Health Policy 103 (2011) 228–235

Contents lists available at SciVerse ScienceDirect

Health Policy

journal homepage: www.elsevier.com/locate/healthpol

Impact of Universal Health Care Coverage on patient demand for health care services in Thailand

Jirawat Panpiemras[a], Thitima Puttitanun[b], Krislert Samphantharak[c,*], Kannika Thampanishvong[a,d]

[a] Thailand Development Research Institute, Bangkok 10310, Thailand
[b] Department of Economics, San Diego State University, San Diego, CA 92182, United States
[c] School of International Relations and Pacific Studies, University of California, San Diego, CA 92093-0519, United States
[d] School of Economics and Finance, University of St Andrews, St Andrews KY16 9AL, United Kingdom

ARTICLE INFO

Keywords:
Universal coverage
Health care utilization
Capitation
Payment mechanism
Thailand

ABSTRACT

Fully implemented in Thailand in 2002, the Universal Health Care Coverage (UC) Program aimed to provide cheap access to health care services, for 30 baht (less than 1 U.S. dollar) per visit, to all uninsured Thais. In this paper, we studied the impact of the UC in Thailand on the demand for health care services using hospital level data. We found that the UC program was successful in increasing outpatient demand for health care, particularly the demand from the elderly and the poor. However, outpatient demand for health care dramatically increased during the first year of the program and faded away quickly in subsequent years. In contrast to outpatient demand, the number of inpatient visits and the number of days for which the inpatients were admitted at hospitals declined after the UC program was launched. In this paper, we offer our explanation of these phenomena, highlight problems associated with the UC program, and provide policy recommendations to improve the program.

Published by Elsevier Ireland Ltd.

1. Introduction

Thailand's Universal Health Care Coverage (UC) Program, also known as the 30 Baht Program, was one of the first Universal Health Care Coverage programs provided in a developing country. Under this program, a patient generally paid 30 baht per visit to a participating health care service unit regardless of the actual total cost of the treatment.[1] In this paper, we evaluate the impact of the UC scheme on health care service utilization. Our hypothesis is as follows: provided that the supply of health care services is inelastic in the short run, any change in health care services is driven by the demand side. Given this hypothesis, we applied an econometric analysis to investigate how the implementation of the UC scheme affects patient demand for health care services in public hospitals. The results from this study highlight the problems encountered by the UC scheme, the key obstacles associated with the scheme, and some policy recommendations to improve its effectiveness.

2. Universal Health Care Coverage in Thailand

Since the Third National Economic Development Plan (1972–1976), Thailand has embraced the policy of expanding access to health care among the poor [1]. From the 1970s to 2001, the Thai government introduced various health insurance schemes. In the 1970s, the two main publicly subsidized health insurance schemes targeting the poor were Medical Welfare Scheme (MWS) and Type

* Corresponding author.
E-mail address: krislert@ucsd.edu (K. Samphantharak).

[1] 30 baht is approximately 0.70 U.S. dollar, using the exchange rate in 2002.

0168-8510/$ – see front matter. Published by Elsevier Ireland Ltd.
doi:10.1016/j.healthpol.2011.08.008

B Fee Exemption Scheme. Started in 1975, the former provided health insurance to those below the poverty line and to the disadvantaged population at no charge. Under the Type B Fee Exemption Scheme, started a few years later, low-income individuals who were not covered by any other health insurance schemes had their fees for medical care waived at the discretion of public health personnel. In addition to these two schemes, the Ministry of Public Health (MoPH) introduced the Health Card Scheme (HCS), a voluntary public health insurance scheme for the non-poor or those who were not eligible for MWS.[2] By the 1990s, public employees and workers in relatively large enterprises in the private sector were covered under the separate schemes. The Civil Servant Medical Benefit Scheme (CSMBS), launched in 1980, has provided comprehensive health insurance for civil servants and their dependents, while the Social Security Scheme, started in 1990, has provided health care to formal-sector employees working in the private sector. Although there were several insurance programs during the 1990s, a large portion of the Thai population was still uninsured.

To fill the gap left by the existing public health insurance schemes described above, in 2001 the government launched its pilot project of the Universal Health Care Coverage (UC) Program, also known as the 30-Baht Program, in six provinces (Payao, Nakornsawan, Patumthani, Yasothorn, Samutsakorn, and Yala) [2]. The UC scheme superseded the HCS, MWS, and Type B Exemption schemes and extended coverage to the entire registered population except those who were beneficiaries of CSMBS and the Social Security Scheme [3]. Under the UC scheme, uninsured patients received medical treatment for a copayment of 30 baht per visit[3] regardless of the actual cost [4]. To use this service, eligible individuals need to register with the local contracted unit for primary care (CUP), which typically are community hospitals and networks of primary care units (PCUs) or health centers in their area of residence.[4] The patients are required to receive services at their registered CUP first. Access to other CUPs or provincial hospitals where a patient is not registered requires a referral from the patient's registered CUP, except in the case of emergencies. Participation of public health care units in the UC scheme is mandatory, while private providers' participation is optional. The amount of private uptake has been insignificant [5].

Under the UC scheme, drug prescriptions for patients are limited to those on a national list (most of the listed drugs are generics). Treatments for patients suffering from high-cost or chronic diseases are prohibited or subject to cost ceilings.[5] The service package under this scheme included most health services, with the exception of cosmetic care, infertility treatment, organ transplant, and hemodialysis or antiretroviral therapy (ART) [4].[6]

In 2002, despite advice from senior economists in favor of gradual implementation over three years, MoPH refomers and the prime minister (eager to keep election promises) decided to quickly implement the UC scheme in all of Thailand's 76 provinces [4]. After full implementation, the percentage of those insured increased from 40% of the population in 2001 to around 97% in 2002 and has stayed around that level since then, with more than 74% of the population being covered by the UC scheme [5], [6]. Although the rapid expansion of coverage was seen as a major success, problems such as low quality of care, insufficient funding, and lack of health care personnel in some hospitals were eventually uncovered.[7]

The main source of financing for the UC scheme is from general tax revenues. The funding is channeled via the National Health Security Office (NHSO), which is the central purchasing agency, to the local contracted units for primary care (CUPs).[8] The CUPs receive an annual capitation-based budget, according to the size of their registered population, to provide services to the registered population and to pay for hospital referrals.[9] In 2001, an annual capitation budget was set at 1202 Thai baht per insured member, an amount that was widely viewed by experts as insufficient and that could compromise the quality of care provided to UC patients (see [1,4,7] among others). Therefore, through annual increments, the capitation budget was increased to 2202 baht in 2009. Initially, the capitation payment was a per-head figure, but in 2002/2003, an adjustment was made for population-age structure. In general, the capitation budget was divided at the Provincial Health Offices (PHOs) and CUP levels in the following manner [3]. Part of the budget was channeled to finance outpatient care in district and provincial hospitals, as well as promotion/prevention services in district hospitals and health centers. Another portion of the capitation budget was devoted to inpatient treatments and used for supporting admission of patients to both district and general hospitals at the applicable diagnosis-related group (DRG) rate. Last but not least, for high-cost treatments and emergencies, funding came from the center (NHSO).

In an early stage of the UC, when the capitation-funding model was not yet settled, two funding models (inclusive and exclusive models) were used throughout the country. Under the inclusive model, Provincial Health Offices (PHOs) passed on the bulk of the UC budget to the CUPs,

[2] At the insurance premium cost of 500 baht/year, each household (up to five persons) can enroll in the program.

[3] The co-payment of 30 Thai baht per chargeable episode was discontinued in 2006.

[4] Individuals are allowed to register only in the CUP located in the district where they have proof of residence. In the UC scheme registration process, each individual needs to provide house registration documents. Members receive a gold card, entitling them to treatment in their registered CUP.

[5] Some of the constraints on the high-cost and chronic disease treatments have recently been relaxed. More budgetary funds are allocated to hospitals to cover the expenditures of some expensive treatments.

[6] Treatments for anti-retroviral therapy and hemodialysis were later brought into the UC scheme.

[7] See [4,8,9], among others.

[8] At the beginning of the UC scheme, the Ministry of Public Finance (MoPH) administered all the purchasing. After 2002, the NHSO has gradually taken over the purchasing role.

[9] The capitation budget is the aggregated allocation based on capitation rate multiplied by registered population, minus top-slicing [3].

and the CUPs were in charge of determining how to spend the money. Under the exclusive model, the PHO held the inpatient budget, and the CUPs distributed the budget for outpatient and inpatient work. In 2003, the exclusive funding model was uniformly adopted throughout the country. The salary budget was held at the Ministry level, and the UC funding allocated to the CUPs was significantly reduced, comprising only the outpatient and promotion/prevention funds (see [3] for details).

As explained at length in [3], the exclusive funding model caused both macro- and micro-allocation problems. The macro-allocation problem concerned the impact of the UC regime on capitation. On one hand, the UC scheme caused some CUPs in poorly populated provinces to end up having plenty of money but very few doctors and health personnel, causing tremendous workload burdens.[10] On the other hand, many large hospitals, particularly supertertiary hospitals in the Bangkok area, were in deficit, and many of them were unable to cover salary costs. The micro-allocation problem concerned how the CUPs distributed the budget within the local health system, which involved both upstream flow of funds to secondary care and downstream flow to primary care units (PCUs) and health care units. Regarding the upstream problem, in the first year of the UC scheme some district hospitals reportedly held on to patients to retain capitation funding that would have been reduced by the cost of referral to provincial hospitals. The downstream problem concerned the limited and unfair allocation of the funding from the CUPs to the PCUs or health centers.

Under the UC scheme, most UC patients' health care costs were reduced to 30 baht per visit.[11] Therefore, it is intuitive to hypothesize that such cost reduction in using health care services would lead to changes in patient behavior. However, the effect of the UC on the utilization of health care is not clear-cut. For outpatients, on one hand, cost reduction could induce an increase in the demand for health care services. On the other hand, the insufficient capitation payment could imply a lower quality of health care service, leading to a lower demand for health care services. For inpatients, on one hand, a lower cost of health care clearly induces more demand. However, given the fact that the hospitals receive a payment at the DRG rate, the hospitals have an incentive to control costs by reducing unnecessary admissions, treatments, and stays. In addition, some patients might view these practices as a reduction in the quality of services and thus might decide to switch to higher quality and more expensive private hospitals. In both cases, the impact of the UC program depends on the magnitude of the two offsetting forces; therefore, it is an empirical question.

Regarding the impact of the UC scheme on the demand side, there are several studies reporting how patients have been affected. In [11], household surveys were conducted in various Thai provinces; the survey results revealed that the UC scheme did not lead to an increase in the number of patient visits, due to patients' concerns over the waiting time and their doubts regarding the quality of services provided by the health care providers. This result was, however, challenged by [12], which showed that there was a substantial increase in health care services during 2001–2002. The disparity in the findings is possibly due to the fact that these studies only reported simple findings from the surveys without statistically controlling for factors such as demographic and economic determinants of demand for health care. Therefore, a more systematic analysis is needed.

3. An analysis at the hospital level

3.1. Data

The data used in this paper is at the hospital level. We restricted our samples to 640 public hospitals across Thailand and covered both district[12] (small) and provincial or general (large) hospitals with complete data for 1998-2006.[13] As mentioned earlier, all public hospitals were required to participate in the UC scheme, and private participation was minimal. Therefore, our sample covers most public hospitals and thus is extensive enough to enable us to capture the national impact of the UC scheme. Data on the number of outpatients, the frequency of their visits, the number of inpatients, and their length of stay at the public hospitals, and the number of beds were obtained from Thailand's Ministry of Public Health (MoPH) database. The district-level population data came from the Ministry of Interior, while the data on real income per capita at the district level (with the year 2004 as the base year) was obtained from the Thailand Poverty Map database and the National Economic and Social Development Board (NESDB). To control for a change in age structure, we created a proxy of the elderly population at the district level by multiplying the population in a district by the ratio of the elderly to total population in a corresponding province (collected from the NESDB). In effect, we assumed that all districts within the same province have the same ratio of elderly in the population. Nonetheless, our proxy should, to some extent, capture the variation in elderly population across districts. Regarding the epidemiologic effect, during the years covered in our study there was only one noteworthy pandemic disease,[14] dengue fever, reported in several

[10] Some facilities have enough money to hire more staff, which could lead to a more even distribution of workforce among hospitals in richly and poorly populated areas in the long run. However, the influx of foreign patients to private hospitals in Thailand since 2002 has induced an internal brain drain of health professionals (from public to private) and made it difficult for the small public hospitals to hire new health professionals [10].

[11] Former HCS members (those with the Taw Tahan version of the UC gold card) continued to be exempted from payment.

[12] A district is an administrative division within a province.

[13] The dropped hospitals include hospitals under the supervision of other government agencies than the Ministry of Public Health, such as military and university hospitals.

[14] Based on the report from Thailand's Bureau of Epidemiology, other diseases such as HIV/AIDS had a stable morbidity rate during the length of our study. The severity of the pandemics of dengue fever that occurred during the period of study is ranked among the top four most severe pandemics in the last five decades.

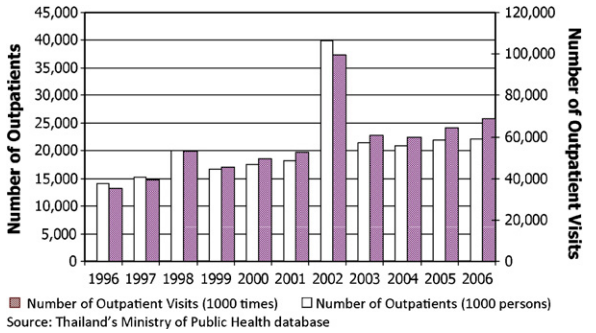

Fig. 1. Number of outpatients and outpatient visits from 1996 to 2006.

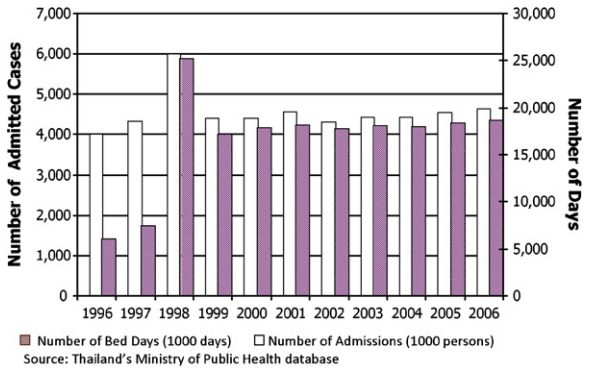

Fig. 2. Number of admissions and bed days from 1996 to 2006.

areas in Thailand. We collect this data from the Bureau of Epidemiology, Ministry of Public Health.

Fig. 1 shows the number of outpatients and the frequency of their visits during 1996–2006. It can be seen from the figure that these numbers gradually increased before the UC scheme was fully implemented in 2002, with the figures in 1998 a little higher than the figures for other years. After the UC scheme was fully launched nationwide, the number of outpatients (OPD) and outpatient visits increased substantially compared to earlier years. Specifically, the number of outpatients increased from 18 million in 2001 to approximately 40 million in 2002, while the number of OPD visits increased from 52.7 million in 2001 to 99.4 million in 2002. However, both the number of outpatients and the OPD visits dropped in 2003. One reason the increase in the number of outpatients and the OPD visits faded away quickly after full implementation of the scheme is because when outpatient demand for health care services skyrocketed after the UC scheme was fully launched, they started to experience long queuing times and a deterioration in the quality of health care services, causing many outpatients to switch to other alternatives such as private hospitals that did not participate in the UC scheme.

Fig. 2 shows the number of hospital admissions and the number of days inpatients were admitted for at the participating hospitals during 1996–2006. There were only small changes in the number of hospital admissions during 1996–2006; the figure in 1998 was the only exception. Relative to 1997, the number of inpatients in 1998 increased by 38%; however, it subsequently declined by 26%.[15] After the UC scheme was fully implemented in 2002, the number of admissions declined slightly but then subsequently increased by a small amount. A similar pattern was found in the number of days for which the inpatients were admitted.

3.2. The model

We adopted a fixed effect (hospital-specific effect) model with cluster robust standard errors with the following model specification:

$$X_{it} = \alpha_{it} + \beta_1 UC_t + \beta_2 bed_{it} + \beta_3 inccap_{jt} + \beta_4 pop_{jt} + \beta_5 old_{jt} + \beta_6 dhf_{jt} + \beta_7 trend_t + \beta_8 trendsq_t + \beta_9 bed_{it} * UC_t + \beta_{10} inccap_{jt} * UC_t + \beta_{11} old_{jt} * UC_t + \varepsilon_{it} \quad (1)$$

where X_{it} denotes each of the four outcome variables for hospital i in year t, which include the number of outpatients (OPD_{it}), the number of outpatient visits ($OPDvisit_{it}$), the number of admissions (IPD_{it}), and the number of days for which the inpatients were admitted (LOS_{it}). UC_t is a dummy variable that takes the value of one when the UC scheme was in place (the year 2001 and forward for the six pilot provinces, and the year 2002 and forward for the rest of the provinces in Thailand) and zero if otherwise; bed_{it} denotes the number of beds in hospital i in year t; $inccap_{jt}$ and pop_{jt} denote the real income per capita of district j in year t (in 1000 baht) and the size of the population of district j in year t, respectively (district j is the district where hospital i is located); old_{jt} denotes the elderly population (age 60 and over) in district j in year t; dhf_{jt} is a dummy variable that takes the value of one if district j experienced the dengue fever pandemic in year t. We controlled for possible time trend by adding trend and trend squared variables in our model. We also added interaction variables to capture the heterogeneity of the impacts of the UCs as follows: $bed_{it}{}^{*}UC_t$ is the interaction between bed_{it} and UC_t; $inccap_{jt}{}^{*}UC_t$ is the interaction between $inccap_{jt}$ and UC_t; $old_{jt}{}^{*}UC_t$ is the interaction between old_{jt} and UC_t. All variables except the dummy variables are in log form. The summary statistics are provided in Table 1.

3.3. Results

Table 2 reports the results of the regression analysis at the hospital level. The UC dummy coefficients in the equations for both the number of outpatients and OPD visits are positive and statistically significant. The number of outpatients increased by 55.98%, while the outpatient visits increased by 41.34% after the UC program was implemented.[16] The results suggest that the UC program, which reduced patients' health care services costs, increased outpatient demand for health care services.

[15] The data shows that the number of days for which inpatients were admitted at hospitals in 1996 and 1997 was unusually low.

[16] The total effect of the UC program is calculated from the estimated coefficients in the models with interaction terms (columns 2 and 4) using the mean values of bed_{it}, $inccap_{jt}$, and old_{jt}. The F-test indicates that UC_t and its interaction terms are jointly significant at the 1% level in both models.

Table 1
Summary statistics at the hospital level.

Variables	No. of observations	Mean	Standard deviation	Minimum	Maximum
OPD_{it}	5760	34322.66	36106.51	771	365563
$OPDvisit_{it}$	5760	95752.02	93859.94	2259	755835
IPD_{it}	5760	7206.63	10622.45	69	141940
LOS_{it}	5760	29218.23	54754.55	173	579550
bed_{it}	5760	88.42	145.85	10	1000
$inccap_{jt}$	5760	3330.83	1427.04	987.21	12518.49
pop_{jt}	5760	65693.21	50958.58	1659	469535
old_{jt}	5760	6482.02	4902.06	123	37250
dhf_{jt}	5760	0.0455	0.2084	0	1

Table 2
Results of the analysis at the hospital level.

	OPD_{it}		$OPDvisit_{it}$		IPD_{it}		LOS_{it}	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	7.0291**	5.3134*	8.0678***	7.6624***	3.3580*	3.2236*	1.8796	1.2334
	(3.0768)	(3.1622)	(1.8694)	(1.8877)	(1.8528)	(1.7812)	(2.1696)	(2.1503)
UC_t	0.5642***	0.2118	0.4158***	0.4761	−0.0513***	−0.0384	−0.0801***	−0.6267*
	(0.0260)	(0.6160)	(0.0146)	(0.3138)	(0.0122)	(0.3315)	(0.0148)	(0.3800)
bed_{it}	0.1928***	0.2114***	0.1732***	0.1933***	0.1217***	0.1588***	0.1687***	0.1888***
	(0.0470)	(0.0492)	(0.0275)	(0.0282)	(0.0302)	(0.0311)	(0.0369)	(0.0381)
$inccap_{jt}$	−0.1967*	−0.1574	−0.1049	−0.0886	−0.0069	−0.0023	0.0307	0.0245
	(0.1156)	(0.1209)	(0.0672)	(0.0713)	(0.0548)	(0.0568)	(0.0646)	(0.0683)
pop_{jt}	0.3996*	0.5426**	0.3602***	0.3897***	0.5513***	0.5412***	0.6873***	0.7160***
	(0.2126)	(0.2178)	(0.1250)	(0.1298)	(0.1191)	(0.1173)	(0.1437)	(0.1428)
old_{jt}	−0.0589	−0.0785	−0.0889	−0.0999	−0.1324	−0.1265	−0.0734	−0.0453
	(0.1613)	(0.1624)	(0.0980)	(0.0974)	(0.1125)	(0.1088)	(0.1210)	(0.1189)
dhf_{jt}	0.1310***	0.1218***	0.0922***	0.0900***	0.0801***	0.0797***	0.0827***	0.0800***
	(0.0267)	(0.0268)	(0.0185)	(0.0185)	(0.0146)	(0.0145)	(0.0167)	(0.0167)
$trend_t$	0.0318***	0.0331**	0.0878***	0.0886***	0.0328***	0.0326***	0.0533***	0.0516***
	(0.0163)	(0.0161)	(0.0108)	(0.0107)	(0.0118)	(0.0114)	(0.0132)	(0.0129)
$trendsq_t$	−0.0088***	−0.0091***	−0.0099***	−0.0100***	−0.0019**	−0.0020***	−0.0042***	−0.0043***
	(0.0012)	(0.0012)	(0.0008)	(0.0007)	(0.0008)	(0.0008)	(0.0009)	(0.0009)
$bed_{it}{}^{*}UC_t$	–	−0.0360**	–	−0.0358***	–	−0.0645***	–	−0.0357***
		(0.0164)		(0.0098)		(0.0102)		(0.0117)
$inccap_{jt}{}^{*}UC_t$	–	−0.0377	–	−0.0070	–	0.0247	–	0.0309
		(0.0495)		(0.0292)		(0.0309)		(0.0353)
$old_{jt}{}^{*}UC_t$	–	0.0704**	–	0.0117	–	0.0032	–	0.0389*
		(0.0321)		(0.0163)		(0.0170)		(0.0200)
No. of obs.	5760	5760	5760	5760	5760	5760	5760	5760
R-squared	0.1836	0.1880	0.3750	0.3783	0.0273	0.0502	0.0335	0.0401

* Denotes 10% level of significance.
** Denotes 5% level of significance.
*** Denotes 1% level of significance.
Cluster robust standard errors are in parentheses.

However, such increases were lower in larger hospitals (as can be seen from negatively significant coefficients on the interaction term $bed_{it}{}^{*}UC_t$ in columns 2 and 4). This finding is consistent with the fact that patients are required to visit the CUPs (smaller hospitals) first. In addition, some CUPs may be reluctant to transfer patients to larger hospitals in order to keep the UC budget within the CUPs.[17]

However, a similar result was not found for inpatients. The UC dummy coefficients for IPD_{it} and LOS_{it} are negative and statistically significant, indicating that the number of inpatient visits and the number of days for which the inpatients were admitted at hospitals declined after the UC program was launched. As mentioned earlier, the net impact of the UC scheme on inpatient demand for health care services depends on the two offsetting forces created by the patients and the hospitals. The results shown in Table 2 suggest that even though inpatient demand for health care services might have increased due to cost reduction through the UC scheme, it was outweighed by the offsetting impacts resulting from the hospitals' incentive to control the cost of the inpatients' care. Noticeably, the decrease in both number of inpatients and the number of days for which the inpatients were admitted at the larger hospitals were higher than at the smaller hospitals (as shown by the negatively significant coefficients of the interaction term $bed_{it}{}^{*}UC_t$ in columns 6 and 8). One possible reason is that the larger hospitals might incur higher

[17] As a robustness check, we replaced the number of beds with the type of hospital. There are five types: central hospitals, general hospitals with more than 300 beds, general hospital with no more than 300 beds, community hospitals with more than 30 beds, and community hospitals with no more than 30 beds. The results remain unchanged. Results are available upon request.

costs of inpatient care compared to smaller hospitals and thus might have a stronger incentive to control costs.

For other control variables, bed_{it}, a proxy for hospital size, and pop_{jt} are positive and statistically significant in all model specifications, showing that the larger hospitals, as well as those located in highly populated areas, face higher demand for health care services than other areas. As expected, the pandemic variable, dhf_{jt}, is positive and statistically significant in all models. The hospitals in the areas that reportedly had the dengue fever pandemic experienced higher numbers of outpatients, outpatient visits and inpatients, and longer inpatient stays, compared to hospitals in areas that had no such pandemic.

The coefficients for $inccap_{jt}$ in columns 1 and 3 are negatively significant, indicating that hospitals in areas with lower average income tended to have higher outpatient numbers and more visits. These results suggest that utilization of the public hospitals can be viewed as an inferior good rather than a normal good, as richer people opt to go to private hospitals rather than public hospitals to avoid the longer waiting times or to receive better services. Another interesting result is the negatively significant interaction term $inccap_{jt}{}^{*}UC_t$ in column 2, which shows that after the UC program was implemented, hospitals in lower income areas experienced more outpatients than those in higher income areas. This result suggests that the UC program was successful in reaching the poor population, granting them more access to health care. Consistent with [13] and [14], the coefficients for $inccap_{jt}$ are relatively small, suggesting that health care service was a necessity good in the sense that the change in outpatient demand for health care is not very responsive to the change in income. The variable $inccap_{jt}$ does not have any effect on the number of inpatients or their length of stay in the hospitals, as both are largely dependent on physician discretion.

Regarding the demographic variable, old_{jt} is negative and statistically significant in all models except for the number of outpatients. The larger elderly population in a given district is associated with the smaller overall demand for health care services in the hospitals in that district. The results imply that the elderly might face more barriers to accessing health care services compared to others. The likely barriers include transportation cost, distance to the hospital, poor road conditions, and lack of public transportation, particularly in rural areas.[18] However, the coefficients for interaction term $old_{jt}{}^{*}UC_t$ are positive and statistically significant in all models. This result implies that the UC program was successful in reaching out to the elderly, as it created higher demand for health care in the areas with larger numbers of elderly. The UC program provided the elderly more access to health care services through a reduction in health care costs.

As mentioned earlier, there was a substantial increase in the number of outpatients and their visits only in 2002, the year that UC was fully implemented, and a sharp decline in subsequent years. We performed a robustness check of our results by looking at the effect of the UC program in specific years. We replace the UC dummy variable with year dummies for 2002, 2003, 2004, 2005, and 2006.[19] Therefore, the years prior to fully implemented UC program (1998–2001) are the reference years for interpretation of results reported in Table 3. The number of outpatients and their visits in 2002 increased by 61.39% and 46.59%, respectively.[20] This can be explained as follows: (1) the lower cost of health care services encouraged patients to visit the hospitals more frequently; (2) many CUPs established primary care units (PCUs) to serve more patients; and (3) some hospitals were less strict on the patients who were insured under the UC scheme.

The effect of the UC program faded away quickly in the subsequent years, which could be explained as follows. A sharp decline in the cost of health care services in 2002 led to a sharp increase in the demand for health care services, but the participating hospitals were constrained by their resources and funding in the first year. Hence, there were adjustments from both the demand and the supply sides of health care services in the subsequent years. On the demand side, once patients realized the lower quality of services provided by the hospitals participating in the UC scheme, such as long queue time, inadequate consulting time provided by their doctors, poor services, and poor quality of care (partly due to the fact that drugs used in the UC program are limited to only those on the national list), they started to reduce their demand for health care services.[21] On the supply side, faced with limited funding under the UC scheme, the hospitals had an incentive to encourage health promotion and preventive care in order to improve the health status of the UC population, and thus reduce future health care costs.[22] The promotion of preventive care and health promotion programs could be another factor that caused the reduction in outpatient demand for health care services over time. Another interesting result presented in Table 3 is that the length of stay (column 7) decreased as time went by. This result supports the hypothesis that in order to control the cost of inpatient care, the hospitals became stricter in their provision of services to their inpatients and therefore tried to reduce unnecessarily long stays. Moreover, the promotion of preventive care

[18] See [15] for the evidence in Kanchanaburi province, Thailand.

[19] The results with the 2001–2006 year dummies are qualitatively the same, where the 2002 year dummy shows the strongest effect. As we were interested in the effects of the UC program after it was fully launched nationwide, and as there were only six provinces (out of 76) that were in the pilot program in the year 2001, we decide to show the results without the 2001 year dummy. The results with the 2001 year dummy are available upon request.

[20] The total effect of the year dummy for 2002 is calculated from the estimated coefficients in the models with interaction terms (columns 2 and 4) using the mean values of bed_{it}, $inccap_{jt}$, and old_{jt}. The F-test indicates that the 2002 year dummy and its interaction terms are jointly significant at the 1% level in both models. Note that [12] and [16] found that the number of visits to the hospitals doubled in 2002, while we found that the number of visits increased by only 46.59%.

[21] [11] reported that a lot of upper-level income and middle-level income groups have negative attitudes towards the quality of services provided by the UC program.

[22] Health promotion and preventive care programs have played an increasingly important role in the UC scheme. Since the full implementation of the UC scheme, many health promotion and preventive care programs have been initiated to improve the health status of the UC population.

Table 3
Results of the analysis at the hospital level (with individual year dummies).

	OPD_{it}		$OPDvisit_{it}$		IPD_{it}		LOS_{it}	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2002	0.6208***	2.2202***	0.4695***	2.5637***	−0.2288***	−0.0977	−0.2542***	−0.3604
	(0.0333)	(0.6822)	(0.0205)	(0.4236)	(0.0173)	(0.3438)	(0.0220)	(0.3924)
2003	−0.2549***	−0.4943	−0.2560***	−0.5558	−0.4504***	−0.4172	−0.4876***	−1.0684***
	(0.0622)	(0.6996)	(0.0374)	(0.3451)	(0.0370)	(0.3604)	(0.0447)	(0.3945)
2004	−0.5342***	−1.7361**	−0.5187***	−1.4782***	−0.7443***	−0.7048*	−0.7979***	−1.4178***
	(0.1031)	(0.7612)	(0.0639)	(0.4051)	(0.0635)	(0.3826)	(0.0748)	(0.4428)
2005	−0.8168***	−2.4361***	−0.7224***	−1.6633***	−1.0858***	−1.2403***	−1.1388***	−1.8906***
	(0.1528)	(0.8473)	(0.0979)	(0.4029)	(0.0973)	(0.4045)	(0.1127)	(0.4747)
2006	−1.1513***	−2.5344***	−0.9644***	−1.3843***	−1.5094***	−1.7978***	−1.5578***	−2.5692***
	(0.2149)	(0.8574)	(0.1390)	(0.3900)	(0.1378)	(0.4322)	(0.1587)	(0.4953)
No. of obs.	5760	5760	5760	5760	5760	5760	5760	5760
R-squared	0.3267	0.3386	0.5788	0.5929	0.0414	0.0668	0.0453	0.0554

Note: Regressions in columns (1), (3), (5) and (7) include a constant term as well as the following variables: bed, inccap, pop, old, dhf, trend, trendsq. Regressions in columns (2), (4), (6), and (8) include a constant term bed, inccap, pop, old, dhf, trend, trendsq, and interaction terms between bed and year dummies, inccap and year dummies, old and year dummies.

* Denotes 10% level of significance.
** Denotes 5% level of significance.
*** Denotes 1% level of significance.
Cluster robust standard errors are in parentheses.

programs in the UC scheme could be another reason for the decline in the length of stays over time. As for other control variables, the results are qualitatively similar to those in Table 2.[23]

3.4. Concluding remarks and policy recommendations

Applying an econometric analysis to study the impact of the Universal Health Care Coverage program in Thailand on the demand for health care services, our results show that the number of outpatients increased by 55.98%, while the number of outpatient visits increased by 41.34% after the UC program was implemented. The results were stronger for small hospitals than for large hospitals. Moreover, the effects were stronger in areas with lower income and areas with higher elderly populations, suggesting that the UC scheme helps poor and elderly outpatients to gain more access to health care services. In contrast to outpatient demand, the number of inpatient visits and the number of days for which the inpatients were admitted at hospitals declined after the UC program was launched. These results suggest that even though inpatient demand for health care services might have increased due to the cost reduction through the UC scheme, it was outweighed by the offsetting impact resulting from hospitals' incentive to control the costs of inpatient care. Moreover, we found that the decrease in both number of inpatients and the number of days for which the inpatients were admitted at the larger hospitals were higher than at the smaller hospitals, implying that the larger hospitals have stronger incentives to control the costs of inpatient care.

Interestingly, the effect of the UC program, particularly the effect on outpatients, has faded over time. This suggests that some patients were not satisfied with aspects of the program, causing a quick drop in the demand for health care services. The problems likely stem from key factors such as the lack of sufficient funds provided to the hospitals participating in the UC scheme, patients' beliefs or presumptions that the quality of health care is low (partly due to the fact that the drugs used in the UC scheme are limited to those on the national list), and inconveniences in receiving the services, such as long waiting time. To ensure that the UC program is truly a reliable source of health care services for the Thai people, we suggest that the Thai government continue to commit to making the UC scheme a more accessible and higher quality program. To do so, the government should allocate appropriate and sufficient funding to participating hospitals so that they can provide health care services to patients without compromising quality. With more funding, it is also possible that restrictions posted on important high-cost and chronic treatments can be relaxed in the future. Second, it is important that the government enhance the quantity and quality of health care personnel to properly cope with the current and possibly higher future demand for health care. Appropriate incentives, such as monetary compensations, should be provided to health care personnel in order to keep current personnel and to attract new personnel to work at the participating hospitals. Third, because public hospitals cannot provide sufficient health care services to the entire registered population, the government should create incentives for private hospitals to participate in the UC scheme, such as giving them adequate capitation funding. Finally, the government should ensure access to health care services for low-income patients whose costs associated with hospital visits, such as transportation costs and foregone earnings, might still be too high to induce them to seek health care services. One way to help these people is to promote mobile hospitals in rural and remote areas.

[23] The results of other control variables are available upon request.

References

[1] Suraratdecha C, Saithanu S, Tangcharoensathien V. Is universal coverage a solution for disparities in health care? Findings from three low-income provinces in Thailand. Health Policy 2005;73.

[2] Na Ranong V, Na Ranong A, Triamworakul S, Wongmonta S. The monitoring and evaluation of universal health coverage in Thailand, first phase 2001/02. Nonthaburi: Health Systems Research Institute, Ministry of Public health; 2002.
[3] Hughes D, Leethongdee S, Osiri S. Using economic levers to change behavior: the case of Thailand's universal coverage health care reforms. Social Science & Medicine 2010;70:447–54.
[4] Hughes D, Leethongdee S. Universal coverage in the land of smiles: lessons from Thailand's 30 baht health reforms. Health Affairs 2007;26:999–1008.
[5] Jongudomsuk P, editor. NHSO annual report 2004: implementation of Universal Health Care Coverage. Nonthaburi: S.P.S. Printing Co. Ltd. (in Thai); 2004.
[6] Tangcharoensathien V, Prakongsai P, Limwattananon S, Patcharanarumol W, Jongudomsuk P. Achieving universal coverage in Thailand: what lessons do we learn? A case study commissioned by the health systems knowledge network; March 2007.
[7] Chamchan C. Impacts and constraints of universal coverage in Thailand's public health: a survey study in the northeast region. Southeast Asian Studies 2007;45(September (2)).
[8] Bordoy R. 30 Baht scheme A billion baht failure: the health promises of 200. City Life Chiangmai 2005;14(January (1)).
[9] Kittikanya C. Health Bangkok post economic review year-end; 2004.
[10] Wibulpolprasert S, Pengpaibon P. Integrated strategies to tackle the inequitable distribution of doctors in Thailand: four decades of experience. Human Resource for Health 2003;1(12).
[11] Na Ranong A. Health Seeking Behavior and Expectations: People's View on the Impacts of Universal Health Coverage. Research Report No. 3 Monitoring and Evaluating Universal Health Care Coverage in Thailand Phase II (2003–2004). Thailand Development Research Institute (in Thai); 2005.
[12] Na Ranong V, Na Ranong A, Wongmonta S. Impacts of the Universal Health Coverage and the 30 Baht Health Care Scheme on Household Expenditures and Poverty Reduction in Thailand. Research Report No. 2 Monitoring and Evaluating Universal Health Care Coverage in Thailand Phase II (2003–04). Thailand Development Research Institute (in Thai); 2005.
[13] Fuchs VR, Kramer MJ. Determinants of Expenditures for Physicians' Services in the United States 1948–68. Publication No. (HSM) 73-3013. National Bureau of Economic Research. National Center for Health Service Research and Development, DHEW; December 1972.
[14] Newhouse JP, Phelps CE. New estimates of price and income elasticities of medical care services. In: Rosset R, editor. Role of health insurance in the health service sector. New York: Neal Watson; 1976. p. 261–320.
[15] Netithanakul A, Soonthorndhada A. Equity in health care utilization of the elderly: evidence from Kanchanaburi DDS, Thailand. Journal of Population and Social Studies 2009;18(July (1)).
[16] Na Ranong V, Na Ranong A, Triamworakul S, Wongmonta S. Universal Health Coverage Schemes in Thailand 2002–2003. Research Report No. 1 Monitoring and Evaluating Universal Health Care Coverage in Thailand Phase II (2003–2004). Thailand Development Research Institute (in Thai); 2005.