of durable goods (air conditioner, car, motorbike) and housing characteristics (construction material, piped water, private flush toilet, number of rooms, phone hookup) were included as controls for household wealth and ability to pay.

The respondent's risk of HIV infection: This variable was captured by a set of dichotomous variables measuring different levels of the respondent's subjective assessment of his/her lifetime risk of becoming infected with HIV. Respondents with any positive risk (small or large) or who did not know what their lifetime risk was were compared with those who claimed that they had "no risk" of lifetime infection. This was used instead of indicators of personal behavior because it includes risk both due to the respondent's own behavior and risk of exposure from interaction with others (such as boyfriends and spouses, or by blood transfusion).

Knowledge of HIV and alternative prevention measures: Because the overwhelming majority of respondents were familiar with the major modes of HIV transmission, two sets of variables that showed some variation were used as proxies for the respondent's personal knowledge of AIDS: (1) a set of dichotomous variables indicating whether the respondent believes that there is a cure for AIDS or is unsure whether a cure exists; and (2) a dichotomous variable equal to one if the respondent personally knows someone with AIDS. The comparison groups for these variables were those that understood that there was no cure for AIDS (about 85% of the sample) and those who do not know anyone with AIDS (about 40% of the sample), respectively. We anticipated that demand will be lower among those who believed that there is a cure for AIDS and higher among those who knew someone with AIDS. This knowledge variable is likely to influence the respondent's understanding of the consequences of AIDS infection and the costs of prevention alternatives.

Finally, variables reflecting respondents' comprehension of the vaccine demonstration and region of residence were included. The regional variables were not easily interpreted as a regional effect, as they pick up all other variation that occurred at a regional level (such as in prices, climate, HIV infection, and the rel-

ative performance of regionally defined field teams) and that were not picked up by controls for wealth and other factors already in the regression.

3. Results

3.1. Characteristics of respondents

A total of 3247 individuals age 18–60 were listed on the household roster of the SES in the nine surveyed provinces. Of these, 2524 (77.7%) were successfully interviewed between October 2000 and February 2001. The response rate for individuals was 61% for Bangkok and 89% for the other eight provinces; at least one person was interviewed from 86.8% of the households in the original sample (76% for Bangkok, 93% elsewhere). Overall, the response rate was significantly lower among men, individuals from the highest consumption quintile, those living in urban areas and those living in Bangkok, the northeast, and central regions (compared to the south). Only 3.4% (110 individuals) of the SES sample of adults refused to participate. Table 1 shows the distribution of households and individuals by region, province, and HIV prevalence among women attending antenatal clinics. A third of all of the households were from Bangkok.

Among the respondents who were successfully interviewed, 56% were female (Table 2). More than a quarter each were under 30 (27%), 30–39 (28%), and 40–49 (27%), leaving 18% in the oldest group, from 50 to 60. Most respondents (54%) had completed some amount of primary schooling (Table 3). Forty-four percent had more than primary schooling and only 2% had no formal schooling. Women represented more than half of all respondents with no schooling and primary schooling, but also the majority of those with university and vocational education.[10]

Table 2
Distribution of respondents by age and gender

Gender	Age group				
	18–29	30–39	40–49	50–60	Total
Male	319	298	288	197	1102 (43.6)
Female	373	405	387	257	1422 (56.4)
Total (%)	692 (27.4)	703 (27.9)	675 (26.8)	454 (17.9)	2524 (100.0)

3.2. Knowledge of AIDS

Almost all respondents (99.8%) had heard of AIDS. When prompted on the knowledge of AIDS transmission routes, knowledge was high for unprotected sex (97.3%), needle sharing (97.9%), blood transfusion (95.8%), and birth to an infected mother (91.2%). However, only 75.4% were aware that HIV could be transmitted via breastfeeding. About 5% of the respondents thought that AIDS could be cured; 33.6% did not believe or were unsure whether someone who appeared healthy could be infected with HIV. Forty-three percent reported personally knowing someone infected with AIDS (range from 1 to 100 persons). Of those knowing someone with AIDS, 96% reported that some of those they knew had already died.

3.3. Self-assessment of lifetime risk of HIV infection

Regarding the perception of personal HIV risk, 43.9% of respondents felt that they had some lifetime risk of getting HIV; 1.1% reported having a large chance of AIDS risk; and 0.2% knew they were already infected. Nearly half (49%) reported that "it is impossible for them to get infected with AIDS".

3.4. Understanding of vaccine efficacy

Three-quarters of respondents correctly answered the three questions checking understanding of vaccine efficacy following the first demonstration and the cumulative percent that passed the check questions following a second demonstration was 90.5%. Comprehension was significantly related to both education and income: 96% of those with secondary education passed the check questions, compared with an 86% pass rate for those with primary and 61%

[10] Compared with our sample of eight provinces and Bangkok, the national population of 18–60-year-olds is less female (53%) and slightly younger (30% under 30 and 41% 40 and older, compared to 27 and 45%, respectively, in the sample). The national population of 18–60-year-olds has a smaller share with no schooling (0.01% compared to 2% in the sample) and with university education (9% compared to 16% in the sample) and more with primary (66%, compared to 54% in the sample) [13].

Table 3
Distribution of respondents by gender and completed schooling

Gender	Highest level of schooling completed							
	None	Lower primary	Upper primary	Lower secondary	Upper secondary	University	Vocational	Total
Male	7 (14.3)	356 (39.1)	207 (45.4)	138 (52.1)	91 (54.5)	169 (42.8)	134 (47.7)	1102
Female	42 (85.7)	555 (60.9)	249 (54.6)	127 (47.9)	76 (45.5)	226 (57.2)	147 (52.3)	1422
Total	49 (100.0)	911 (100.0)	456 (100.0)	265 (100.0)	167 (100.0)	395 (100.0)	281 (100.0)	2524
Percent	1.9	36.1	18.1	10.5	6.6	15.7	11.1	

pass rate for those with no schooling. Among the highest consumption/capita quintile, the pass rate was 97%, compared to 86% among the lowest quintile. A slightly higher share of respondents understood the demonstration of 50% efficacy (91.5%) than 95% efficacy (89.5%) ($P = 0.090$).

3.5. The demand for an AIDS vaccine

Randomization of the two efficacy levels and 11 prices across the households resulted in a sample of between 97 and 131 respondents for each vaccine efficacy-price combination (Table 4). Six percent said that they would purchase the vaccine "if they had the money", 62% said that they would not buy the vaccine and 2% did not know whether they would buy it. In general, the demand for an AIDS vaccine declined with price from nearly two-thirds of respondents at a price of 200 Baht ($5) to 15% or less at a price of 20,000 Baht ($500) or higher. Demand generally declined monotonically with price and was lower for a 50% effective vaccine at any given price.

Table 4
Percent of respondents willing and able to purchase an AIDS vaccine, by price and vaccine effectiveness (n = number of respondents; N = number of households)

Price (Baht)	Percent purchasing a vaccine	
	50% efficacy (n; N)	95% efficacy (n; N)
200	65.1 (126; 56)	64.3 (126; 57)
500	52.6 (114; 56)	61.1 (126; 56)
1000	41.0 (100; 53)	54.1 (122; 57)
3000	30.9 (97; 54)	40.8 (120; 60)
5000	22.4 (107; 54)	26.6 (109; 57)
7500	17.0 (112; 57)	25.4 (114; 54)
10000	18.8 (112; 51)	26.6 (109; 56)
15000	19.1 (115; 58)	14.5 (131; 58)
20000	14.9 (121; 57)	14.9 (107; 55)
40000	6.2 (129; 59)	9.8 (102; 53)
60000	6.5 (108; 57)	12.0 (117; 60)
Total	26.8 (1241; 612)	32.7 (1283; 623)

Equivalent prices in US$ are $5, $12.50, $25, $75, $125, $188, $250, $375, $500, $1000, and $1500. Difference in demand by vaccine efficacy (total) is statistically significant ($\chi^2_{(1)} = 10.5247$, $P = 0.001$).

To control for clustering of respondents in households and to examine the determinants of individual demand, a probit model of the demand for an AIDS vaccine was estimated. Forty respondents who said that the vaccine was not safe and/or were HIV infected, were regarded as "scenario rejecters" and dropped from the regression. The dependent variable was a dichotomous variable, which equaled one if the respondent was able and willing to purchase the vaccine for him/herself at the assigned price, and zero otherwise.

Variable definitions and descriptive statistics are in Appendix B. Probit results are shown in the first column of Table 5 for the pooled sample of all respondents, regardless of the level of vaccine efficacy, and separately in columns 2 and 3 for those offered a 50 or 95% effective vaccine. The probit coefficients have been transformed into marginal changes in the probability of purchasing the vaccine for a one-unit change in the explanatory variable, evaluated at the mean of all explanatory variables. For dichotomous explanatory variables, the comparison is the evaluation of the dependent variable when the explanatory variable is set equal to one, compared with the value when set equal to zero. Coefficients for household asset variables and regions have been suppressed to conserve space,[11] with a joint test of assets and regions presented at the bottom of the table.

[11] The full set of regression results is available from the authors on request.

Table 5
Probit of the demand for an AIDS vaccine

Variable	Both		50% effective		95% effective	
	d*p*/d*x*	*T*	d*p*/d*x*	*T*	d*p*/d*x*	*T*
Vaccine characteristics						
Price (log)	−0.110	18.43	−0.102	17.41	−0.116	15.42
95% efficacy	0.057	2.50				
Demographic						
Female	−0.021	2.10	−0.047	1.98	0.005	0.26
Married	−0.043	1.98	−0.069	1.74	−0.022	0.65
Age 20–24	0.140	3.22	0.041	0.73	0.227	2.59
Age 25–29	0.049	1.32	−0.080	1.05	0.179	2.63
Age 30–34	0.097	2.06	0.046	0.51	0.140	1.40
Age 35–39	0.019	0.29	−0.007	0.09	0.021	0.20
Age 40–44	0.018	0.33	−0.031	0.38	0.053	0.53
Age 45–49	−0.007	0.12	−0.100	1.20	0.081	0.80
Age 50+	−0.062	1.13	−0.086	1.20	0.044	0.53
Primary	0.084	1.03	0.084	0.66	0.085	0.78
Secondary	0.064	0.75	0.079	0.57	0.034	0.34
University	0.106	1.15	0.101	0.62	0.089	0.75
Vocational	0.085	0.92	0.043	0.27	0.101	0.84
Economic						
Household consumption	0.067	3.43	0.026	1.01	0.105	4.67
Personal risk						
Any risk	0.082	3.51	0.072	1.86	0.090	3.47
Don't know risk	0.092	2.22	0.015	0.44	0.172	2.48
Knowledge						
AIDS is curable	0.024	0.59	−0.011	0.19	0.059	1.13
Don't know if curable	0.021	0.50	0.017	0.24	0.027	0.71
Know someone with AIDS	0.061	2.95	0.061	2.89	0.062	1.50
Understood demonstration	0.071	1.60	0.056	1.03	0.089	1.90
Pseudo R^2	0.1874		0.1911		0.2009	
Observed *P*	0.302		0.272		0.331	
Predicted *P*	0.266		0.232		0.295	
Sample size	2484		1221		1263	
Joint tests (*P*)						
Age	0.0000		0.0000		0.0000	
Education	0.4645		0.3015		0.0170	
Assets	0.4433		0.0000		0.6520	
Regions	0.0102		0.3377		0.0007	
Self-assessed risk	0.0001		0.1676		0.0002	

Note. Also in the regressions but not shown is a set of household assets (air conditioning, car, phone, housing materials, flush toilet, number of rooms) and location (region and urban residence). These coefficients are not shown to conserve space and are available from the authors on request. Reported *T*-statistics reflect the significance of the underlying probit coefficient, not the marginal effect, which is computed at the mean of all variables. All standard errors were corrected to account for correlations across members of the same household.

Looking first at the column of pooled results of all respondents, the demand for a 95% effective vaccine is nearly 6 percentage points higher compared to a 50% effective vaccine. While this result is statistically significant, it is not a large difference, indicating that respondents value a partially effective vaccine almost as much as a highly effective one. As expected, demand declines with higher prices and rises with higher

consumption/capita. Demand is significantly greater among those who believe they have any lifetime risk of becoming infected with HIV, who are not sure of their risk, or who personally have known someone with AIDS.

Once price, income, and risk are controlled for, other demographic variables have limited relation with demand. Women are less likely than men to pay for an AIDS vaccine, and demand is highest among those in their early 20s and lowest among those over 50, compared with young people under 20. Married respondents have lower demand, as might be expected. Those who understood the demonstration had higher demand, but this result is not statistically significant.

Looking to the separate regressions for vaccines of different efficacies, demand declines with increased price for both vaccines but only a 95% effective vaccine is a 'normal' good, in the sense that demand significantly rises with the income proxy. Respondents with any self-assessed risk of HIV infection have higher demand for a 95% effective vaccine only. Knowing someone with AIDS raises demand for a 50% effective vaccine, while those who understood the demonstration have higher demand than those that did not only for a 95% effective vaccine.

The predicted proportion of respondents, who would buy an AIDS vaccine evaluated over the price range from US$ 5 to US$ 250 and by vaccine efficacy, as calculated from the probit in Table 5, is presented in Fig. 1.

3.6. Reasons for purchasing the vaccine

The respondents who said that they would purchase the vaccine (1633) were asked why. "It's a good precaution to take" was cited by the greatest number of responses (72.1%), followed by "the vaccine benefits me" (12.3%), "the vaccine is not expensive" (11.8%), "I think I'm at risk" (3.3%), and "other" (0.5%). On the other hand, the most commonly cited reason among those who were not willing to purchase the vaccine (879) was "I think I'm not at risk" (69.7%), followed by "have no money" (13.2%), "vaccine has no benefit to me" (10.8%), "not effective" (3.3%), and small numbers on other reasons.

3.7. Willingness to be vaccinated (WTV)

Seventy-eight percent of respondents would be able and willing to purchase the vaccine at some non-zero price or would agree to be vaccinated if the vaccine were offered free. Among respondents not willing to be vaccinated, 78.8% reported that they believed they were not at risk of HIV infection. Table 6 presents the results of a maximum likelihood probit of the probability that the respondent is willing to accept a free vaccine. The probit coefficients have been transformed into marginal effects, evaluated at the mean of all explanatory variables.

The first column pools the responses for the two vaccine efficacies and includes a dummy variable for the 95% effective vaccine. The willingness to be vaccinated is about 5 percentage points higher for a

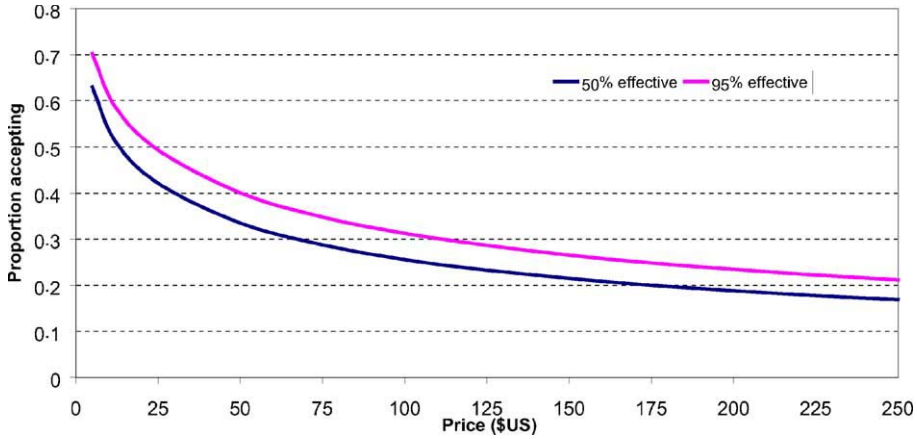

Fig. 1. Predicted proportion of Thai adults 18–60 who would purchase an AIDS vaccine, according to price and vaccine efficacy.

Table 6
Probit of the probability of accepting a free AIDS vaccine

Variable	Both		50% effective		95% effective	
	dp/dx	T	dp/dx	T	dp/dx	T
Vaccine characteristics						
Price (log)	0.001	0.13	−0.002	0.31	0.004	0.81
95% efficacy	0.047	2.61				
Demographic						
Female	0.037	2.96	0.003	0.12	0.067	4.02
Married	−0.005	0.25	−0.022	0.56	0.008	0.32
Age 20–24	0.034	0.61	−0.006	0.06	0.091	1.86
Age 25–29	−0.068	1.25	−0.100	1.04	−0.035	0.53
Age 30–34	−0.093	1.56	−0.099	1.17	−0.079	1.18
Age 35–39	−0.116	1.99	−0.096	1.18	−0.128	2.00
Age 40–44	−0.130	2.08	−0.130	1.37	−0.134	2.00
Age 45–49	−0.187	2.45	−0.179	1.61	−0.186	3.24
Age 50+	−0.249	3.67	−0.246	2.29	−0.247	4.35
Primary	−0.145	1.91	−0.166	1.93	−0.127	1.26
Secondary	−0.239	2.35	−0.294	2.49	−0.190	1.40
University	−0.191	1.94	−0.245	2.02	−0.159	1.28
Vocational	−0.170	1.81	−0.256	1.81	−0.103	0.81
Economic						
Ln HH consumption/capita	−0.011	0.51	−0.009	0.30	−0.011	0.36
Personal risk						
Any risk	0.135	5.80	0.142	5.57	0.123	4.08
Don't know risk	0.081	1.99	0.079	1.32	0.080	2.67
Knowledge						
AIDS curable	0.053	1.19	0.046	0.63	0.052	1.24
Don't know if curable	−0.018	0.84	−0.052	1.58	0.026	1.01
Know someone with AIDS	0.023	1.13	0.0002	0.01	0.038	1.34
Understood demonstration	0.083	4.31	0.115	2.58	0.058	1.84
Pseudo R^2	0.0891		0.0812		0.1205	
Observed P	0.792		0.772		0.811	
Predicted P	0.815		0.791		0.845	
Sample size	2472		1215		1257	
Joint tests (P)						
Age	0.0000		0.0064		0.0000	
Education	0.0568		0.0582		0.5229	
Assets	0.0000		0.0000		0.0000	
Regions	0.0206		0.1024		0.0046	
Self-assessed risk	0.0000		0.0000		0.0002	

Note. Also in the regression but not shown were a set of household assets (air conditioning, car, phone, housing materials, flush toilet, number of rooms) and location (region and urban residence). These coefficients are not shown to conserve space and are available from the authors on request. T-statistics reflect the significance of the underlying probit coefficient, not the marginal effect, which is computed at the mean of all variables. All standard errors were corrected to account for correlations across members of the same household.

95% effective vaccine evaluated at the mean of all explanatory variables, compared with a 50% effective vaccine, and vaccine efficacy is highly statistically significant. Neither household resources (consumption per capita), nor the price have any influence on the WTV with a free vaccine—nor should they. This indicates that respondents understood the concept that the vaccine would be available regardless of ability to pay, as the researchers intended, and that the vaccine would truly be available at a zero price (despite prior price discussions).

While women were less likely to purchase an AIDS vaccine, they were more likely to be willing to be vaccinated with a free vaccine than were men. Other factors raising the willingness to be vaccinated are age, education, self-assessed lifetime risk of HIV infection, and understanding the vaccine efficacy demonstration. Personal knowledge of someone with AIDS, and the belief that there might be a cure have no effect on WTV, contrary to expectations.

The second and third columns of Table 6 present separate results for WTV by vaccine efficacy. The results are largely similar to those for the pooled data with a few exceptions. Women have significantly higher WTV for a 95% vaccine than do men, but equal WTV as men for a 50% effective vaccine. The WTV for a 50% vaccine is more nearly equal across age groups, while for a 95% effective vaccine WTV is highest among younger people. Respondents of all education levels are equally likely to be willing to be vaccinated with a high-efficacy AIDS vaccine. Finally, respondents who understood the 50% efficacy demonstration had an 11% higher WTV than those who did not, while those who understood the 95% efficacy demonstration had WTV that was 6 percentage points higher. The variation explained by the explanatory variables for the 95% effective vaccine (pseudo $R^2 = 0.1205$) is greater than for the 50% effective vaccine (pseudo $R^2 = 0.0812$).

3.8. Impact on condom use

At the end of the survey, respondents were asked, "If you were vaccinated with this vaccine that is (50/95) percent effective, do you think you would use condoms to prevent AIDS when you have sexual relations with other(s), who is (are) not your spouse?" Roughly 91% of those who reported that they would agree to

Table 7
Intent to continue condom use among respondents who would agree to be vaccinated and had non-spousal partners

Would recipient use condoms with partners who are not a spouse?	50% effective vaccine	95% effective vaccine
Yes	94.5	86.3
No	4.4	7.5
Don't know	1.1	6.3
Number of respondents	91	80

Note. The difference in the percentage who would use condoms among those accepting a 50% vs. 95% effective vaccine is (marginally) statistically significant at $P = 0.064$.

be vaccinated and who also had non-spousal sexual partners stated that if vaccinated they would continue to use condoms to prevent AIDS when having sexual relations with others, but this varied according to vaccine efficacy—nearly 95% would continue condom use if vaccinated with a 50% effective vaccine, but only 86% if vaccinated with a 95% effective vaccine (Table 7, $P = 0.064$). More respondents would not use condoms at all or were not sure if they would use condoms if vaccinated with a high-efficacy vaccine, compared with one of low efficacy. These results are additional evidence that respondents *did* grasp the increased risk of infection with a low-efficacy vaccine and are aware that a potential benefit of the vaccine is reduced need for condoms.

4. Discussion and conclusions

This study demonstrated that the concept of vaccine efficacy can be successfully conveyed with the proper tools. However, there were nonetheless large differentials in the ability to understand vaccine efficacy by level of education, suggesting that the high comprehension in Thailand is partly due to high average levels of education. Indeed, a recent contingent valuation (CV) survey of AIDS vaccine demand that used identical efficacy demonstration methods to this survey found much lower overall comprehension among adults in Uganda (60%, compared with 90.5% in Thailand) in a population with considerably less education [20]. Thai respondents also had slightly greater difficulty understanding the concept of 95% efficacy than 50% efficacy. An important caveat to these conclusions is that the study used a definition of efficacy that was relatively easy to explain—that among a population of those vaccinated, some will be fully protected and some will be completely unprotected. It might have been considerably more difficult to explain efficacy in an alternative way, in which everyone vaccinated has 50 or 95% protection.

The demand for a low-efficacy vaccine was significantly less than for a high-efficacy vaccine, on average, but still substantial. This is most likely related to the very high awareness of AIDS in Thailand and the large percentage of the population (over 40%) who know someone with AIDS, as is often the case in countries with longstanding and severe AIDS epidemics. Both the previously mentioned CV study in Uganda and one among high-risk groups in Thailand (CSW and IDU) using identical techniques developed by this study, suggest that in populations with a more severe AIDS epidemic the demand for high- and low-efficacy vaccines may be equally high [20,21]. In a similar vein, overall demand and the difference in demand between high- and low-efficacy vaccines might have been quite different in a country with a younger epidemic in which AIDS awareness is lower, the population knows few people with AIDS, and where stigma against those with HIV or who exhibit high-risk behavior may be even greater. The observed levels of vaccine demand in this study are conditioned on public perceptions of the consequences of HIV infection, which are influenced by the availability of treatment. To the extent that improved access to treatment extends the lives and improves the health of AIDS patients (real or perceived), reducing those consequences, the private demand for an AIDS vaccine (and for other preventive measures) may decline.

The demand for an AIDS vaccine is significantly higher (at any price and if free) among those with greater perceived risk of infection. These results suggest that individuals at higher risk of HIV infection will be more likely to seek an AIDS vaccine when it becomes available—a kind of 'self-targeting' of those in greatest need of vaccination. These are the individuals for whom the private benefits are great and, to the extent that they may be engaging in risk behavior, the positive externalities from vaccination are also greatest for the rest of the population.

Since the demand for an AIDS vaccine is influenced by both vaccine price and income levels, high prices and low ability to pay could limit access of those at highest risk. In that case and if the vaccine is too ex-

pensive to be offered for free, government will have an important role to play in ensuring that the vaccine is available to high-risk individuals with low income, while making sure the vaccine is available on the market to those who can afford it, satisfying both equity and efficiency objectives and achieving high benefits to the whole population.

One of the important concerns of policymakers about the introduction of a less than fully effective AIDS vaccine is the potential impact such a vaccine might have on sexual behavior and condom use. Particularly in Thailand, where there is evidence of widespread and almost universal condom use in commercial sex and where the percent of men using sex workers has dropped by perhaps half [5], any drop in condom use or increase in use of commercial sex associated with AIDS vaccine immunization (among those vaccinated or those not) could negate or even reverse the impact of the vaccine in reducing transmission [4,6]. The study indicates that some recipients of an AIDS vaccine would reduce other preventive behaviors, especially if vaccinated with a highly effective vaccine. This reinforces the point that the introduction of an AIDS vaccine will have to be strengthened by widespread public information campaigns and increased promotion of other prevention methods.

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Appendix A. AIDS vaccine scenario and demonstration of effectiveness

Now I would like to talk with you about the ways that AIDS can be transmitted and how people can protect themselves. AIDS is a fatal disease. [*Interviewer: Show card with modes of HIV transmission*.] HIV can be transmitted in all of the following ways: having sexual intercourse with someone who is infected with HIV, receiving a transfusion of infected blood, sharing needles with infected person, being born to an infected mother and being breastfed by an infected mother. There are several ways that a person can prevent becoming infected with AIDS: they can avoid sex with many partners, they can use condom, they can avoid sharing needles and injecting equipment with others. Do you have any questions?

For several years, doctors and medical researchers have been working to develop a vaccine that would prevent people from being infected with the HIV virus, but to date a vaccine does not exist. However, I would like to know what you think you would do if an AIDS vaccine did exist and you could purchase the vaccine. Suppose it were possible to be vaccinated against AIDS. [*Interviewer*: *Show card with vaccine characteristics*.] The vaccine would not protect people already infected with HIV. Assume that this vaccine would be completely safe and have no side effects. Assume that the vaccine was [50/95] percent effective and would last for 10 years.

[*Interviewer: Explain vaccine efficacy using dolls*.] For example, each doll [*Interviewer: Hold a doll*.] represents one person. The 100 dolls in the box represent 100 people who were vaccinated. Those dolls

outside the box are people who were not vaccinated. Since the vaccine was only [50/95] percent effective, the vaccine would completely protect [50/95] of them for 10 years [*Interviewer*: *Put the loop around the 50/95 dolls*]. These are the dolls in the circle in this box. Those [50/95] people could not get infected with HIV or get AIDS. The other [50/5] people or dolls that were placed outside the circle but in the box were vaccinated but will not be protected and would have the same risk of getting infected with HIV, the virus that causes AIDS, as they have now. However, the person who is vaccinated will not know whether or not he/she is protected and can get AIDS. Do you have any questions?

Check questions on effectiveness

I want to make sure that you understand the effectiveness of this vaccine.

First time

1. Show me all the people who are vaccinated [*Interviewer: Did the respondent correctly show all those vaccinated?*]
   Yes = 1
   No = 2
   Don't know/No answer = 9 ☐

2. Show me all the people who are protected and cannot get HIV/AIDS.
   [*Interviewer: Did the respondent correctly show all those protected?*]
   Yes = 1
   No = 2
   Don't know/No answer = 9 ☐

3. How many people are vaccinated but not protected and can still get HIV/AIDS?
   [*Interviewer: Did the respondent answer this question correctly?*]
   Yes = 1
   No = 2
   Don't know/No answer = 9 ☐

   [*Interviewer: Did the respondent answer all three of these questions correctly?*]
   Yes = 1 (***Continue the scenario***) ☐
   No = 2 (***Demonstrate effectiveness using the dolls again***)

Second time

4. Show me all the people who are vaccinated [*Interviewer: Did the respondent correctly show all those vaccinated?*]
   Yes = 1
   No = 2
   Don't know/No answer = 9 ☐

5. Show me all the people who are protected and cannot get HIV/AIDS.
   [*Interviewer: Did the respondent correctly show all those protected?*]
   Yes = 1
   No = 2
   Don't know/No answer = 9 ☐

6. How many people are vaccinated but not protected and can still get HIV/AIDS?
   [*Interviewer: Did the respondent answer this question correctly?*]
   Yes = 1
   No = 2
   Don't know/No answer = 9 ☐

   [*Interviewer: Did the respondent answer all three of these questions correctly?*]
   Yes = 1 (***Continue the scenario***) ☐
   No = 2 (***Continue the scenario***)

Suppose that the vaccine was in limited supply and that those who wanted a vaccine would have to pay for it. Everyone would pay the same price out of their own income. If you currently have health insurance, assume that your health insurance would not pay for the vaccine.

Now I would like to ask you whether you would buy this vaccine against AIDS if it were available for a specified price. There is no right or wrong answer. Some people say that they would buy the vaccine while other people say that they would not buy the vaccine for different reasons. However, before making decision [*Interviewer: Show card with items to be considered before making decision*], we would like you to consider the following items, income, your and family's economic status compared to the vaccine price, your risk of getting AIDS, other methods to protect you from AIDS besides a vaccine, such as condoms, and the effectiveness of the vaccine at [50/95] percent for 10 years. Do you have any questions?

[*Interviewer: Keep the demonstration box out but leave the card with vaccine characteristics and the card with items to be considered before making a decision in front of the respondent.*]

7. Suppose the price of the AIDS vaccine were [200/500/1,000/3,000/5,000/7,500/0,000/15,000/20,000/40,000/60,000] Baht. Would you be willing and able to pay for the vaccine for yourself?

Yes	= 1	
Yes, if I had the money	= 2	**(*Go to Q 9*)**
No	= 3	**(*Go to Q 9*)**
Don't know/Not sure	= 9	**(*Go to Q 9*)**

☐

Appendix B. Variable definitions and descriptive statistics

Variable	Description	Mean	S.D.	Minimum	Maximum
Dependent variables					
Willing to purchase for self	=1 if willing and able to purchase a vaccine for oneself at the given price, else=0	0.302	0.459	0	1
WTV[a]	=1 if willing to be vaccinated with a free vaccine, else=0	0.792	0.406	0	1
Demographic					
Female	=1 if female, else=0	0.566	0.496	0	1
Married	=1 if married, else=0	0.695	0.460	0	1
Age 20–24	=1 if aged 20–24, else=0	0.112	0.316	0	1
Age 25–29	=1 if aged 25–29, else=0	0.121	0.326	0	1
Age 30–34	=1 if aged 30–34, else=0	0.133	0.339	0	1
Age 35–39	=1 if aged 35–39, else=0	0.145	0.352	0	1
Age 40–44	=1 if aged 40–44, else=0	0.147	0.354	0	1
Age 45–49	=1 if aged 45–49, else=0	0.119	0.324	0	1
Age 50+	=1 if aged 50–60, else=0	0.179	0.384	0	1
Primary	=1 if highest is primary, else=0	0.542	0.498	0	1
Secondary	=1 if highest is secondary, else=0	0.171	0.377	0	1
University	=1 if highest is university, else=0	0.157	0.364	0	1
Vocational	=1 if highest is vocational, else=0	0.110	0.313	0	1

Variable	Description	Mean	S.D.	Minimum	Maximum
Economic					
Ln consumption/capita	Natural log of consumption/capita	7.856	0.720	6.031	10.635
Ln first bid price	Natural log of first bid price	8.527	1.754	5.298	11.002
Cement	=1 if dwelling is cement, else=0	0.451	0.498	0	1
Air conditioner	=1 if household owns air conditioner, else=0	0.167	0.373	0	1
Car	=1 if household owns car, else=0	0.169	0.375	0	1
Motorbike	=1 if the household has a motorbike, else=0	0.629	0.483	0	1
Phone	=1 if household has private phone hookup in dwelling, else=0	0.484	0.500	0	1
Private piped water	=1 if household has a private water connection in the home, else=0	0.685	0.464	0	1
Private flush toilet	=1 if the dwelling has a private flush toilet, else=0	0.109	0.311	0	1
Rooms	Number of rooms in the dwelling	3.07	1.37	1	9
Geographic					
Bangkok	=1 if Bangkok, else=0	0.320	0.467	0	1
North	=1 if Phayao or Chiang Mai, else=0	0.185	0.388	0	1
Northeast	=1 if Kalasin or Khon Kaen, else=0	0.200	0.400	0	1
Central	=1 if Angthong or Nakhon Sawan	0.128	0.334	0	1
Urban	=1 if municipality, else=0	0.546	0.498	0	1
Personal risk					
Any risk	=1 if self-assessed lifetime risk of HIV is small or large, else=0	0.450	0.498	0	1
Don't know risk	=1 if don't know lifetime risk of HIV, else=0	0.056	0.231	0	1
Knowledge					
AIDS curable	=1 if believes AIDS can be cured, else=0	0.055	0.227	0	1
DK if curable	=1 if don't know whether AIDS can be cured, else=0	0.091	0.288	0	1
Know someone with AIDS	=1 if personally knows someone with AIDS, else=0	0.424	0.494	0	1
Understood demonstration	=1 if answered all three check questions on the demonstration correctly, else=0	0.906	0.292	0	1
95% effective	=1 if received a scenario with a 95% effective vaccine, else=0	0.508	0.500	0	1

[a] Computed off of a sample size of 2472.

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ไตวายเรื้อรังระยะสุดท้าย การเจ็บป่วยราคาแพง: ทางออกคืออะไร

วิชช์ เกษมทรัพย์
วิโรจน์ ตั้งเจริญเสถียร
สุวรรณา มูเก็ม
โครงการเมธีวิจัยอาวุโสด้านเศรษฐศาสตร์และ การคลังสาธารณสุข
สำนักงานกองทุนสนับสนุนการวิจัย - สถาบันวิจัยระบบสาธารณสุข

ไตวายเรื้อรังระยะสุดท้าย เป็นภาวะการเจ็บป่วยที่ไตไม่สามารถทำหน้าที่ขับของเสียได้หรือขับได้น้อยมาก ทำให้ผู้ป่วยมีของเสียคั่งค้างในร่างกาย ถ้าไม่ได้รับการรักษาด้วยวิธีทดแทนไตวิธีใดวิธีหนึ่ง ผู้ป่วยจะต้องเสียชีวิตในระยะเวลาไม่นาน ประมาณ 3-6 เดือน ในปัจจุบันวิธีการทดแทนไตมีด้วยกัน 3 วิธีคือ การให้การทดแทนไตด้วยการฟอกเลือด(Hemodialysis, HD) การให้การทดแทนไตด้วยการล้างช่องท้อง (continuous ambulatory peritoneal dialysis) และการปลูกถ่ายไตใหม่ (Renal transplantation, RT) จะทำให้ผู้ป่วยมีชีวิตยืนยาวขึ้นอีกหลายปี ถ้าไม่มีโรคแทรกซ้อนและได้รับการรักษาที่มีคุณภาพดีอาจจะมีชีวิตยืนยาวนับสิบปี

จากรายงานการสำรวจของสมาคมโรคไตแห่งประเทศไทยในปี 2540 พบว่า ประเทศไทยมีผู้ได้รับการรักษาทดแทนไตอยู่ 54.4 รายต่อล้านประชากร มีผู้ป่วยใหม่ที่เข้าถึงการรักษาในแต่ละปี 10.2 รายต่อล้านประชากรต่อปี คาดว่ารายงานนี้เป็นเพียงร้อยละ 70 ของจำนวนผู้ป่วยที่เข้าถึงบริการทั้งหมดในประเทศไทย ซึ่งเมื่อเทียบกับตัวเลขในต่างประเทศแล้วพบว่าประเทศไทยมีผู้ป่วยน้อยกว่ามาก คือ ในประเทศที่พัฒนาแล้วทั้งหมด พบว่าผู้ป่วยที่ได้รับบริการทดแทนไตมีอยู่ประมาณ 419 -1120 รายต่อล้านประชากร มีผู้ป่วยใหม่ที่เข้าถึงการรักษาทดแทนไตในแต่ละปีประมาณ 72-214 รายต่อล้านประชากรต่อปี

ทำให้มีข้อสงสัยว่าตัวเลขผู้ป่วยที่เข้าถึงบริการในประเทศไทยมีน้อยกว่าที่รายงานในต่างประเทศ เพราะอัตราการเกิดโรคน้อยกว่าหรือว่าอัตราการเข้าถึงบริการต่ำกว่ามาก จากข้อมูลที่ได้จากอายุรแพทย์โรคไตพบว่าผู้ป่วยมากกว่าครึ่งหนึ่งไม่สามารถเข้าถึงบริการทดแทนไตได้ เนื่องจากมีปัญหาเรื่องค่าใช้จ่ายในการรักษาซึ่งแพงมากประมาณ 3 แสน ถึง 4 แสนบาทต่อปี ผู้ที่เข้าถึงบริการส่วนใหญ่จะเป็นผู้ที่มีฐานะดี และผู้ที่มีสิทธิในสวัสดิการรักษาพยาบาลข้าราชการ หรือประกันสังคม มีการประมาณกันว่าถ้าโรคนี้เกิดกับผู้ป่วยทั่วไปในชนบทที่ต้องการการรักษาทดแทนไตผู้ป่วยและญาติจะต้องลงทุนจำนองหรือขายที่ดินทำกินที่มีอยู่เพื่อจะนำเงินไปจ่ายค่ารักษาพยาบาล ซึ่งเงินที่ได้มาก็จะหมดไปในเวลาไม่นาน จนอาจจะต้องไปเป็นหนี้เป็นสินจากการกู้ยืมเพื่อรักษาต่อหรือญาติพี่น้องต้องหมดเนื้อหมดตัวเมื่อเริ่มทำใจได้ว่าผู้ป่วยจะต้องเสียชีวิตในเวลาไม่นานเพราะไม่มีเงินที่จะมาจ่ายค่ารักษาอีกต่อไป แม้ประชาชนที่เป็นชนชั้น

ตารางที่ 1 จำนวนผู้ป่วยที่ได้รับการรักษาทดแทนไต และ ไม่ได้รับการรักษา แบ่งตามสวัสดิการที่มีอยู่ในพื้นที่ 3 จังหวัดคือ อุบลราชธานี สงขลา และ นครสวรรค์ ระหว่าง 1 ตุลาคม 2541 - 30 กันยายน 2542

สวัสดิการที่มีอยู่	จำนวนผู้ป่วยที่ไม่ได้รับการรักษาทดแทนไต (%)	จำนวนผู้ป่วยที่ได้รับการรักษาทดแทนไต (%)	รวม (%)
ผู้มีรายได้น้อยและผู้ที่สังคมควรช่วยเหลือเกื้อกูล	60 (98.4%)	1 (1.6%)	61 (100%)
สวัสดิการรักษาพยาบาลข้าราชการ	16 (31.4%)	35 (68.6%)	51 (100%)
ประกันสังคม	-	2 (100%)	2 (100%)
จ่ายเอง	66 (92.9%)	5 (7.1%)	71 (100%)
รวม	**142 (76.8%)**	**43 (23.2%)**	**185 (100%)**

ตารางที่ 2 จำนวนผู้ป่วยที่ได้รับการรักษาทดแทนไต และ ไม่ได้รับการรักษา แบ่งตามกลุ่มอายุในพื้นที่ 3 จังหวัดคือ อุบลราชธานี สงขลา และนครสวรรค์ ระหว่าง 1 ตุลาคม 2541 - 30 กันยายน 2542

กลุ่มอายุ	จำนวนผู้ป่วยที่ไม่ได้รับการรักษาทดแทนไต (%)	จำนวนผู้ป่วยที่ได้รับการรักษาทดแทนไต (%)	รวม (%)
0-39 ปี	31 (21.3%)	8 (18.6%)	39 (20.6%)
40-59 ปี	54 (37%)	16 (37.2%)	70 (37%)
>60 ปี	61 (41.7%)	19 (44.2%)	80 (42.4%)
รวม	**146 (100%)**	**43(100%)**	**189 (100%)**

กลางในเมืองก็คงจะรับภาระจ่ายค่ารักษาทดแทนไตนี้ได้ไม่นานด้วยภาระค่าใช้จ่ายระดับนี้

การศึกษานี้มีความต้องการที่จะทราบขนาดของปัญหาที่มีอยู่ในประเทศไทย สภาพของปัญหาที่มีอยู่ กระบวนการตัดสินใจของแพทย์ในการพิจารณารับผู้ป่วยเข้ารับบริการทดแทนไต และภาระค่าใช้จ่ายที่จะเกิดขึ้นเพื่อการตัดสินใจแก้ปัญหาในระดับนโยบายของประเทศต่อไป

จากการสำรวจอุบัติการของโรคไตวายเรื้อรังระยะสุดท้ายในจังหวัดตัวอย่าง 3 จังหวัด คือ อุบลราชธานี สงขลา และนครสวรรค์ ในช่วงระหว่าง 1 ตุลาคม 2541 - 30 กันยายน 2542 พบว่ามีอุบัติการไตวายเรื้อรัง ทั้งสิ้น 203 ราย (49.4 รายต่อล้านประชากร) ผู้ป่วยมากกว่าสามในสี่มีอายุมากกว่า 40 ปี (ตารางที่2) และมีผู้ป่วยเพียง 43 รายเท่านั้น (21.2%) สามารถเข้าถึงบริการรักษาทดแทนไต ในจำนวนนี้ 35 ราย มีสวัสดิการรักษาพยาบาลข้าราชการ 5 รายออกเงินเอง 2 ราย มีประกันสังคมและมีเพียงแค่รายเดียวที่เป็นอยู่ในสวัสดิการรักษาพยาบาลประชาชนผู้มีรายได้น้อยหรือผู้ที่สังคมควรช่วยเหลือเกื้อกูล (สปร) ดังตารางที่ 1 ซึ่งในความเป็นจริงสัดส่วนประชาชนผู้ที่อยู่ในกลุ่มนี้เป็นสัดส่วนประมาณร้อยละ 28 ของประชากรทั้งประเทศ ในขณะที่ผู้ที่มีสิทธิภายใต้สวัสดิการรักษาพยาบาลข้าราชการและประกันสังคมมีสัดส่วนเพียงร้อยละ 18 ของประชากรทั้งหมด ที่เป็นเช่นนี้เพราะผู้ป่วย

ที่มีสิทธิในสวัสดิการรักษาพยาบาลข้าราชการจะสามารถเบิกค่ารักษาพยาบาลคืนได้ทั้งหมด ส่วนผู้ป่วยประกันสังคมนั้นเปิดโอกาสให้ผู้ที่มีสิทธิเข้ารับการรักษาทดแทนไตด้วยการฟอกเลือดโดยให้เงินอุดหนุนครั้งละ 1,500 บาท ในขณะผู้ที่มีสิทธิในสวัสดิการ สปร.มีแค่สิทธิในการรับการรักษาระยะสั้นในกรณีที่เป็นไตวายเฉียบพลันเท่านั้น แสดงให้เห็นถึงความไม่เป็นธรรมในการเข้ารับบริการรักษาทดแทนไตในประเทศไทย

ตารางที่ 1 และ 2 แสดงถึงการเข้าถึงบริการทดแทนไตของประชาชนกลุ่มต่างๆในสังคมไทย ซึ่งสอดคล้องกับคำตอบที่ได้จากอายุรแพทย์และอายุรแพทย์โรคไต จากการส่งแบบสอบถามซึ่งได้รับการตอบกลับมา 183 ท่านจากทั่วประเทศไทย โดยแพทย์เห็นด้วยกับข้อความที่ว่าที่ว่า "ระบบการคัดเลือกผู้ป่วยเข้ารับการรักษาในปัจจุบันไม่เป็นธรรม กล่าวคือ ผู้ที่จ่ายได้หรือเบิกได้เท่านั้นที่ได้รับบริการ คนที่ไม่สามารถจ่ายได้ หรือเบิกได้ ไม่ได้รับบริการ" และ "ระบบการคัดเลือกปัจจุบัน ทำให้ผู้ใช้บริการทดแทนไตเป็นผู้ป่วยสูงอายุที่เบิกได้เป็นส่วนใหญ่ คนวัยหนุ่มสาวที่เบิกไม่ได้กลับไม่ได้รับบริการเท่าที่ควร" อย่างไรก็ตามอายุรแพทย์ก็เห็นด้วยกับข้อความที่ว่า "ภายใต้ข้อจำกัดของทรัพยากรในปัจจุบัน ที่ผู้ป่วยทุกคนไม่สามารถเข้าถึงบริการได้ ท่านคิดว่า ยังสามารถปรับปรุงระบบการคัดเลือกผู้ป่วยและการให้บริการเพื่อให้เกิดความเป็นธรรมและมีประสิทธิภาพมากขึ้น" นอกจากนี้อายุรแพทย์และอายุรแพทย์โรคไต ประมาณว่าในผู้ป่วยที่ป่วยเป็นโรคไตวายเรื้อรังทั้งหมด

ประมาณครึ่งหนึ่งสมควรได้รับบริการทดแทนไต แต่มีผู้ป่วยเพียงร้อยละ 25 เท่านั้นที่เข้าถึงบริการทดแทนไต ซึ่งปัญหาส่วนใหญ่เพราะไม่มีความสามารถในการจ่ายค่าบริการ

เมื่อถามถึงการตัดสินใจรับผู้ป่วยเข้ารับการรักษาทดแทนไตโดยให้อายุรแพทย์และอายุรแพทย์โรคไตให้คะแนนตามความเป็นจริงที่เป็นอยู่พบว่าข้อพิจารณาที่นำมาใช้ตัดสินใจที่สำคัญเรียงตามลำดับได้แสดงไว้ในตารางที่ 3

จากตารางที่ 3 จะเห็นได้ว่านอกจากจะคำนึงถึงผลลัพธ์ในการรักษาที่ดีแล้ว ความเหมาะสมในการที่จะได้รับการได้รับการปลูกถ่ายไตของผู้ป่วยก็เป็นข้อพิจารณาอีกประการหนึ่ง ซึ่งการปลูกถ่ายไตนี้ถือเป็นการรักษาที่ได้รับการยอมรับในต่างประเทศว่าเป็นวิธีที่ให้ความคุ้มค่าในการรักษามากที่สุดระหว่างการรักษาทดแทนไตทั้งสามวิธี เพราะใช้ค่าใช้จ่ายน้อยกว่าและคุณภาพชีวิตผู้ป่วยดีกว่า และพบสถานะทางเศรษฐกิจของผู้ป่วยและการมีประกันสุขภาพของผู้ป่วย มีส่วนเข้ามาเกี่ยวข้องกับการตัดสินใจให้การรักษาเพราะการรักษานี้เป็นการรักษาราคาแพงมาก ซึ่งสอดคล้องกับข้อมูลที่ได้จากการสำรวจอุบัติการผู้ป่วยข้างต้น

จากการสำรวจต้นทุนการให้บริการโดยส่งแบบสอบถามถึงสถานพยาบาลที่ให้การบริการฟอกเลือดและให้บริการด้วยวิธีล้างช่องท้องทดแทนไตในสถานพยาบาลของรัฐ 21 แห่ง และสถานพยาบาลเอกชน 11 แห่ง พบว่าต้นทุนการฟอกเลือดของสถานพยาบาลภาครัฐอยู่ระหว่าง 1,416 - 4,370 บาท ค่ามัธยฐาน(Median) อยู่ที่ 1,945 บาทต่อครั้ง ถ้ามีการบริหารจัดการดีมากต้นทุนจะอยู่ภายใน 1,500 บาท ซึ่งปีหนึ่งจะใช้ต้นทุนในการให้บริการประมาณ 150,000 บาทต่อราย ส่วนในภาคเอกชน 11 แห่ง พบว่าส่วนต้นทุนนการทดแทนไตด้วยวิธีล้างช่องท้องของสถานบริการเอกชนอยู่ระหว่าง 1,671-5,066 บาทต่อครั้ง ถ้าการดำเนินการเป็นไปอย่างมีประสิทธิภาพต้นทุนจะอยู่ไม่เกิน 1,700 บาท ประมาณเป็นต้นทุนในการให้บริการต่อปีประมาณ 170,000 บาทต่อรายต่อราย และพบว่าโครงสร้างต้นทุนของบริการทดแทนไตด้วยการ

ตารางที่ 3 ค่าเฉลี่ย ค่าฐานนิยม และค่ามัธยฐาน ของเหตุผลในการตัดสินใจให้บริการทดแทนไตแก่ผู้ป่วยที่ใช้กันอยู่ในปัจจุบัน ของอายุรแพทย์และอายุรแพทย์โรคไต 183 ท่าน จากทั่วประเทศไทยในปี 2542 (ให้ตัดสินใจเลือกคะแนนตั้งแต่ 1-9 โดยคะแนนมากคือเห็นด้วย)

เกณฑ์ที่ท่านใช้จริง ๆ ในการคัดเลือกผู้ป่วยเข้ารับการรักษาทดแทนไตด้วยการฟอกเลือดและการล้างช่องท้อง ในปัจจุบัน	ค่าเฉลี่ย	ค่ามีธยฐาน (ค่าที่กึ่งกลาง)	ค่าฐานนิยม (ค่าที่ได้รับเลือกมากที่สุด)
1. การประเมินโดยรวมว่าถ้ารับการรักษาจะมีผลลัพธ์การรักษา clinical outcome ที่ดี	7.81	8	9
2. สถานะทางเศรษฐกิจของผู้ป่วย / ครอบครัวดี สามารถจ่ายค่ารักษาได้ในระยะยาว	7.71	8	9
3. ผู้ป่วยมีความเหมาะสม (fit) ที่จะได้รับการปลูกถ่ายไตในอนาคตได้	7.61	8	9
4. มีประกันสุขภาพ หรือเบิกได้จากสวัสดิการข้าราชการ, จากประกันสังคมได้	6.94	7	7
5. ผู้ป่วยอายุไม่มากเกินไป	6.79	7	7
6. ไม่มี co-morbidity เช่น เบาหวาน โรคหัวใจ อัมพฤกษ์ อัมพาต เป็นต้น	6.39	7	7
7. ระดับการศึกษาผู้ป่วย / ญาติ สูง	6.16	7	7
8. มีหรือเป็นญาติเจ้าหน้าที่ในโรงพยาบาล, คนรู้จักของท่าน	5.14	5	5

ฟอกเลือดนี้แบ่งเป็น ต้นทุนค่าลงทุนประมาณร้อยละ 20-30 ค่าแรงประมาณร้อยละ 30-40 และค่าวัสดุประมาณร้อยละ 30-40 เช่นกัน พบว่าต้นทุนของการให้บริการจะขึ้นอยู่กับปริมาณการดำเนินการของแต่ละสถานพยาบาลว่าจะได้มีจำนวนครั้งมากน้อยเพียงไร โดยต้นทุนในส่วนของค่าลงทุนนี้จะลดลงเมื่อปริมาณการดำเนินการเพิ่มขึ้น ส่วนต้นทุนค่าแรงนี้จะลดลงได้ระดับหนึ่งเมื่อปริมาณการดำเนินการเพิ่มขึ้นเช่นกัน และต้นทุนค่าวัสดุอาจจะต้องใช้มาตรการในการจัดซื้อที่มีอำนาจต่อรองสูง เช่นการจัดซื้อร่วมกันของหลายหน่วยงานมาช่วยในการจัดซื้อให้ราคาถูกลงแต่ได้ของที่มีคุณภาพดี

จากการสำรวจพบว่าการเก็บค่ารักษา (charge) ด้วยการฟอกเลือด ในโรงพยาบาลของรัฐมีค่าเฉลี่ยอยู่ที่ 2,700 บาทต่อครั้งสำหรับข้าราชการ และ 2,441 บาทต่อครั้งสำหรับผู้ป่วยที่จ่ายเอง ค่ามัธยฐานก็จะอยู่ที่ 2,675 บาทต่อครั้ง และ 2,500 บาทต่อครั้งตามลำดับ ซึ่งพบว่าการเก็บค่าบริการนั้นเกินกว่าต้นทุนที่ควรจะเป็นอยู่พอสมควร

ส่วนในการบริการทดแทนไตด้วยการล้างช่องท้องนั้น พบว่าต้นทุนกว่าร้อยละ 90 เป็นค่าน้ำยาล้างช่องท้อง ที่มีราคาถุงละระหว่าง 164-220 บาท ต้องใช้วันละ 4 ถุง รวมเป็นค่ารักษาวันละ 656-880 บาท ปีละประมาณ 235,000-295,000 บาทต่อปี และต้นทุนรวมค่าวัสดุอื่นที่ใช้ร่วมด้วยจะอยู่ที่ประมาณ 15,000 บาทต่อปี รวมประมาณค่าใช้จ่ายบริการทดแทนไตด้วยการล้างช่องท้องจะอยู่ระหว่าง 250,000 - 310,000 บาทต่อรายต่อปี ซึ่งค่าใช้จ่าย

นี้ค่อนข้างจะคงที่การจะลดต้นทุนจะทำได้โดยการเพิ่มอำนาจการต่อรองในการจัดซื้อหรือหาวิธีการส่งเสริมให้มีการผลิตเองในประเทศ

ข้อมูลจากการศึกษาต้นทุนในการการปลูกถ่ายไตในโรงพยาบาลมหาวิทยาลัยของรัฐแห่งหนึ่งพบว่า ค่าผ่าตัดปลูกถ่ายไตอยู่ที่ 150,000-200,000 บาทต่อราย และผู้ป่วยที่ได้รับการเปลี่ยนไตจะต้องรับยากดภูมิคุ้มกันเพื่อป้องกันการต่อต้านเนื้อเยื่อของร่างกายไปตลอด ค่ายากดภูมิคุ้มกันในปีแรกประมาณ 200,000 บาทต่อราย ในปีต่อๆไปประมาณ 100,000 บาทต่อรายต่อปี รวมแล้วในปีแรกจะต้องใช้ค่าใช้จ่ายประมาณ 350,000-400,000 บาท แต่จะลดลงเหลือประมาณ 100,000 บาทในปีต่อๆไป

จากข้อมูลข้างต้นเมื่อคำนวณออกมาจะเห็นได้ว่า ถ้าเราให้ผู้ป่วยทั้งหมดที่เกิดใหม่ในแต่ละปี 3000 ราย (ประมาณ 50 รายต่อล้านประชากรต่อปี) ให้ได้รับบริการทดแทนไต จะต้องใช้ค่าใช้จ่ายทั้งสิ้น 450-900 ล้านบาทต่อปีในปีแรกที่ให้บริการ และจะเพิ่มสะสมเรื่องๆจนกระทั่งถึงจุดสูงสุดเป็น 2,250 -4,500 ล้านบาทต่อปีภายใน 5 ปี เนื่องจากผู้ป่วยจะมีอายุเฉลี่ยยืนยาวไปอีกประมาณ 5 ปีแทนที่จะเป็น 3-6 เดือน ซึ่งงบประมาณ จำนวนนี้คิดเป็นประมาณร้อยละ 3.75-7.5 ของงบทั้งหมดของกระทรวงสาธารณสุขในปีงบประมาณ 2543 ซึ่งต้องดูแลผู้โรคต่างๆทุกชนิด หรือคิดเป็นประมาณร้อยละ 0.8-1.6 ของรายจ่ายสุขภาพของทั้งประเทศของประชาชนกว่า 60 ล้านคนในปี 2542

ในปัจจุบัน มีผู้ป่วยทั่วประเทศประมาณ 3,500 - 5,000 ราย โดยเป็นผู้ป่วยรายใหม่ประมาณ 700 - 1,000 รายต่อปี แต่ค่าใช้จ่ายที่เกิดขึ้นเนื่องจากการตั้งเบิกหรือการจ่ายจริงของผู้ป่วยอยู่ที่ประมาณ 250,000- 300,000บาทต่อรายต่อปี ทุกปีที่ผ่านมามีการใช้จ่ายเรื่องการรักษาพยาบาลสำหรับไตวายเรื้อรังอยู่แล้วประมาณ 1,000 ล้านบาท ซึ่งคาดว่าไม่ต่ำกว่า 500 ล้านบาทเป็นเงินที่จ่ายผ่านทางสวัสดิการรักษาพยาบาลข้าราชการซึ่งเป็นงบประมาณของรัฐที่ใช้สำหรับคนกลุ่มเดียวที่มีสัดส่วนประมาณ 10% ของประชากรทั้งประเทศ เพื่อรักษาโรคเพียงโรคเดียว

จากปัญหาที่ปรากฏและงบประมาณที่คาดว่าจะต้องใช้ คงต้องตั้งคำถามว่าเราจะหาทางออกสำหรับปัญหานี้ อย่างไร

1. ไม่ต้องดำเนินการอะไรปล่อยให้เป็นไปตามเดิม เพราะงบที่จะต้องใช้มากเกินกว่าที่จะจัดการได้ หรือ

2. ส่งเสริมให้เกิดความเป็นธรรมในการเข้ารับบริการทดแทนไตมากขึ้น โดยการอุดหนุนจากรัฐด้วยวิธีใดวิธีหนึ่งดังนี้

2.1 ไม่ต้องเพิ่มงบประมาณแต่ให้นำงบประมาณที่เคยใช้มาจัดระบบการคัดผู้ป่วยใหม่โดยใช้หลักเกณฑ์ที่เหมาะสมและให้ประชาชนทุกกลุ่มมีสิทธิได้รับคัดเลือกอย่างเท่าเทียมกัน และเพิ่มประสิทธิภาพของหน่วยบริการแต่ละแห่งเพื่อเพิ่มที่ว่างสำหรับบริการและลดต้นทุนค่ารักษาลง

2.2 โดยเพิ่มงบประมาณตามสมควรเพื่อสร้างเสริมให้มีความเป็นธรรมมากขึ้นในสังคม โดยไม่ไปจัดการกับกลุ่มที่ได้รับการอุดหนุนการรักษาอยู่ก่อนแล้ว แต่เน้นเพิ่มการเข้าถึงบริกการไปที่กลุ่มที่ยังไม่มีสวัสดิการใดทั้งสิ้น หรือเน้นเฉพาะกลุ่มที่มีรายได้น้อยหรือสังคมควรช่วยเหลือเกื้อกูล

2.3 โดยเพิ่มงบประมาณตามสมควร และเพื่อให้มีความเป็นธรรมมากขึ้น ให้เปลี่ยนวิธีการคัดเลือกและอุดหนุนค่ารักษาใช้กับคนไทยทุกคน ไม่ใช่เพียงกลุ่มข้าราชการและประกันสังคมที่เบิกค่าใช้จ่ายได้

2.4 โดยต้องเพิ่มงบประมาณตามจำนวนผู้ป่วย ไม่ว่าจะต้องใช้เท่าไรก็ตามให้เกิดเท่าเทียม

ตารางที่ 4 ค่าเฉลี่ย ค่ามัธยฐาน ค่าฐานนิยม ของคะแนนที่อายุรแพทย์และอายุรแพทย์โรคไต 183 ท่านทั่วประเทศไทย ให้กับเกณฑ์ต่าง ๆที่จะใช้คัดเลือกผู้ป่วยเข้ารับการรักษาทดแทนไตด้วยการฟอกเลือด และการล้างช่องท้อง (ให้ตัดสินใจเลือกคะแนนตั้งแต่ 1-9 โดยคะแนนมากคือให้ความสำคัญมาก)

เกณฑ์ที่ควรจะใช้คัดเลือกผู้ป่วยเข้ารับการรักษาทดแทนไตด้วยการฟอกเลือด และ ล้างช่องท้อง	ค่าเฉลี่ย	ค่ามัธยฐาน	ค่าฐานนิยม
1. ให้ความสำคัญแก่ผู้ป่วยที่ fit สำหรับการปลูกถ่ายไตในอนาคต	7.79	8	9
2. ให้ความสำคัญแก่ผู้ป่วยที่มีผลลัพธ์การรักษาดีกว่า (better clinical outcome)	7.77	8	8
3. ผู้ที่มีเศรษฐานะไม่ดี แต่น่าจะมีผลลัพธ์การรักษาดี ควรมีโอกาสเข้าถึงบริการทดแทนไตได้	7.29	8	8
4. Comorbidity ของผู้ป่วย ให้ความสำคัญแก่ผู้ป่วยที่ไม่มี comorbidity หรือมีน้อยกว่า	7.03	7	8
5. อายุผู้ป่วย ให้ความสำคัญแก่ผู้ป่วยที่มีอายุน้อยกว่า	6.77	7	7

ตารางที่ 5 เกณฑ์ที่อายุรแพทย์และอายุรแพทย์โรคไตจำนวน 183 รายทั่วประเทศไทย เสนอให้ใช้ในการพิจารณาคัดเลือกผู้ป่วยเข้ารับการรักษาทดแทนไตด้วยวิธีฟอกเลือดและล้างช่องท้อง

เกณฑ์สำหรับคัดเลือกรับผู้ป่วยเข้ารับการรักษาทดแทนไตด้วยการฟอกเลือดหรือล้างช่องท้อง	ลำดับ 1 (จำนวนครั้ง)	ลำดับ 2 (จำนวนครั้ง)	ลำดับ 3 (จำนวนครั้ง)	รวม (จำนวนครั้ง)
1. ให้ความสำคัญแก่ผู้ป่วยที่มีผลลัพธ์การรักษาดีกว่า	47	34	18	99
2. ให้ความสำคัญแก่ผู้ป่วยที่ fit สำหรับการปลูกถ่ายไต	35	24	26	85
3. ให้ความสำคัญแก่ผู้ป่วยที่มีอายุน้อยกว่า	44	19	19	82
4. ให้ความสำคัญแก่ผู้ป่วยที่ไม่มีโรคร่วมหรือมีน้อยกว่า	13	44	21	78
5. เศรษฐานะ, ปานกลาง/ดี ขึ้นไป, พอจ่ายค่าบริการได้, support finance ได้, ไม่มี financial problem, มีรายได้หมุนเวียนสำหรับค่ารักษาบำบัด	9	15	30	54
6. หัวหน้าครอบครัว/เป็นกำลังหลักสำคัญของครอบครัว	3	10	8	21
7. มีประโยชน์ต่อสังคม, social function, หน้าที่การงาน, ผู้มีงานทำและทำงาน productivity life ต่อหน่วยงาน	3	8	9	20

กันในการรับบริการสำหรับทุกคนหรือ

3. จัดตั้งกองทุนประกันสุขภาพสำหรับการรักษาราคาแพงขึ้น โดยให้ประชาชนทุกสมัครและจ่ายเงินสมทบทุกปีในราคาไม่แพง และผู้ป่วยจะได้รับการอุดหนุนการรักษาจากกองทุนที่มีอยู่ หรือ

4. ให้ส่งเสริมการป้องกันโรคไตวายเรื้อรังระยะสุดท้าย เพราะน่าจะเป็นวิธีการที่ให้ผลคุ้มค่ามากที่สุด

สรุป

ผู้วิจัยเห็นว่าหลักฐานจากการศึกษาที่มีอยู่ เราสามารถระบุได้ว่าระบบการรักษาทดแทนไตสำหรับผู้ป่วยไตวายเรื้อรังระยะสุดท้ายเป็นบริการที่มีราคาแพง และมีความไม่เป็นธรรมในการเข้าถึงบริการสูง โดยผู้ป่วยที่อยู่ในกลุ่มผู้มีฐานะยากจนได้รับการรักษาทดแทนไตในสัดส่วนที่น้อยมาก เพราะไม่มีเงินไปจ่ายค่ารักษา และสวัสดิการรักษาพยาบาลไม่เปิดช่องให้เท่ากับสวัสดิการรักษาพยาบาลข้าราชการหรือประกันสังคมที่ผู้ป่วยที่ทำการรักษาทดแทนไตได้รับการอุดหนุนค่าใช้จ่ายเกือบทั้งหมด

เพราะฉะนั้นทางเลือกที่จะไม่ดำเนินการอะไรเลยเมื่อเห็นปัญหาอยู่ตรงหน้าเป็นทางเลือกที่ไม่ควรพิจารณา แต่การแก้ปัญหาในเรื่องนี้ก็เป็นเรื่องที่ยากเช่นกันเพราะทุกอย่างถูกกำหนดด้วยข้อจำกัดจากทรัพยากรมีไม่เพียงพอที่จะให้บริการสำหรับคนทุกคน การที่จะส่งเสริมป้องกันโรคนี้เป็นหลักการทางสาธารณสุขที่น่าพิจารณาที่สุด แต่จะป้องกันโรคไตวายเรื้อรังระยะสุดท้ายอย่างไรให้ได้ผลดี เป็นคำถามที่แพทย์และนักวิทยาศาสตร์การแพทย์คงจะต้องหาคำตอบต่อไปว่าสาเหตุของการเกิดโรคคืออะไรและการที่จะป้องกันที่สาเหตุนั้นต้องทำอย่างไร จะต้องลงทุนอีกเท่าไรในการที่จะป้องกันไม่ให้เกิดผู้ป่วยรายใหม่หนึ่งราย ซึ่งจะต้องใช้ระยะเวลาในการหาคำตอบพอสมควร การที่จะจัดตั้งกองทุนประกันสุขภาพสำหรับโรคราคาแพง ต้องมีจำนวนผู้เข้าร่วมจำนวนมาก (หลายล้านคน) ถึงจะสามารถดำเนินการได้ อาจจะต้องมีการออกกฎหมายเพื่อให้ประชาชนทุกคนเข้าร่วมกับกองทุนนี้ ซึ่งน่าจะมีการศึกษาถึงความเป็นไปได้โดยนักวิชาการที่เกี่ยวข้องต่อไป

จากข้อมูลที่พบว่าค่าใช้จ่ายในการรักษาผู้ป่วยทุกคนอาจจะสูงถึงหลายพันล้านบาทซึ่งทำให้การให้การรักษาทดแทนไตแก่ผู้ป่วยไตวายเรื้อรังระยะสุดท้ายทุกคนด้วยการอุดหนุนจากรัฐเป็นไปได้ยาก การสร้างเกณฑ์ในการคัดเลือกผู้ที่จะสมควรจะได้รับบริการให้เข้าถึงบริการและได้รับการอุดหนุนค่ารักษาพยาบาลจากภาครัฐเป็นสิ่งที่ผู้วิจัยเห็นว่าจำเป็นในสถานการณ์ปัจจุบัน เพื่อลดช่องว่างความเหลื่อมล้ำในสังคมที่มีอยู่ ตารางที่ 4-5 เป็นเกณฑ์ที่อายุรแพทย์ได้ให้ความเห็นเพื่อคัดเลือกผู้ป่วยเมื่อทรัพยากรมีจำกัด ซึ่งอาจจะเป็นจุดเริ่มต้นที่จะทำให้ได้คิดในการแก้ปัญหาสำหรับโรคที่มีค่าใช้จ่ายสูงต่าง ๆต่อไป

อย่างไรก็ตามเกณฑ์ในการคัดเลือกผู้ป่วยนี้เป็นเพียงร่างความเห็นจากแพทย์ผู้ให้บริการเพียงฝ่ายเดียว การได้รับความเห็นร่วมจากกลุ่มต่าง ๆ ที่เกี่ยวข้อง ไม่ว่าจะเป็นประชาชนทั่วไป ผู้ป่วย นักวิชาการสาขาต่าง ๆ และผู้ที่มีหน้าที่ในการออกกฎระเบียบและนโยบายต่าง ๆ จะทำให้ได้ทางออกที่เป็นที่ยอมรับและเป็นไปได้ โดยคำนึงถึงความเป็นธรรมในการให้บริการรักษาพยาบาลแก่ประชาชน เมื่อทรัพยากรที่ใช้ในการรักษาพยาบาลมีจำกัด

วารสารวิชาการสาธารณสุข
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นิพนธ์ต้นฉบับ

เครื่องมือแพทย์ราคาแพงในประเทศไทย: การกระจาย การใช้ และ การเข้าถึงบริการ

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วิโรจน์ ตั้งเจริญเสถียร
โครงการเมธีวิจัยอาวุโสด้านเศรษฐศาสตร์การคลังสาธารณสุข สถาบันวิจัยระบบสาธารณสุข

บทคัดย่อ ศึกษาการกระจาย การใช้ และการเข้าถึงบริการเครื่องมือแพทย์ราคาแพงในประเทศไทย ในระหว่างปี ๒๕๓๗-๒๕๔๒ ได้แก่ เครื่องสลายนิ่ว (ESWL) เครื่องเอกซเรย์คอมพิวเตอร์ (CT scanner) เครื่องตรวจอวัยวะภายในด้วยสนามแม่เหล็กไฟฟ้าหรือเครื่องเอ็มอาร์ไอ (MRI) และเครื่องตรวจมะเร็งเต้านม (Mammography) เพื่อนำไปสู่การจัดการทรัพยากรสาธารณสุขให้มีประสิทธิภาพทั้งในด้านเทคนิคและการจัดสรรทรัพยากร รวมทั้งให้ตระหนักความคุ้มค่าในการลงทุนและความเสมอภาคในการเข้าถึงบริการ

การกระจายเครื่องมือแพทย์ราคาแพง กระจุกตัวอยู่ในสถานพยาบาลภาคเอกชน ยกเว้นเครื่องสลายนิ่วที่มีการติดตั้งในรัฐมากกว่าภาคเอกชน การเพิ่มจำนวนเครื่องมือแพทย์ราคาแพงจะสัมพันธ์กับการเติบโตทางเศรษฐกิจอย่างรวดเร็วและมีแนวโน้มช้าลงหรือลดลงเมื่อเกิดภาวะวิกฤติเศรษฐกิจ ซึ่งสืบเนื่องมาจากความอ่อนแอของภาครัฐในการควบคุมทั้งจำนวนการกระจายเครื่องมืออย่างมีประสิทธิภาพและเหมาะสม และความเป็นธรรมในการบริการ การใช้ประโยชน์จากเครื่องมือแพทย์ราคาแพงยังไม่เต็มประสิทธิภาพในภาครัฐและภาคเอกชน เนื่องจากการลงทุนค่าเครื่องมือสูงมาก กอรปกับค่าดูแลรักษาเครื่อง ค่าสถานที่ ค่าแพทย์ผู้เชี่ยวชาญพิเศษในการใช้เครื่อง ฯลฯ ดังนั้น เพื่อความคุ้มทุนในระยะสั้นสำหรับเครื่องมือบางชนิด ได้ใช้กลไกการตลาดเพื่อเพิ่มจำนวนบริการ ซึ่งก่อให้เกิดข้อท้วงติงด้านจริยธรรมทางการแพทย์และเพิ่มค่าใช้จ่ายทางด้านสุขภาพโดยไม่จำเป็น นอกจากนี้ยังพบว่าผู้ที่มีรายได้น้อยและไม่มีหลักประกันสุขภาพเข้าถึงบริการด้วยเครื่องมือแพทย์ราคาแพงน้อยกว่าผู้มีรายได้สูงและมีหลักประกันสุขภาพ โดยเฉพาะอย่างยิ่งกลุ่มข้าราชการและรัฐวิสาหกิจ

ข้อเสนอแนะเชิงนโยบาย ควรมีการพัฒนาฐานข้อมูลจำนวนเครื่องมือแพทย์และปริมาณการใช้บริการของผู้ป่วยเพื่อใช้ในการพัฒนานโยบายการวางแผน การจัดสรรให้เหมาะกับปัญหา ควรปรับปรุงกฎหมายควบคุมเครื่องมือแพทย์ให้แก้ปัญหาเชิงรุกในภาพรวมของทั้งประเทศเพื่อการกระจายและการใช้อย่างเหมาะสม ควรปฏิรูประบบสุขภาพให้ระบบประกันสุขภาพครอบคลุมประชาชนคนไทย ควรคำนึงถึงบริการด้วยเครื่องมือแพทย์ราคาแพงสำหรับประชาชนทุกคนที่จำเป็นและได้รับการวินิจฉัยจากแพทย์ตามข้อบ่งชี้ที่สมควร เพื่อสร้างความเป็นธรรมทางสุขภาพ

คำสำคัญ: เครื่องมือแพทย์ราคาแพง, การกระจาย, การใช้ประโยชน์, เครื่องสลายนิ่ว, เครื่องเอกซเรย์คอมพิวเตอร์, เครื่องเอ็มอาร์ไอ, เครื่องตรวจมะเร็งเต้านม

บทนำ

ค่าใช้จ่ายเพื่อสุขภาพของคนไทยเพิ่มขึ้นอย่าง ต่อเนื่อง จากร้อยละ ๓.๘ ของผลิตภัณฑ์มวลรวมภายในประเทศ (GDP) ในปี ๒๕๒๓ เป็นร้อยละ ๖.๒ ในปี ๒๕๔๑ เป็นจำนวนเงินที่เพิ่มสูงขึ้นถึง ๙ เท่า (จาก ๕๔๕ บาทต่อคนเป็น ๔,๖๖๓ บาทต่อคน) ปัจจัยสำคัญประการหนึ่งเป็นค่าใช้จ่ายสำหรับเทคโนโลยีทางการแพทย์และเครื่องมือแพทย์ต่างๆ ที่มีราคาสูง และนำเข้าจากต่างประเทศ.เป็นอุปกรณ์และวัสดุการแพทย์ถึง ๑๙,๑๔๖ ล้านบาท[๑] ส่วนเครื่องมือแพทย์ มูลค่าการนำเข้า ๗๑๕.๒ ล้านบาท ปี ๒๕๑๙ และเพิ่มเป็น ๓,๙๖๐.๕ ล้านบาท ในปี ๒๕๒๙[๒] ในช่วง ๔ ปีที่เศรษฐกิจมีการเจริญเติบโตแบบฟองสบู่ อัตราเพิ่มของการนำเข้าสูงมากเกือบเป็น ๒ เท่า ในปี ๒๕๒๙ (จาก ๔,๓๙๕.๖ ล้านบาท ในปี ๒๕๓๖ เป็น ๗,๖๗๐.๑ ล้านบาท ในปี ๒๕๔๐) หลังจากนั้นจึงค่อยลดลงเป็น ๕,๔๕๗.๖ ล้านบาท และ ๔,๘๘๕.๔ ล้านบาทในปี ๒๕๔๑-๒๕๔๒ เครื่องมือเหล่านี้ต้องมีค่าใช้จ่ายการดูแลรักษา ค่าใช้จ่ายการฝึกอบรม และค่าอุปกรณ์ใช้สอยสำหรับการให้บริการอีกมาก

เครื่องมือแพทย์ที่ทำการศึกษาครั้งนี้ประกอบด้วย เครื่องสลายนิ่ว (ESWL) เครื่องเอกซเรย์คอมพิวเตอร์ (CT scanner) เครื่องตรวจอวัยวะภายในด้วยสนามแม่เหล็กไฟฟ้าหรือเครื่องเอ็มอาร์ไอ (MRI) และเครื่องตรวจมะเร็งเต้านม (Mammography) หากไม่มีการบริหารจัดการการกระจายและการใช้ประโยชน์เครื่องมือแพทย์ราคาแพง อาจเป็นสาเหตุการใช้งานอย่างไม่มีประสิทธิภาพและการเข้าถึงเครื่องมืออย่างไม่เป็นธรรมของคนจนและผู้ไม่มีหลักประกันสุขภาพ ดังนั้น การศึกษาครั้งนี้เป็นการมองภาพรวมของการกระจายเครื่องมือแพทย์และการใช้ประโยชน์จากเครื่องมือแพทย์ราคาแพง เพื่อศึกษาปัญหาต่างๆที่เกิดขึ้นและเสนอแนวทางแก้ไขให้เกิดประโยชน์สูงสุดทั้งในส่วนของผู้ให้บริการและผู้รับบริการ เพื่อไปสู่แนวทางการใช้ทรัพยากรที่มีอยู่ให้มีประสิทธิภาพและเกิดความคุ้มค่ามากที่สุด กอรปกับเป็นข้อมูลพื้นฐานในการวางแผนในการจัดสรรทรัพยากรให้เกิดความเสมอภาคและเป็นธรรมต่อไป

วัตถุประสงค์ในการศึกษาครั้งนี้เพื่อวิเคราะห์สถานการณ์การกระจายของเครื่องมือแพทย์ทั้ง ๔ ชนิด ตาม ประเภทสถานพยาบาล (ภาครัฐและภาคเอกชน) และตามภาคภูมิศาสตร์ (กรุงเทพฯ และต่างจังหวัด) การใช้ประโยชน์จากเครื่อง และการเข้าถึงบริการการตรวจ ประสิทธิภาพการใช้เครื่องมือและความเสมอภาคการเข้าถึงบริการ

วิธีการศึกษา

เป็นการสังเคราะห์ผลการศึกษาเกี่ยวกับเครื่องมือแพทย์ราคาแพงทั้งหมด ๔ เรื่อง ที่ได้ทำการศึกษาในระหว่างปี ๒๕๓๗-๒๕๔๒ เพื่อเสนอเป็นภาพรวมของประเทศไทยให้สมบูรณ์ ผลการศึกษาทั้ง ๔ เรื่อง ได้แก่

๑. การใช้เครื่องสลายนิ่วในประเทศไทย : ประสิทธิภาพและความเสมอภาค[๓]

๒. การกระจายและการใช้งานเครื่องเอ็มอาร์ไอ ในประเทศไทย[๔]

๓. สำมะโนเครื่องมือแพทย์ราคาแพงในประเทศไทย ปี ๒๕๔๒[๕]

๔. การใช้บริการและอัตราคืนทุนของเครื่องตรวจมะเร็งเต้านมในสถาบันมะเร็งแห่งชาติ[๖]

ผลการศึกษา

๑. ต้นทุนการลงทุนและอัตราค่าบริการ

ต้นทุนการลงทุนของเครื่องมือแพทย์ทั้ง ๔ ชนิด เฉพาะราคาเฉลี่ยในปีที่จัดซื้อเครื่องโดยไม่ได้รวมค่าสถานที่ ค่าติดตั้ง ค่าฝึกอบรม ฯลฯ เครื่องสลายนิ่ว ๒๓.๒ ล้านบาท (ราคาสูงสุด ๓๗ ล้านบาท), เครื่องเอ็มอาร์ไอ ๕๑.๔ ล้านบาท (ราคาสูงสุด ๗๙.๕ ล้านบาท), เครื่องเอกซเรย์คอมพิวเตอร์ ๑๓.๓ ล้านบาท (ราคาสูงสุด ๓๕ ล้านบาท) และ เครื่องตรวจมะเร็งเต้านม ๓.๑ ล้านบาท (ราคาสูงสุด ๙ ล้านบาท)

ค่าบริการเครื่องมือแพทย์ต่อครั้งค่อนข้างสูงมากในภาคเอกชนโดยเฉลี่ยจะสูงกว่าภาครัฐ การรักษาด้วยเครื่องสลายนิ่วจนหาย ในภาครัฐ ๑๕,๐๐๐-๑๗,๐๐๐ บาท และในภาคเอกชน ๒๕,๐๐๐ บาท ค่าบริการตรวจด้วยเครื่องเอ็มอาร์ไอต่อครั้ง ในภาครัฐ ๗,๗๕๐ บาท ในภาคเอกชน ๘,๕๐๐ บาท ส่วนค่าบริการตรวจด้วยเครื่องเอกซเรย์คอมพิวเตอร์ ทั้งในภาครัฐและภาคเอกชน ราคาไม่แตกต่างกันมากนัก ขึ้นกับอวัยวะที่ตรวจ โดยการตรวจบริเวณสมอง ราคาต่ำที่สุด ๔,๐๐๐ บาทต่อครั้ง, การตรวจในช่องท้องทั้งส่วนบนและล่าง ราคาสูงที่สุด ๘,๐๐๐-๑๐,๐๐๐ บาทต่อครั้ง และการตรวจที่อวัยวะต่างๆ ได้แก่ ตับ ปอด เชิงกราน ราคาประมาณ ๕,๐๐๐-๖,๐๐๐ บาท และค่าบริการการตรวจมะเร็งเต้านมต่อครั้งทั้งภาครัฐและเอกชน ราคาประมาณ ๑,๐๐๐-๓,๐๐๐ บาท

๒. แบบแผนการกระจายเครื่องมือแพทย์ราคาแพง

จากการสำมะโนเครื่องมือแพทย์ ๔ รายการที่ยังใช้งานอยู่ (active service) ในประเทศไทย ณ ตุลาคม ๒๕๔๒ พบว่า มีเครื่องสลายนิ่วทั้งหมด ๓๘ เครื่อง เครื่องเอกซเรย์คอมพิวเตอร์ ๒๗๒ เครื่อง เครื่องตรวจมะเร็งเต้านม ๑๑๒ เครื่อง และเครื่องเอ็มอาร์ไอ ๒๖ เครื่อง

๒.๑ การกระจายเครื่องมือแพทย์ราคาแพงตามประเภทสถานพยาบาล

เครื่องเอกซเรย์คอมพิวเตอร์ เครื่องตรวจมะเร็งเต้านม และ เครื่องเอ็มอาร์ไอ ติดตั้งในภาคเอกชนมากถึงร้อยละ ๗๗, ๖๔, และ ๖๒ ตามลำดับ แต่เครื่องสลายนิ่วติดตั้งสถานพยาบาลภาครัฐร้อยละ ๖๑ ที่เหลือเป็นภาคเอกชน (ตารางที่ ๑)

๒.๒ แบบแผนการกระจายเครื่องมือแพทย์ปีที่ติดตั้งจริงและตามลำดับของปีที่ติดตั้ง

ภาพที่ ๑ การกระจายของเครื่องตรวจมะเร็งเต้านมมีความคล้ายคลึงกับเครื่องเอกซเรย์คอมพิวเตอร์ มีอัตราการเพิ่มค่อนข้างสูงในเวลาอันสั้น ซึ่งเครื่องมือทั้งสองมีราคาไม่แพงมากนักและติดตั้งในภาคเอกชนมากกว่าภาครัฐ ส่วนเครื่องสลายนิ่วและเครื่องเอ็มอาร์ไอมีลักษณะคล้ายคลึงกัน มีการเพิ่มจำนวนขึ้นอย่างช้าๆ เนื่องจากราคาค่าลงทุนต่อเครื่องค่อนข้างสูง

เครื่องเอกซเรย์คอมพิวเตอร์จะเพิ่มขึ้นอย่างช้าๆ จากใน พ.ศ. ๒๕๑๙ เป็น ๓๘ เครื่องใน พ.ศ. ๒๕๓๓ หลังจากนั้นจะเพิ่มขึ้นอย่างรวดเร็วมากในช่วงเศรษฐกิจฟองสบู่เป็น ๒๕๙ เครื่องใน พ.ศ. ๒๕๔๐ โดยเพิ่มเกือบ ๗ เท่า ภายในระยะเวลา ๗ ปี หลังจากประเทศประสบภาวะวิกฤตเศรษฐกิจในกลางปี ๒๕๔๐ อัตราการเพิ่มของเครื่องเอกซเรย์คอมพิวเตอร์ชะลอลงอย่างชัดเจน โดยเพิ่มขึ้นเป็น ๒๗๒ เครื่องใน พ.ศ. ๒๕๔๒

เครื่องตรวจมะเร็งเต้านมมีการติดตั้งครั้งแรกที่สถาบันมะเร็งแห่งชาติเมื่อ พ.ศ. ๒๕๑๐ และมีการติดตั้งอย่างต่อเนื่องทั้งภาครัฐและเอกชน แต่เนื่องจากเครื่องที่ติดตั้งก่อนปี ๒๕๓๑ ได้ยกเลิกการใช้แล้ว ในภาพที่ ๖ เป็นเครื่องที่กำลังมีการดำเนินการอยู่ในปัจจุบันนับ

ตารางที่ ๑ การกระจายเครื่องมือแพทย์ราคาแพงในประเทศไทย พ.ศ. ๒๕๔๒ แยกตามประเภทสถานพยาบาล

		ภาครัฐ		ภาคเอกชน	
	จำนวนทั้งหมด	จำนวน	%	จำนวน	%
เครื่องสลายนิ่ว[๑]	๓๘	๒๓	๖๑	๑๕	๓๙
เครื่องเอกซเรย์คอมพิวเตอร์[๑]	๒๗๒	๖๒	๒๓	๒๑๐	๗๗
เครื่องเอ็มอาร์ไอ[๒]	๒๖	๑๐	๓๘	๑๖	๖๒
เครื่องตรวจมะเร็งเต้านม[๑]	๑๑๒	๔๐	๓๖	๗๒	๖๔

ที่มา : *๑. วิโรจน์ ตั้งเจริญเสถียร, วงเดือน จินดาวัฒนะ, ๒๕๔๒ ๒. ปิยะ หาญวรวงศ์ชัย และคณะ, ๒๕๔๒*

ตารางที่ ๖ ร้อยละลักษณะการจ่ายเงินของผู้ป่วยที่ใช้บริการเครื่องมือแพทย์ราคาแพงในประเทศไทย

ลักษณะการจ่ายเงิน	เครื่องสลายนิ่ว[๑]	เครื่องเอ็มอาร์ไอ[๒]			เครื่องตรวจมะเร็งเต้านม[๓]
	รพ.รัฐ	รพ.รัฐ	รพ.เอกชน	ศูนย์เอกชน	ภาครัฐ
จ่ายออกจากกระเป๋าตนเอง	๓๘	๓๐.๑	๗๔.๗	๔๓.๐	๔๓
สวัสดิการข้าราชการและวิสาหกิจ	๓๕	๔๐.๕	๒.๔	๒๘.๕	๔๗
ประกันสุขภาพ&จ่ายเอง	-	๐.๓	๗.๑	๕.๕	๓
ประกันสุขภาพเอกชน	-	๐.๔	๗.๑	๑๒.๑	๐
ประกันสังคม	๒	๓.๖	-	๓.๐	๑
สวัสดิการจากนายจ้าง	-	๑.๐	๗.๕	๒.๐	๐
บัตรสงเคราะห์ผู้ป่วยที่มีรายได้น้อย และสังคมสงเคราะห์	๒๔	๓.๗	-	๐.๗	๑
บัตรประกันสุขภาพ	๑	๘.๗	๐.๘	๐.๗	๒
อื่นๆ	-	๑๑.๖	-	๐.๗	๒
รวม	๑๐๐	๑๐๐	๑๐๐	๑๐๐	๑๐๐
จำนวนทั้งหมด	๔,๐๖๕	๘๐๐	๔๐๐	๔๐๐	๔๓๕

ที่มา : *๑. วิโรจน์ ตั้งเจริญเสถียร และคณะ, ๒๕๓๗ ๒. ปิยะ หาญวรวงศ์ชัย และคณะ, ๒๕๔๒ ๓. วงเดือน จินดาวัฒนะ, ๒๕๔๒*

ตารางที่ ๗ การเปรียบเทียบภูมิลำเนาของผู้ป่วยและที่ตั้งของหน่วยสลายนิ่วตามภาคภูมิศาสตร์

ที่ตั้งของหน่วยสลายนิ่ว	ภูมิลำเนาของผู้ป่วย						
	กทม.-ปริมณฑล	ภาคกลาง	ภาคอีสาน	ภาคเหนือ	ภาคใต้	รวม	Import*
กทม.-ปริมณฑล	๕๑๐	๔๖๑	๒๗๓	๓๕๗	๑๖๖	๒,๑๖๗	๑,๒๕๗ (๕๗%)
ภาคกลาง	๐	๐	๐	๐	๐	๐	๐ (๐%)
ภาคอิสาน	๒	๒	๒,๒๖๕	๒๔	๑	๒,๒๕๔	๒๕ (๒%)
ภาคเหนือ	๒	๔	๒	๔๕๕	๐	๕๐๗	๘ (๑%)
ภาคใต้	๐	๐	๐	๐	๐	๐	๐ (๐%)
รวม	๕๑๔	๔๖๗	๒,๕๔๐	๘๘๐	๑๖๗	๔,๕๖๘	๑,๒๕๔ (๑๐๐%)

หมายเหตุ: **Import ในที่นี้ หมายถึง ผู้ป่วยที่มีภูมิลำเนาในภาคภูมิศาสตร์หนึ่ง แต่ไปใช้บริการเครื่องสลายนิ่วที่ตั้งอยู่ในภาคภูมิศาสตร์อื่น*
ที่มา : *วิโรจน์ ตั้งเจริญเสถียร และคณะ, การใช้เครื่องสลายนิ่วในประเทศไทย ประสิทธิภาพและความเสมอภาค, ๒๕๓๗*

กรุงเทพมหานครและปริมณฑลมีผู้ป่วยร้อยละ ๙๗ ที่เดินทางมาจากจังหวัดอื่นๆมารับบริการที่หน่วยสลายนิ่วในเขตกรุงเทพมหานครและปริมณฑล

วิจารณ์

๑. ค่าลงทุนสูง (High cost investment)

เครื่องมือแพทย์เป็นเครื่องมือที่มีการลงทุนสูงมากในการให้บริการวินิจฉัยโรคและรักษาพยาบาล ได้แก่ เครื่องเอ็มอาร์ไอมีราคาสูงที่สุด รองลงมาคือ เครื่องเอกซเรย์คอมพิวเตอร์ และเครื่องสลายนิ่ว ส่วนเครื่องแมมโมแกรมราคาไม่สูงมากนัก จึงมีการลงทุนมากในภาคเอกชน แต่อย่างไรก็ตามเครื่องมือแพทย์เหล่านี้ให้ประโยชน์ทางการแพทย์เมื่อมีการใช้อย่างถูกต้องเหมาะสม นอกจากค่าเครื่องที่มีราคาแพงแล้ว ยังต้อง

จำนวนกว่าร้อยละ ๕๐ ของ โรงพยาบาลเอกชนที่ตั้งอยู่ในกรุงเทพมหานคร ส่วนเครื่องสลายนิ่วที่ติดตั้งมากในกรุงเทพมหานคร รองลงมาเป็นภาคตะวันออกเฉียงเหนือและภาคเหนือ

ดัชนีความแตกต่างเมื่อวัดโดยจำนวนเครื่องต่อล้านประชากรของเครื่องมือแพทย์ที่ติดตั้งในกรุงเทพมหานคร โดยเทียบกับค่าเฉลี่ยของประเทศ (ให้เท่ากับ ๑) (ตารางที่ ๓) พบว่า เครื่องเอ็มอาร์ไอ, เครื่องตรวจมะเร็งเต้านม, เครื่องสลายนิ่ว, และเครื่องเอกซเรย์คอมพิวเตอร์ เท่ากับ ๗.๙, ๕.๙, ๕.๕ และ ๓.๖ ตามลำดับ ซึ่งเมื่อเทียบกับดัชนีความแตกต่างของการติดตั้งเครื่องมือเหล่านี้ในภาคต่างๆ พบว่า มีค่าอยู่ระหว่าง ๐.๔-๐.๙ เมื่อเทียบกับของประเทศ

๒.๔ การกระจายเครื่องมือแพทย์ตามขนาดเตียงสถานพยาบาล

การกระจายเครื่องมือแพทย์ตามขนาดของเตียง พบว่า เครื่องสลายนิ่วและเครื่องเอ็มอาร์ไอ ส่วนใหญ่มีการติดตั้งที่โรงพยาบาลที่มีขนาดเตียงมากกว่า ๒๕๐ เตียงขึ้นไป เครื่องเอกซเรย์คอมพิวเตอร์และเครื่องตรวจมะเร็งเต้านมเกือบทั้งหมดจะติดตั้งในโรงพยาบาลที่มีขนาดเตียง ๕๐-๕๐๐ เตียง ส่วนศูนย์เอกชนส่วนใหญ่ทำการติดตั้งเครื่องเอ็มอาร์ไอและเครื่องเอกซเรย์

ตารางที่ ๒ เครื่องมือแพทย์ราคาแพงในประเทศไทยตามภาคภูมิศาสตร์ พ.ศ. ๒๕๔๒

	เครื่องสลายนิ่ว[๑]	เครื่องเอกซเรย์คอมพิวเตอร์[๑]	เครื่องเอ็มอาร์ไอ[๒]	เครื่องตรวจมะเร็งเต้านม[๑]
กรุงเทพฯ	๑๗ (๔๕%)	๘๕ (๓๓%)	๑๘ (๖๕%)	๖๑ (๕๔%)
ภูมิภาค	๒๑ (๕๕%)	๑๘๓ (๖๗%)	๘ (๓๑%)	๕๑ (๔๖%)
- ภาคกลาง	๕	๗๔	๒	๒๑
- ภาคเหนือ	๕	๔๑	๒	๗
- ภาคตะวันออกเฉียงเหนือ	๕	๔๖	๒	๑๔
- ภาคใต้	๒	๒๒	๒	๕
ทั้งประเทศ	๓๘	๒๗๒	๒๖	๑๑๒

ที่มา : *๑. วิโรจน์ ตั้งเจริญเสถียร, วงเดือน จินดาวัฒนะ, ๒๕๔๒ ๒. ปิยะ หาญวรวงศ์ชัย และคณะ, ๒๕๔๒*

ตารางที่ ๓ จำนวนเครื่องมือแพทย์ต่อล้านประชากรและดัชนีความแตกต่างตามภาคภูมิศาสตร์ พ.ศ. ๒๕๔๒

	ประชากร (ล้านคน)	จำนวนเครื่องมือแพทย์ต่อล้านประชากร				ดัชนีความแตกต่าง (Discrepancy Index)			
		ESWL	CT	MRI	Mammo	ESWL	CT	MRI	Mammo
กรุงเทพฯ	๕.๖	๓.๔	๑๕.๖	๓.๒	๑๐.๖	๕.๕	๓.๖	๗.๖	๕.๖
ภูมิภาค	๕๕.๕	๐.๓	๓.๓	๐.๑	๐.๖	๐.๖	๐.๗	๐.๔	๐.๕
- ภาคกลาง	๑๔.๒	๐.๒	๕.๒	๐.๑	๑.๕	๐.๓	๑.๒	๐.๓	๐.๘
- ภาคเหนือ	๑๒.๑	๐.๔	๓.๔	๐.๒	๐.๖	๐.๗	๐.๘	๐.๔	๐.๓
- ภาคตะวันออก เฉียงเหนือ	๒๑.๒	๐.๔	๒.๒	๐.๑	๐.๗	๐.๗	๐.๕	๐.๒	๐.๔
- ภาคใต้	๘	๐.๓	๒.๘	๐.๓	๑.๑	๐.๔	๐.๖	๐.๖	๐.๖
ทั้งประเทศ	๖๑.๑	๐.๖	๔.๕	๐.๔	๑.๘	๑.๐	๑.๐	๑.๐	๑.๐

หมายเหตุ: *ESWL คือ เครื่องสลายนิ่ว CT คือ เครื่องเอ็กซเรย์คอมพิวเตอร์ MRI คือ เครื่องเอ็มอาร์ไอ และ Mammo คือ เครื่องตรวจมะเร็งเต้านม*

คอมพิวเตอร์

๓. การใช้ประโยชน์จากเครื่องมือแพทย์ราคาแพง

ศึกษาจากจำนวนผู้ป่วยที่มารับบริการตรวจด้วยเครื่องมือแพทย์ เทียบกับเกณฑ์มาตรฐานที่ควรตรวจได้ต่อปีของแต่ละเครื่องมือนั้นๆ (Maximum capacity) จากตารางที่ ๔ พบว่า เครื่องมือแพทย์ทั้ง ๓ ชนิด ได้แก่ เครื่องสลายนิ่ว เครื่องเอ็มอาร์ไอ และเครื่องตรวจมะเร็งเต้านม ยังสามารถเพิ่มจำนวนผู้ป่วยได้ถึงเกือบ ๑๐ เท่า, ๒ เท่า, และ ๑.๖ เท่า ตามลำดับ

๔. การเข้าถึงบริการเครื่องมือแพทย์

ตารางที่ ๕ ผู้ที่มีรายได้สูง สามารถเข้าถึงบริการเครื่องเอ็มอาร์ไอในภาคเอกชนทั้งโรงพยาบาลและศูนย์เอกซเรย์ได้มากกว่ากลุ่มที่รายได้น้อย ส่วนในภาครัฐทั้งเครื่องเอ็มอาร์ไอและเครื่องแมมโมแกรม มีสัดส่วนของผู้มีรายได้น้อยมากกว่า

ตารางที่ ๖ มากกว่าร้อยละ ๗๐ ของผู้รับบริการที่จ่ายเงินด้วยตนเองหรือสามารถเบิกคืนจากระบบสวัสดิการข้าราชการและรัฐวิสาหกิจซึ่งค่อนข้างสูงทั้ง ๓ เครื่องมือในภาครัฐ ส่วนในภาคเอกชนของเครื่องเอ็มอาร์ไอ พบว่า ผู้ป่วยสามารถจ่ายด้วยตนเองสูงถึงร้อยละ ๗๔ ในโรงพยาบาลเอกชน และร้อยละ ๔๓ ในศูนย์เอกชน

ตารางที่ ๗ แสดงให้เห็นถึงการไหลเวียนผู้ป่วยที่มารับบริการกับประชาชนรอบๆหน่วยบริการนั้นๆ (catchment population) พบว่า หน่วยสลายนิ่วในกรุงเทพมหานครและปริมณฑลให้บริการผู้ป่วยที่มีภูมิลำเนาในเขตกรุงเทพมหานครและปริมณฑลเพียงร้อยละ ๔๒ เท่านั้น อีกร้อยละ ๕๘ ที่มีภูมิลำเนามาจากที่อื่น และเมื่อเปรียบเทียบกับหน่วยสลายนิ่วที่ตั้งอยู่ในภาคอื่นๆ พบว่าหน่วยสลายนิ่วใน

ตารางที่ ๔ การบริการรายปีของเครื่องมือแพทย์เทียบกับมาตรฐานที่ควรบริการได้รายปี

เครื่องมือแพทย์	รพ.รัฐ	รพ.เอกชน	ศูนย์เอกชน	ค่าเฉลี่ย	มาตรฐานที่ควรบริการได้รายปีต่อเครื่อง*
เครื่องสลายนิ่ว[๑] (๒๕๓๗)	๒๖๒.๘	-	-	๒๖๒.๘	๒,๕๐๐
เครื่องเอ็มอาร์ไอ[๒] (๒๕๔๐)	๑,๔๘๒	๘๑๒	๑,๕๔๓	๑,๒๓๓	๒,๕๐๐
เครื่องตรวจมะเร็งเต้านม[๓] (๒๕๔๒)	๑,๕๔๔	-	-	๑,๕๔๔	๒,๖๐๐

ที่มา : *๑. วิโรจน์ ตั้งเจริญเสถียร และคณะ, ๒๕๓๗ ๒. ปิยะ หาญวรวงศ์ชัย และคณะ, ๒๕๔๒ ๓. วงเดือน จินดาวัฒนะ, ๒๕๔๒*

หมายเหตุ **จาก US Certificate of needs*

ตารางที่ ๕ ร้อยละของผู้รับบริการการตรวจด้วยเครื่องมือแพทย์ราคาแพงตามระดับรายได้รายเดือน พ.ศ. ๒๕๔๒

ระดับรายได้ต่อเดือน	เครื่องเอ็มอาร์ไอ[๑]			เครื่องตรวจมะเร็งเต้านม[๒]
	รพ.รัฐ	รพ.เอกชน	ศูนย์เอกชน	รพ.รัฐ
< ๑๐,๐๐๐	๔๕	๒๓	๒๖	๓๗
๑๐,๐๐๑-๒๕,๐๐๐	๓๔	๔๒	๓๓	๓๕
> ๒๕,๐๐๐	๒๑	๓๕	๔๑	๒๔
รวม (%)	๑๐๐	๑๐๐	๑๐๐	๑๐๐
จำนวนทั้งหมด (N)	๘๐๐	๔๐๐	๔๐๐	๔๒๔

ที่มา : *๑. ปิยะ หาญวรวงศ์ชัย และคณะ, ๒๕๔๒ ๒. วงเดือน จินดาวัฒนะ, ๒๕๔๒*

ตารางที่ ๖ ร้อยละลักษณะการจ่ายเงินของผู้ป่วยที่ใช้บริการเครื่องมือแพทย์ราคาแพงในประเทศไทย

ลักษณะการจ่ายเงิน	เครื่องสลายนิ่ว[๑]	เครื่องเอ็มอาร์ไอ[๒]			เครื่องตรวจมะเร็งเต้านม[๓]
	รพ.รัฐ	รพ.รัฐ	รพ.เอกชน	ศูนย์เอกชน	ภาครัฐ
จ่ายออกจากกระเป๋าตนเอง	๓๘	๓๐.๑	๗๔.๗	๔๓.๐	๔๓
สวัสดิการข้าราชการและวิสาหกิจ	๓๕	๔๐.๕	๒.๔	๒๘.๕	๔๗
ประกันสุขภาพ&จ่ายเอง	-	๐.๓	๗.๑	๕.๕	๓
ประกันสุขภาพเอกชน	-	๐.๔	๗.๑	๑๒.๑	๑
ประกันสังคม	๒	๓.๖	-	๓.๐	๑
สวัสดิการจากนายจ้าง	-	๑.๐	๗.๕	๒.๐	๑
บัตรสงเคราะห์ผู้ป่วยที่มีรายได้น้อย และสังคมสงเคราะห์	๒๔	๓.๗	-	๐.๗	๑
บัตรประกันสุขภาพ	๑	๘.๗	๐.๘	๐.๗	๒
อื่นๆ	-	๑๑.๖	-	๐.๗	๒
รวม	๑๐๐	๑๐๐	๑๐๐	๑๐๐	๑๐๐
จำนวนทั้งหมด	๔,๐๖๕	๘๐๐	๔๐๐	๔๐๐	๔๓๕

ที่มา : *๑. วิโรจน์ ตั้งเจริญเสถียร และคณะ, ๒๕๓๗ ๒. ปิยะ หาญวรวงศ์ชัย และคณะ, ๒๕๔๒ ๓. วงเดือน จินดาวัฒนะ, ๒๕๔๒*

ตารางที่ ๗ การเปรียบเทียบภูมิลำเนาของผู้ป่วยและที่ตั้งของหน่วยสลายนิ่วตามภาคภูมิศาสตร์

ที่ตั้งของหน่วยสลายนิ่ว	ภูมิลำเนาของผู้ป่วย						
	กทม.-ปริมณฑล	ภาคกลาง	ภาคอีสาน	ภาคเหนือ	ภาคใต้	รวม	Import*
กทม.-ปริมณฑล	๕๑๐	๔๖๑	๒๗๓	๓๕๗	๑๖๖	๒,๑๖๗	๑,๒๕๗ (๕๗%)
ภาคกลาง	๐	๐	๐	๐	๐	๐	๐ (๐%)
ภาคอิสาน	๒	๒	๒,๒๖๕	๒๔	๑	๒,๒๕๔	๒๖ (๒%)
ภาคเหนือ	๒	๔	๒	๔๕๕	๐	๕๐๗	๘ (๑%)
ภาคใต้	๐	๐	๐	๐	๐	๐	๐ (๐%)
รวม	๕๑๔	๔๖๗	๒,๕๔๐	๘๘๐	๑๖๗	๔,๕๖๘	๑,๒๕๔ (๑๐๐%)

หมายเหตุ: **Import ในที่นี้ หมายถึง ผู้ป่วยที่มีภูมิลำเนาในภาคภูมิศาสตร์หนึ่ง แต่ไปใช้บริการเครื่องสลายนิ่วที่ตั้งอยู่ในภาคภูมิศาสตร์อื่น*
ที่มา : *วิโรจน์ ตั้งเจริญเสถียร และคณะ, การใช้เครื่องสลายนิ่วในประเทศไทย ประสิทธิภาพและความเสมอภาค, ๒๕๓๗*

กรุงเทพมหานครและปริมณฑลมีผู้ป่วยร้อยละ ๙๗ ที่เดินทางมาจากจังหวัดอื่นๆมารับบริการที่หน่วยสลายนิ่วในเขตกรุงเทพมหานครและปริมณฑล

วิจารณ์

๑. ค่าลงทุนสูง (High cost investment)

เครื่องมือแพทย์เป็นเครื่องมือที่มีการลงทุนสูงมาก ในการให้บริการวินิจฉัยโรคและรักษาพยาบาล ได้แก่ เครื่องเอ็มอาร์ไอมีราคาสูงที่สุด รองลงมาคือ เครื่องเอกซเรย์คอมพิวเตอร์ และเครื่องสลายนิ่ว ส่วนเครื่องแมมโมแกรมราคาไม่สูงมากนัก จึงมีการลงทุนมากในภาคเอกชน แต่อย่างไรก็ตามเครื่องมือแพทย์เหล่านี้ให้ประโยชน์ทางการแพทย์เมื่อมีการใช้อย่างถูกต้องเหมาะสม นอกจากค่าเครื่องที่มีราคาแพงแล้ว ยังต้อง

มีการลงทุนด้านสถานที่ บุคลากร ฯลฯ เช่น ในกรณีของเครื่องเอ็มอาร์ไอ นอกจากค่าลงทุนที่สูงแล้ว ค่าใช้จ่ายในการดำเนินการและค่าดูแลรักษาเครื่องยังสูงด้วย การตัดสินใจลงทุนโดยคำนึงถึงค่าเครื่องอย่างเดียวคงไม่ถูกต้องนัก ดังเช่นในบางโรงพยาบาลรัฐบางแห่งได้รับจัดสรรเครื่อง แต่ไม่มีงบประมาณในการดำเนินการหรือการมีเครื่องในโรงพยาบาลที่ไม่มีรังสีแพทย์เพียงพอ ก็เกิดปัญหาในการลงทุนสูงแต่ใช้ประโยชน์ไม่คุ้มค่า เกิดการสูญเสียทรัพยากรสาธารณสุขและเสียโอกาสในการพัฒนาสาธารณสุขด้านอื่นๆ ซึ่งยังคงเป็นปัญหาใหญ่ของระบบการจัดสรรทรัพยากรอย่างไม่ มีประสิทธิภาพ

๒. การกระจุกตัวอยู่ที่ภาคเอกชน และกรุงเทพมหานคร (Dominate in private sector and concent rate in Bangkok)

เครื่องมือแพทย์ทั้ง ๔ ชนิด มีการกระจุกตัวอยู่ในภาคเอกชน และส่วนใหญ่ติดตั้งอยู่ในกรุงเทพมหานครมากกว่าภาคอื่นๆ จากการไหลเวียนผู้ป่วยที่มารับบริการกับประชาชนรอบๆหน่วยบริการสลายนิ่ว แสดงให้เห็นว่า การกระจายและการใช้เครื่องสลายนิ่วไม่เหมาะกับสภาพปัญหาระบาดวิทยาและความชุกของโรคนิ่วทางเดินปัสสาวะ โดยผู้ป่วยในภูมิภาคอื่นต้องไปรับบริการสถานพยาบาลที่อยู่ในเขตกรุงเทพมหานคร ซึ่งแสดงให้เห็นถึงความไม่เท่าเทียมกันในการจัดสรรทรัพยากรเพื่อการสาธารณสุขในการแก้ปัญหา

จากดัชนีความแตกต่างของเครื่องมือแพทย์เมื่อวัดโดยจำนวนเครื่องต่อล้านประชากรของเครื่องมือแพทย์โดยเทียบกับค่าเฉลี่ยของประเทศที่ติดตั้งในกรุงเทพ-มหานครสูงกว่าที่ติดตั้งในส่วนภูมิภาคในทุกภาค ซึ่งการกระจุกตัวที่ภาคเอกชนและในกรุงเทพมหานครนี้ยังนำไปสู่การกระจุกตัวของแพทย์ผู้เชี่ยวชาญในการใช้เครื่องมือดังกล่าวด้วย ถึงแม้ว่าจะมีการใช้งานที่เหมาะสมและมีประสิทธิภาพ ปัญหาใหญ่ที่ตามมาคือความเสมอภาคในการเข้ารับบริการ ดังนั้นการมีโอกาสเข้าถึงการใช้บริการเครื่องมือแพทย์เหล่านี้น้อยมากสำหรับประชาชนในส่วนภูมิภาค แม้ว่าจะมีความต้องการหรือปัญหาสุขภาพที่เหมือนกัน

๓. การเพิ่มจำนวนอย่างรวดเร็วโดยไม่มีการควบคุม (Rapid increase without control)

การที่เครื่องมือแพทย์ราคาแพงเหล่านี้เพิ่มจำนวนอย่างรวดเร็วน่าจะมีสาเหตุจากปัจจัยต่างๆ ร่วมกันหลายประการ ได้แก่

- กำลังซื้อที่เพิ่มขึ้นของผู้บริโภคและการเจริญเติบโตของบริการรักษาพยาบาลในภาคเอกชน ตลอดจนการเพิ่มจำนวนของโรงพยาบาลเอกชน

- การแข่งขันระหว่างโรงพยาบาล เครื่องมือแพทย์เหล่านี้เป็นการสร้างภาพลักษณ์ของโรงพยาบาล[๙] อันเป็นตัวแทนแสดงถึงคุณภาพที่สื่อไปถึงกลุ่มผู้บริโภคได้ง่ายและชัดเจน ผ่านทางสื่อต่างๆ บิดเบือนการรับรู้ของผู้ป่วยที่มีความจำกัดในการตัดสินคุณภาพของสถานบริการ

- ระบบสุขภาพของไทยโดยเฉพาะภาคเอกชนเป็นอิสระ ขาดการควบคุมราคา อีกทั้งระบบประกันสุขภาพยังมีขนาดเล็กและไม่มีอำนาจหรือไม่มีความสนใจในการกำหนดหรือต่อรองราคา โรงพยาบาลมีแรงจูงใจที่จะซื้อเครื่องและให้บริการเพราะสามารถเก็บค่าบริการตามต้องการเพื่อสร้างผลกำไร

- แพทย์มีแรงจูงใจในการใช้เครื่องมือเหล่านี้ โดยเฉพาะในกลุ่มแพทย์รุ่นใหม่ที่ได้รับการฝึกฝนและเริ่มทำงานในโรงพยาบาลขนาดใหญ่และมีเทคโนโลยีใหม่ๆ ความต้องการของแพทย์ทำให้โรงพยาบาลต้องจัดหาเครื่องมือเหล่านี้เพิ่มมากขึ้น

ความอ่อนแอของภาครัฐ ระบบการควบคุมการกระจายเครื่องมือแพทย์ให้เหมาะสมกับปัญหาและครอบคลุมตามความต้องการของประชาชนยังเป็นระบบตั้งรับ เป็นไปตามกลไกตลาดและการลงทุน กฎหมายที่มีอยู่ยังไม่ได้ครอบคลุมถึงการกระจายการควบคุมประสิทธิภาพและประสิทธิผลการใช้เครื่องมือแพทย์ราคาแพง การแก้ไขพระราชบัญญัติเครื่องมือแพทย์ จะเป็นโอกาสที่สำคัญในการปรับเปลี่ยนบทบาท

ของรัฐในปัจจุบัน แม้กองโรงพยาบาลภูมิภาคที่เป็นหน่วยงานสำคัญในการจัดหาหรือกำหนดหลักเกณฑ์ของโรงพยาบาลที่สมควรมีเครื่องมือแพทย์ราคาแพงในสังกัดกระทรวงสาธารณสุข ยังมีฐานข้อมูลการกระจายที่ไม่ครบถ้วนและไม่ต่อเนื่อง โดยเฉพาะในส่วนของภาครัฐนอกกระทรวงสาธารณสุขและภาคเอกชน จึงควรเร่งรัดให้ประมวลภาพแบบแผนการกระจายของเครื่องมือแพทย์และวางแผนให้สอดคล้องกับปัญหาสาธารณสุขในท้องถิ่น

๔. ผลิตภาพต่ำ (Low productivity)

การขาดการประสานงานระหว่างภาครัฐและภาคเอกชน หรือแม้แต่ภาครัฐด้วยกัน ทำให้สถานพยาบาลแต่ละแห่งพยายามหาเครื่องมือแพทย์เหล่านี้ไว้เป็นเจ้าของ ทำให้ค่าใช้จ่ายด้านการลงทุนทางการแพทย์เพิ่มขึ้นสูงและเพิ่มจำนวนผู้รับบริการโดยไม่จำเป็น จากผลการศึกษาพบว่าในเครื่องมือแพทย์ทั้ง ๔ ชนิดยังมีความสามารถที่จะเพิ่มจำนวนผู้รับบริการต่อเครื่องได้ การมีเครื่องมือจำนวนมากในกรุงเทพมหานคร การแข่งขันโฆษณา อาจส่งผลถึงผู้ป่วยซึ่งมีความรู้ไม่พอ มอบภาระการตัดสินใจให้ขึ้นกับแพทย์หรือโรงพยาบาลที่ให้การรักษา มีผลสร้างความต้องการเทียมในผู้ป่วย (Supplier induced demand) โดยเฉพาะอย่างยิ่งสำหรับเครื่องมือที่ใช้ในการวินิจฉัยโรค โรงพยาบาลและศูนย์เอกชนบางแห่ง ได้ใช้กลไกการตลาดเพื่อเพิ่มจำนวนผู้ใช้บริการ โดยให้ค่าตอบแทนพิเศษ[๔] เป็นการสูญเสียทรัพยากร ขาดประสิทธิภาพในการบริโภค และเป็นความถดถอยทางจริยธรรม

๕. สิทธิประโยชน์ที่ได้รับในระบบประกันแบบต่างๆ (Benefit package)

ผู้มีรายได้น้อย เช่น กลุ่มที่มีบัตรสงเคราะห์ผู้ป่วยรายได้น้อย หรือ ผู้ที่สังคมสมควรช่วยเหลือเกื้อกูล มีโอกาสเข้าถึงการบริการน้อยกว่าผู้มีรายได้สูงและผู้ที่มีสิทธิเบิกค่ารักษาพยาบาล เช่น ข้าราชการ พนักงานรัฐวิสาหกิจ แม้จะมีความต้องการหรือปัญหาสุขภาพที่เหมือนกัน

การกระจายของเครื่องมือแพทย์ราคาแพงอย่างทั่วถึงคงไม่สามารถทำให้การใช้ทรัพยากรทางการแพทย์ให้เป็นไปอย่างมีประสิทธิภาพ ประเด็นที่ควรคำนึง คือ การเลือกใช้หรือสั่งใช้บริการอย่างเหมาะสม มีข้อบ่งชี้ในกลุ่มโรคที่พิสูจน์มีความคุ้มค่า (Cost-effective) โดยผู้ที่จำเป็นใช้เข้าถึงบริการได้ ซึ่งในการศึกษานี้ยังไม่ได้ศึกษาในมุมมองของข้อบ่งชี้การให้บริการของผู้ให้บริการ ที่สำคัญคือเครื่องมือทางนโยบาย (policy options) นโยบายด้านการเงิน (financing policy) ก็เป็นปัจจัยที่ส่งผลทำให้มีการใช้เครื่องอย่างเหมาะสมมากขึ้น

ข้อเสนอแนะเชิงนโยบาย

๑. ควรมีกฎหมายควบคุมจำนวนและการกระจายของเครื่องมือแพทย์ราคาแพงตามเกณฑ์ที่เหมาะสม เช่น การประเมินความต้องการใช้เครื่องมือแพทย์ในแต่ละพื้นที่โดยใช้ฐานความต้องการตามสัดส่วนของประชากร ความชุกอุบัติการของโรค เป็นต้น ซึ่งควรคำนึงถึงรายละเอียดเชิงปฏิบัติการ และศึกษาเพิ่มเติมทั้งในส่วนหน่วยงานที่ดูแล ความเป็นอิสระและความชำนาญในการตัดสินใจ เกณฑ์การคัดเลือกเครื่องมือแพทย์ที่จะเฝ้าระวังควบคุม แผนการทบทวนกรณีที่มีการเปลี่ยนแปลงเทคโนโลยีด้านการรักษาพยาบาลหรือข้อมูลระบาดวิทยาและระบบบริการสุขภาพที่เปลี่ยนแปลงไปในแต่ละช่วงเวลา เป็นต้น

๒. ควรจัดทำเครือข่ายของสถานพยาบาลทั้งในภาครัฐและในภาคเอกชน เพื่อประสานการใช้เครื่องมือร่วมกันในเขตพื้นที่ใกล้เคียง ซื้อบริการระหว่างภาครัฐกับภาครัฐ หรือระหว่างภาครัฐกับภาคเอกชน

๓. ควรกำหนดให้สำนักนโยบายและแผนสาธารณสุข และกองประกอบโรคศิลปะ กระทรวงสาธารณสุข เป็นหน่วยงานที่รับผิดชอบในการจัดเก็บรวบรวมข้อมูล จำนวนเครื่องมือแพทย์ที่ครอบคลุมภาครัฐและเอกชนทุกประเภทให้เป็นข้อมูลที่ทันสมัย ตลอดจนข้อมูลปริมาณการใช้บริการของผู้ป่วย เพื่อเป็นข้อมูลพื้นฐานในการพัฒนานโยบายวางแผนและ

จัดสรรเครื่องมือแพทย์ให้เหมาะกับปัญหาและทั่วถึงประชากรทุกพื้นที่

๔. ควรกำหนด "ข้อกำหนดการใช้" ของเครื่องมือแพทย์แต่ละชนิด และในการส่งตรวจแต่ละครั้ง แพทย์จะต้องมีการบันทึกการส่งตรวจ การตรวจ และผลการตรวจอย่างละเอียด เพื่อประโยชน์ในการตรวจวินิจฉัยและรักษาโรค ตลอดจนป้องกันปัญหาการส่งตรวจไม่เหมาะสมหรือเกินความจำเป็น

๕. ควรมีระบบประกันสุขภาพที่ครอบคลุมประชาชนทุกระดับ อันจะมีผลให้ผู้ยากไร้สามารถเข้าถึงบริการจำเป็นพื้นฐานและบริการเครื่องมือแพทย์ราคาแพงที่มีประสิทธิภาพและประสิทธิผลโดยไม่ติดกับข้อจำกัดด้านการเงิน สำหรับบุคคลที่มีปัญหาสุขภาพเหมือนกัน โดยการกำหนดสิทธิประโยชน์การใช้บริการครอบคลุมเครื่องมือแพทย์แต่ละชนิดและกำหนดราคาที่เหมาะสมและเป็นธรรม

กิตติกรรมประกาศ

ขอขอบคุณ สถาบันวิจัยระบบสาธารณสุขและสำนักงานกองทุนการวิจัย ที่สนับสนุนงบประมาณทางโครงการเมธีวิจัยอาวุโสด้านเศรษฐศาสตร์การคลังสาธารณสุข ทีมวิจัยทุกท่านที่ศึกษาเอกสารที่นำมาประมวลสถานประกอบการจำหน่ายเครื่องมือแพทย์ทั้ง ๔ ชนิด ตลอดจนหน่วยงานทั้งภาครัฐและภาคเอกชนทุกแห่ง ที่ให้ข้อมูลในการทำวิจัย

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Abstract **High Cost Medical Devices in Thailand: Diffusion, Utilization, and Access**

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Without proper management of medical device diffusion and utilization, it tends to create problems in both inefficiency and inequity. These problems were demonstrated through a critical analysis of four high cost medical devices, namely, Extra-corporeal Shock Wave Lithotripter (ESWL), CT scanner, Magnetic Resonance Imaging (MRI) and Mammography during 1994-1999.

General trend emerges, three devices (CT, MRI and mammography) were dominated by private sectors, especially small profit hospitals and stand-alone centres; except the case of public dominated ESWL. Their distribution was determined by economic affluence, favoring Bangkok and Central region; it associated with the pattern of growth of private hospitals during the economic boom or bust. International comparison showed that investment was not rational given Thailand is still a lower income developing country relative to other OECD members.

Utilization was sub-optimal and less than the break-even points. The problems of inefficiency in public settings differed from those of private ones. Unethical market promotion was not uncommon and difficult to filter. Lower income and uninsured showed limited access to these services than the higher income and insured particularly among Civil Servant Medical Benefit Scheme beneficiaries.

Development of compulsory report on diffusion and utilization by owners of these technologies is immediate recommendations. Diffusion must be guided by epidemiological profiles and health needs. A comprehensive reform is required aiming at universal coverage and standardized service package across population groups. National capacity in technology assessment for the design of benefit package is also needed. Introducing close end expenditure and, hence, sending a proper signal for efficiency and cost consciousness is recommended.