

## **Oral Contraceptives and User Satisfaction in Kanchanaburi, Thailand**

Tiwarat Tor.Jarern<sup>1</sup>  
Mahidol University  
Email: cartoon037@gmail.com

Kusol Soonthorndhada  
Mahidol University  
Email: prkst@mahidol.ac.th

**Abstract.** This study aims to identify the factors that affect women who use public and private oral contraceptive services. It also aims to assess user satisfaction among pill users, particularly those who are covered by the 30-Baht card of the Universal Coverage Scheme. 1,234 women of reproductive age from the Kanchanaburi DSS (Round 5, 2004) were studied by using logistic regression to determine factors affecting the selection of family planning providers. More than half of the pill users used private family planning services. These users tended to be have a higher wealth index, live in urban areas, work in the business sector, and have at least a lower secondary education. Choice of the family planning service provider was influenced mostly by the price of the pill, followed by the number of drugstores in the community. Almost all users were satisfied with the family planning services they chose, whether these were public or private. Of the 121 pill users who were covered by the 30-Baht card of the Universal Coverage Scheme in the public sector, most were satisfied with the quality of medicine as well as the services they received from health providers.

**Keywords:** oral contraceptives, user satisfaction, family planning, Thailand

**JEL classifications:** I18, I19, J13, J18

### **1. Introduction**

Family planning programmes have been implemented in Thailand since 1970 with the aim of reducing the population growth rate. As a result, the contraception prevalence rate (CPR) has increased significantly. This indicates that Thailand has met with considerable success in family planning as a substantial decline has been noted in all demographic indicators (Ministry of Public Health, 2003).

Oral contraception is the most popular method of contraception in Thailand. The Thai government has provided oral contraceptives mainly free of charge, and the private sector has supplemented the government in providing contraceptives to eligible couples anytime they needed them. The latter has also made the contraceptives more accessible to potential users.

Since the 1970s, government coordination of family planning has been handled by the Department of Public Health. In 2002, the Ministry of Public Health implemented the 30-Baht “Gold-card” under the Universal Coverage (UC) Scheme. In late 2006, the 30-Baht item became free for all service person working in the military and for all citizens who had no access to any kind of health service or who were uninsured. The budget for family planning, which was formerly managed through the Department of Public Health, has been shifted to each provincial budget management unit for which distribution policies are not met with state family planning policy on free oral contraceptives, but adding up service charge for pill price has been arbitrarily made. Also in the provincial procurement policy, there are limitations on a variety of pills available for client selection. All these have inhibited access by clients to private providers (Kiatying-Angsulee *et al.*, 2003). The alternative service for oral contraceptives then have been private providers namely, drugstores, medical clinics, groceries and convenience stores (Kiatying-Angsulee *et al.*, 2003; IPSR, 2007). Thus, establishing the key factors in the choice between public or private providers, and user satisfaction with the services provided has become a matter of concern (Andersen, 1995).

It is questionable whether the government and private sectors provide effective service for oral contraceptive users, and whether there is any difference in user satisfaction between these two sectors. The satisfaction level in the public sector, which for the last three decades has been the major provider of family planning programme services, is also a matter of interest. The results on satisfaction levels will reflect the impact of the 30-Baht card of the Universal Coverage Scheme. This study, therefore has three objectives. Through the use of the Kanchanaburi Demographic Surveillance System (Kanchanaburi DSS) data, it aims, firstly, to identify the factors that influence women’s choice between public/private providers for obtaining oral contraceptives. Secondly, it aims to assess user satisfaction among pill users, and thirdly, to assess pill users’ satisfaction levels, particularly among those who have the 30-Baht card of the Universal Coverage Scheme.

The Kanchanaburi DSS is generally considered to provide very reliable data. It is a major survey that has been conducted principally by an expert team from Mahidol University, and it has as one of its focal points contraceptive use behaviour in Thailand after the implementation of the Universal Coverage (UC) Scheme. Another reason why the Kanchanaburi province which borders Myanmar in the west has been selected as the area of study is that Kanchanaburi is a remote rural province in the west of Thailand’s central plains, as well as being a province with the region’s lowest population density. The province is the biggest in the central region, excluding Bangkok. It is also the largest in area with the lowest population density (37 per square kilometre). 76.5% of the population mainly lives in rural localities (NSO,

2000). So in some respects, it could represent the extent of underdevelopment and the lack of adequate reproductive health services.

## 2. Background

In 1970, the Thai government declared its first population policy in order to reduce the population growth rate. According to the Evaluation of Health Promotion in the 8<sup>th</sup> National Economic and Social Development Plan (NESDP), the contraception prevalence rate (CPR) had substantially increased from 4 per cent in 1970 to 79 per cent and 81 per cent in 2001 and 2005, respectively (MoPH, 2005). In addition, Total Fertility Rate (TFR) had decreased from 6.3 in 1967 to less than replacement level (1.7 and 1.5 in 2003 and 2005, respectively). The population growth rate had also decreased from 3.3 per cent in 1970 to 0.8 per cent in 2003 (IPSR, 2008; MoPH, 2003; WHO, 2004).

Oral contraception has been the first choice in contraceptive methods since 1993, because it is effective, reversible, convenient, inexpensive, easy to use, and can be easily obtained from drugstores (WHO, 2004). The Kanchanaburi DSS (2004) data showed that the pill was the second most preferred choice among women. The Kanchanaburi DSS 2004 report showed that female sterilization was first choice at 28 per cent, followed by oral and injectable contraceptives (24 per cent and 19 per cent, respectively). However the pill has the highest percentage among temporary methods. The oral contraceptive method is not only available at government facilities such as public hospitals, primary healthcare centres, and mobile clinics, but also at many private facilities, such as drugstores, private hospitals/clinics, grocery stores, and convenience stores (IPSR, 2007).

The factors that affect women's choice of family planning services at primary healthcare centres are: closeness to their homes (44%), convenient transportation (29%), good service (26%), familiarity with such services, that is, having used them before (25%), experienced providers (13%), and inexpensiveness (4%). When compared to private providers who offer varying prices from 15-160 baht per one-cycle package, depending on the kind of drug and dosage (Kiatying-Angsulee *et al.*, 2003), Panyadelok and Chudin (2005) found that family planning clients prefer the public sector.

Steele (2003) argued that women's choice of health facility is determined by demographic and socioeconomic characteristics. The enlarged utilization of private facilities could be because of the increase in demand for contraception or improved private facilities. However, women's choice between public and private facilities could be due to unobserved factors at the community level.

Concerning the different usage of public and private services, it is assumed that enabling factors such as the number of drugstores in the community and place of residence may also play important roles.

### 3. Data and Methods

The Kanchanaburi DSS 2004 was conducted in 100 selected villages in the Kanchanaburi province, Thailand, to observe population change. The villages and census blocks for the Kanchanaburi DSS were selected using a stratified systematic sample design. The primary selection units for rural areas were villages, while those for the urban areas comprised census blocks. The data were collected via structured interviews and three sets of questionnaires administered at the village, household and individual levels. At the household level, data were collected from household heads, and individual data were obtained by interviewing individuals aged 15 and above. This study mainly used the Kanchanaburi DSS data of round 5 (2004), choosing married women of reproductive age (15-49 years old). Altogether, there were 1,234 married women involved. Data regarding demographic, socioeconomic, enabling factors and, the pill price of the last contraceptive service used, and whether the contraceptive was obtained from a public or private provider was collected using an individual level questionnaire. The wealth index was formulated by using the household property as a proxy of economic status. Satisfaction of pill takers was also explored using the Kanchanaburi DSS, and in the case of the 30-Baht card, satisfaction level was identified among those who used 30-Baht card of the UC Scheme in their last utilization of services. Two aspects of services were identified: to learn about the users' satisfaction level, that is healthcare providers, and quality of medicine. Data from the Provincial Health Center (POC, 2008) was used as a proxy variable for the number of drugstores in the community to explain the selection of source of the pill supply in the Kanchanaburi DSS area.

The independent variables were grouped as demographic factors (age of women), socioeconomic factors (occupation, education, household wealth index, place of residence), and enabling factors (number of drugstores in the community and price of the pill) which are categorical variables, while the wealth index was classified into three categories with knots at the 20<sup>th</sup> and 80<sup>th</sup> percentile (poor, moderate and rich).

In terms of user satisfaction, the pill users were asked, "Are you satisfied with the last services you used?" and if the answer was "no", they were asked to explain further. The question on the 30-Baht card of the UC Scheme case was, "From 1st July 2003 till the time of interview, had you ever used the 30-Baht card of the UC Scheme (gold card)?", and only those who answered "yes" were selected. The next consideration was "What were the illnesses/symptoms you experienced when you had treatment using the gold card the last time?" From this question, those among the pill users who had obtained family planning services as part of their last treatment were selected. Finally, the respondents were asked a question about level of satisfaction with

services received from health providers and quality of drugs at their most recent visit.

#### **4. Data Analysis**

Univariate analysis dealt with percentage of the pills used under each variable. It was included in the descriptive statistics used to explore the pill users' satisfaction, particularly among those who had the "30-Baht card of the UC Scheme" and utilized the gold card for their most recent visit for family planning services. In addition, cases in which the samples were dissatisfied were studied in detail. Bivariate analysis used cross-tabulation to depict the relationship between independent and dependent variables. Multivariate analyses using binary logistical regression models were used to determine the independent and non-linear effects of the predictor variables on the outcome variables in order to explain the preferences of current oral contraceptive with regard to the choice of private or public health providers.

#### **5. Limitations**

One limitation of this study was the exclusion of the provision of the pill in emergency situations (morning after pill, post-coital pill) or the use of the pill for objectives other than family planning. Moreover, there are many kinds of oral contraceptives which the Kanchanaburi DSS data has no details about. Some variables had to be constructed through proxy variables such as wealth index and the number of drugstores in the community. So only the price of the family planning product was considered. However, sometimes there would also be service charges (tagged to pill price) which would influence the selection of either public or private providers. Travel time and transportation costs as a part of opportunity cost and total cost should have been taken into account, but these were not available in the Kanchanaburi DSS data. Lastly, the questions on users' satisfaction asked only whether the user was satisfied or not satisfied rather than measuring different levels of satisfaction. However, levels of satisfaction were measured for users of the 30-Baht card of the UC Scheme.

#### **6. Results**

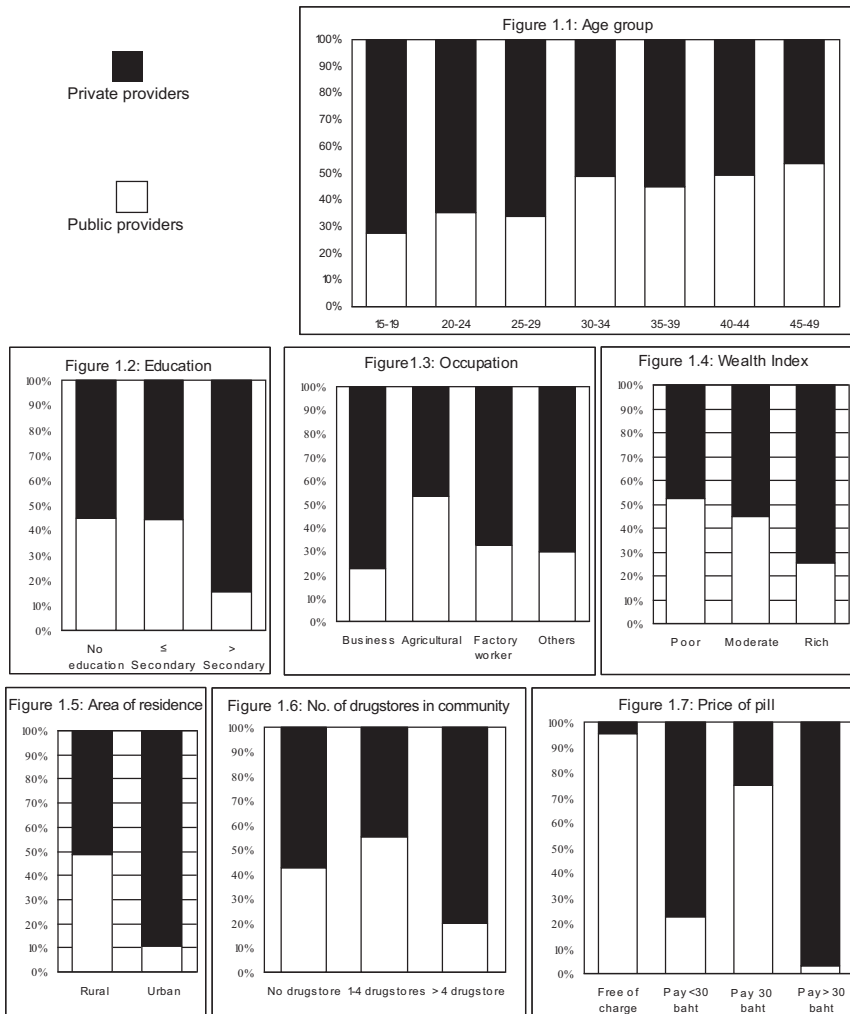
##### ***6.1 Respondents' Characteristics***

Of the sample of 1,234 married women of reproductive age, 58 per cent preferred to obtain oral contraceptives from private providers compared to 42 per cent who preferred the public sector.

*Bivariate Analysis*

The relationship among demographic, socio-economic, and enabling factors, price of the pill at the last visit, and the selection of either public or private oral contraceptive service in the Kanchanaburi DSS is shown in Figure 1. It is clear that with increase in age, the proportion of respondents utilizing services from public providers also increased (Figure 1.1). Women with education higher than secondary school preferred to obtain services from private providers (Figure 1.2). Women in the business sector, factory workers

Figure 1: Private and Public Service Providers, 2004



Source: Compiled from Kanchanaburi DSS data.

and others also tended to obtain the pill from the private sector, while those working in agriculture obtained the pill from public providers (Figure 1.3). In terms of economic status, it was obvious that the wealthier the respondents, the greater the tendency for them to obtain their pill from private providers rather than public providers (Figure 1.4). Nine-tenths of urban residents selected private providers while only half of the rural residents preferred the private sector (Figure 1.5).

Four-fifths of pill users residing in communities with more than 4 drugstores used private family planning services on the last occasion they had procured oral contraceptives (Figure 1.6). According to the pill price, the clients were classified into four groups: free of charge, pay less than 30 baht, pay 30 baht, and pay more than 30 baht. Almost all clients (96%) who got free service and three-fourths of those who paid 30 baht got service from the public sector. On the other hand, three-fourths of pill users who were getting service from the private providers were paying less than 30 baht, and almost all pill users (97%) who could afford to pay more than 30 baht selected private sources (Figure 1.7).

### *Multivariate Analysis*

Logistic regression analysis was used to assess the net effect of background and enabling factors on selecting public or private providers by married women of reproductive age for obtaining oral contraceptives in the study area during 2004. This study entailed four major independent factors which were employed in binary logistic regression and analyzed through four additional models. Model 1 considered only demographic factors, while model 2 included demographic and socioeconomic factors that explain individual characteristics. Model 3 described enabling factors, such as number of drugstores, and urban/rural residence was added. The last model looked into the price of the pill in addition to previous models, and took into account all other factors (see Table 1).

In *model 1*, only the age of the respondents as an independent variable was introduced to determine the association with private or public utilization without controlling for any other factors. The results showed that the increase in age for 1 year reduced the odds of obtaining oral contraceptives at private facilities by 4%.

In *model 2*, three more variables, education, occupation and wealth index, were added. Almost the same pattern was observed for age in significance and magnitude after inclusion of new independent variables. Women with higher than secondary education significantly chose private providers about 1.7 times compared to uneducated women. For occupation, women in the agricultural sector, factory workers, and those working in other occupations

Table 1: The odds ratios of choosing public-private providers, Kanchanaburi, 2004

Variables	Model 1	Model 2	Model 3	Model 4
<b>Demographic factors</b>				
<i>Age of women</i>	0.964***	0.965***	0.968***	0.987
<b>Socioeconomic factors</b>				
<i>Education</i>				
No education		1.000	1.000	1.000
Less than secondary		0.645	0.557	0.669
Higher than secondary		1.682*	1.264**	0.947
<i>Occupation</i>				
Business		1.000	1.000	1.000
Agriculture		0.303***	0.348***	0.354***
Factory worker		0.582*	0.508*	0.495
Other		0.543*	0.479**	0.606
<i>Wealth Index</i>				
Poor		1.000	1.000	1.000
Moderate		1.342	1.272	1.921**
Rich		2.651***	1.778*	2.293**
<b>Enabling Factor</b>				
<i>Area of residence</i>				
Rural			1.000	1.000
Urban			3.080***	3.132**
<i>Number of drugstores in community</i>				
No drugstore				
1-4 drugstores			0.685**	1.145
More than 4 drugstores			1.856**	2.434**
<b>Price of the pill</b>				
Free of charge				1.000
Less than 30 baht			92.365***	
30 baht				8.449***
More than 30 baht			487.039***	
Constant	4.465	10.044	10.364	0.082
-2 log likelihood	1657.79	1544.49	1466.62	870.23
R-square (Cox and Snell R Square)	0.019	0.105	0.160	0.482

Note: Significant level – \*  $p \geq 0.05$ , \*\*  $p \geq 0.01$  and \*\*\*  $p \geq 0.001$ .

Source: Compiled from Kanchanaburi DSS data.



showed significantly less likelihood of choosing private providers for oral contraception compared to those who worked in the business sector. Among women of the richer class, as expected, utilization of private sources for oral contraceptives was 2.7 times higher than for the poor. The explanatory power of the model (R-square) increased with inclusion of new variables.

In *model 3* additional enabling factors, area of residence and number of drugstores in the community were included. The results showed an improvement in the overall explanatory power of the model (R-square = 0.16). Again, almost the same pattern as for previous models (with minute variations) could be observed after controlling for the newly added variables. However, women with high wealth index showed nearly twice as much likelihood (1.8) of choosing a private provider.

Looking at the newly added variables, urban residents were 3 times more likely to use private providers for oral contraception than rural women. As expected, the number of drugstores in the community was significantly associated with choosing private services among women, but there was a lower chance of using the pill when there were less than 4 sources of commercial supplies (0.7). However, the odds of going to a private facility for oral contraception were twice as high if that community had more than 4 drugstores.

With the inclusion of the additional independent variable, that is, the price of the pill, the independent effect of each explanatory variable on the outcome variable is depicted in *model 4*. When other variables were controlled, education was no more significant. As for occupation, only working in agriculture was significant. It is clear that all other independent variables remained consistent in association with the dependent variable, though some little variation occurred among the odds. Interestingly, wealth index showed the higher odds; women with moderate and wealthier economic status were significantly more likely to choose private providers than the poor at about 2 times and 2.3 times, respectively. Price of service for the pill revealed elevated odds (8-487 times) compared to the odds for those who obtained the pill free of charge. This was in line with expectations that women who could pay for the pill would have higher odds of utilizing private provider services over free-of-charge or public services. The fluctuation of odds ratio might be attributable to a few cases where those who used public providers under the UC Scheme had to pay a fee or make a donation to the health facility.

## 6.2 User Satisfaction

This section examines the level of satisfaction expressed by the respondents. Following initial presentation of the results, more comparative assessment is undertaken in this section.

The statistics in Table 2 indicate that almost all respondents (1,234) were satisfied with the services, but this satisfaction was higher for private providers (99.7%) than public providers (98.9%). Though the differences between both providers were not remarkable, the percentage of unsatisfied clients was four times higher for public providers (1.1%) than for private providers (0.3%).

Table 2: User satisfaction of family planning services 2004

Providers	Number	Satisfied	Dissatisfied
Public	523	98.9%	1.1%
Private	711	99.7%	0.3%
Total	1,234	99.4%	0.6%

Source: Compiled from Kanchanaburi DSS data.

#### *Satisfaction and Dissatisfaction of Pill Users between Public and Private Providers*

The table shows that the most satisfied and moderately satisfied level subgroups comprise a very large majority of the respondents. This indicates that public health service by health providers and quality of medicine generally met customer expectations (Table 3).

In the mid 1960's, the private sector had the major share (96%) of the distribution of oral contraceptives. More recently, in the late 1980's, only 30 per cent of the share belonged to the private sector (Chamrathirong and Liunanonchai 1986), which meant the private sector had become less involved in distribution as a result of population and family planning policy (8<sup>th</sup> NESDP). But most recently in 2004, Kanchanaburi DSS data revealed that private providers with 58 per cent of market share were still the majority.

Hanson *et al.* (2001) mention that private services have generally been more accessible to the rich, but that poorer people have been increasingly using the private sector. This trend was confirmed in this study with the

Table 3: Universal coverage scheme user subgroups by level of satisfaction

Providers and Drug Quality	Most satisfied	Moderately satisfied	Less satisfied	Dis-satisfied	Non-reception
Health providers	51.2%	42.1%	1.7%	3.3%	1.7%
Quality of drugs	54.5%	43.0%	0.8%	1.7%	0.0%
Total	52.9%	42.6%	1.3%	2.5%	0.9%

Source: Compiled from Kanchanaburi DSS data.

significantly high prevalence rate of 74% of the rich using the private sector. At the same time, this study also found that an increasingly high number of the poor (48%) also turned to the private sector. Understanding the reason for this trend of a shift to the private sector requires further study.

Public-private partnership is important for people in order to improve the availability of oral contraceptive services. Those who have purchasing power can have more choices to access oral contraceptive services in the private sector, and at the same time, others who have no purchasing power can access oral contraceptives in the public sector without any charges (USAID, 2006). The results from this study confirm that the rich tend to choose the private sector more than double to the rate of the poor. In addition, urban women tended to use private providers at a rate 3 times higher than rural women; this might be due to there being a substantially higher number of drugstores in urban areas. Those who had the ability to pay for services preferred to choose the private sector. The low price of medicine leads clients to a perception that oral contraceptives received free of charge from public providers are of poor quality (IRIN, 2007; Suebwonglee, 2004).

With regard to oral contraceptives of user satisfaction between public and private providers, the results of our study revealed that there is no significant difference between both sectors. In a related study carried out by Panyadelok and Chunin (2005), a survey on user satisfaction level between public and private providers which focused on all modes of family planning services through a selection of sample from the public (health stations), revealed more satisfaction level on public providers. Since the question of satisfaction in their study involved more than just oral contraceptives, but also implantation, female sterilization, injectable contraceptives, and IUDs. Thus, all of these variables might have acted as confounding factors that created more clients propensity to public providers.

## 7. Conclusions and Recommendations

This study aimed to identify the factors that affect women's choice of public or private oral contraceptive services, and also to assess user satisfaction, particularly among those who were covered by the 30-Baht card of the UC Scheme. The findings suggest that the private sector was the major service provider for oral contraception in the Kanchanaburi DSS area during 2004. Bivariate results indicated that younger women, those with higher education, and those working in the business sector preferred to choose private providers. Women in the higher strata of the wealth index tended to use private service providers more than women in lower strata. Interestingly, the proportion of rural women who utilized private services was greater than the proportion of urban women using them. The presence of drugstores was also associated

with choosing private providers, whereas free-of-charge services for oral contraception were associated with public providers.

The independent effect of predictor variables, after controlling for other factors, suggests that there was no difference in choice of public or private provider when considering women's ages. Women with no education and having business were more likely to obtain service from private providers. As expected, women in the higher wealth index and living in urban areas were significantly more likely to choose private providers. The public sector attracted a large proportion of the pill users for free-of-charge service, while the users who could afford to pay were significantly associated with utilization of private services.

Finally, keeping in view the background characteristics of the respondents and other factors, it can be concluded that women were more likely to choose private sector providers as compared to public sector ones, though the satisfaction level among the pill users was not much different when comparing between public and private service utilization.

Policy makers should consider a public-private partnership to increase accessibility and availability to pill users. The joint venture of both sectors should focus on providing other kinds of family planning methods as well.

Pending further study, these findings can be extended to adolescent girls and unmarried women in the community who also use oral contraceptives for prevention of pregnancy. The government should promote knowledge that increases the awareness of public and private provision of services.

While the standard of quality of care varies between the public and private sectors, the difference is not great. However, more focus should be given to the quality of care. Both providers should inform pill users with due diligence about the side effects, the proper methods to use the pill, contraindications, and other necessary information.

## Note

1. Corresponding author. I would like to thank the Wellcome Trust, London, United Kingdom for the funding, and the Institute for Population and Social Research (IPSR), Mahidol University, for providing me with a scholarship and permitting me to use the Kanchanaburi DSS data for analysis in this paper. I would also like to thank Associate Prof. Kusol Soonthorndhada and my father, Chairat Tor.Jarern for their support and advice in the development of this paper

## References

- Andersen, R.M. (1995) "Revisiting the Behavioral Model and Access to Medical Care: Does it Matter", *Journal of Health and Social Behavior*, 36(1): 1-10.
- Chamratrithirong, A. and Liunanonchai, M. (1986) *Statistics on Contraceptive Service Utilization and Accessibility from Public and Private Facilities in Thailand: From*

- the Study on Contraceptive Practice in Thailand in 1984*, Institute for Population and Social Research, Mahidol University, Nakhon Phthom (in Thai).
- Hanson, K., Kumaranayake, L. and Thomas, I. (2001) "Ends versus Means: The Role of Markets in Expanding Access to Contraceptives", *Health Policy and Planning*, 16(2): 127.
- Institute for Population and Social Research (IPSR) (2007) *Report of Baseline Survey (2004) (Round 5)*, Mahidol University Thailand. Nakhon Pathom: Institute for Population and Social Research, Mahidol University.
- Institute for Population and Social Research (IPSR) (2008) *Mahidol Population Gazette*, Mahidol University (vol. 17).
- Integrated Regional Information Networks (IRIN) (2007) *SYRIA: Demand for Health Care Soars as Spending Shrinks*, IRIN humanitarian news and analysis, UN Office for the Coordination of Humanitarian Affairs, November 21, Retrieved 26 August 2008, from <http://www.irinnews.org/report.aspx?ReportId=75423>
- Kiatying-Angsulee, N., T.chaisumritchoke, S., Amrumpai, Y., Chanthapasa, K. and Jamniandamrongkarn, S. (2003) *Drug System and Women Health: A Case Study of Contraceptives*, Chulalongkorn, Faculty of Pharmaceutical Science, Chulalongkorn University, Thailand (in Thai).
- Ministry of Public Health (MoPH) (2003) *Thailand Reproductive Health Profile: Chapter III: Reproductive Health Situation and Problems, Policies, Programme Implementation and Research Needs*, World Health Organization.
- Ministry of Public Health (MoPH) (2005) *Statistics: Indicator and Situation of Reproductive Health*, Reproductive Health Division.
- National Statistical Office (NSO) of Thailand (2000) *Preliminary Report: The 2000 Population and Housing Census*, Office of the Prime Minister, retrieved 9 June 2008, from <http://web.nso.go.th/eng/en/pop2000/report/prelim.pdf>
- Panyadelok, S. and Chunin, R. (2005) *Customer Satisfaction of Family Planning Program*, Reproductive Health Division, Department of Health, Ministry of Public Health (in Thai).
- Provincial Operation Center (POC) of Kanchanaburi (2008) *Number of Drugstores in Province*, Kanchanaburi Provincial Health Office, July. Provincial Operation Center version v10.5 FINAL 31/5/2549. Retrieved 8 June 2008, from [http://61.7.153.155/kanchanaburi\\_poc/report/sar/report/report.php?id=sm020401&headName=สารกรรณเสข](http://61.7.153.155/kanchanaburi_poc/report/sar/report/report.php?id=sm020401&headName=สารกรรณเสข) (in Thai).
- Suebwonglee, S. (2004) "Academic Seminar on Public Health Policy", *Nurse*, 24 June, Faculty of Nursing, Mahasarakham University (in Thai).
- Steele, F. (2003) "Selection Effects of Source of Contraceptive Supply in an Analysis of Discontinuation of Contraception: Multilevel Modeling when Random Effects are Correlated with an Explanatory Variable", *Journal of the Royal Statistical Society*, Series A, Royal Statistical Society, 127(3): 407-423.
- United States Agency of International Development (USAID) (2006) *Private Provider Networks: The Role of Viability in Expanding the Supply of Reproductive Health and Family Planning Services*, Technical Report no.3. Maryland. Retrieved 8 May 2008, [www.abtassociates.com/reports/private\\_provider\\_networks\\_0406.pdf](http://www.abtassociates.com/reports/private_provider_networks_0406.pdf)
- World Health Organization (WHO) (2004) *Thailand and Family Planning: An Overview*. Department of Family and Community Health, Geneva.