Analysis of Composition Change of Public Facility Care Users After the Universal Coverage Scheme in Thailand

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Abstract
This study conducted a preliminary analysis to examine the impact of Thailand’s Universal Coverage Scheme (UCS) on health care use. In contrast with our expectation, no significant increase was found in the use of public facility care (i.e., use of the UCS services) after the UCS because the UCS increased the use of public facility care for the previously uninsured, but at the same time, it similarly decreased the previously insured who were previous public facility care users. Based on a view of this situation as a composition change of public facility care users, this study investigated where and discussed why the composition change occurred. By classifying health care use into four types (no care, informal care, public facility care, and private facility care), descriptive analysis and pooled logistic regression analysis were performed with data from the Health and Welfare Survey 2001 and 2003 to 2005. The study results showed that the UCS largely increased the use of public facility care for the previous uninsured people. In addition, the degree of the increase was relatively larger in lower income, older, younger, female, and rural people. Meanwhile, the UCS decreased the use of public facility care for previous public facility care users, especially those in higher income, middle-aged (mostly age 20–39 years), male, and urban people. This was probably due to an imbalance between the scaled-up UCS implementation and the resources allocated for improving the capacity of public facilities. This may have created circumstances that did not serve the needs of users (e.g., long waiting time) and pushed those previous users to the private sector.

Keywords
Universal Coverage Scheme, 30-baht scheme, health insurance, health care use, health care access, Thailand

Introduction
The Universal Coverage Scheme (UCS), which is the largest social health insurance program in Thailand, was implemented in 2002. Since then, approximately 47 million people (approximately 75% of the population) have received almost free health care services. The Thai health insurance system classifies the entire population into three groups: government sector employees, including their dependents (approximately 9%), private sector employees (approximately 16%), and informal sector employees (approximately 75%). The UCS is for informal sector employees (Health Insurance System Research Office [HISRO], 2012).

Before 2002, the current UCS beneficiaries had been covered by two health insurance programs, the Medical Welfare Scheme (MWS) and the V oluntary Health Card Scheme (VHCS). The MWS was a free medical benefit for socially vulnerable groups such as the poor. The VHCS was voluntary health insurance available for people who were not government or private sector employees and were not eligible for the MWS. One-year VHCS insurance coverage could be purchased by each household for only 500 Thai baht (THB), which is equivalent to approximately US$15 (Damrongplasit & Melnick, 2009).

The MWS and VHCS together were expected to cover all people who met the criteria. However, the programs encountered administrative problems, and approximately 18 million people (approximately 30% of the population) were not covered by either of the two programs (HISRO, 2012). The MWS encountered a “mistarget” problem. Because it was difficult to accurately assess the income of informal sector employees, MWS cards were more likely to be distributed to nonpoor people than to poor people (Tangcharoensathien et al., 2007). The VHCS encountered “adverse selection” problems. A previous study found that the purchase and use of the VHCS depended on the presence of illness (Sakunphanit, 2006). Subsequently, the government launched
the UCS by combining the two programs, and it successfully covered the 18 million uninsured people (HISRO, 2012).

The UCS offers a comprehensive benefit package. Beneficiaries can use the package for only 30 THB (approximately US$0.9) only if they visit designated facilities (i.e., health care providers designated by the UCS insurance). If beneficiaries bypass designated facilities, they must pay the full cost out of pocket (Limwattananon et al., 2007). The designated facilities are mostly primary health care providers that act as gatekeepers to secondary and tertiary health care providers (World Bank, 2007).

Significance of the Study Problem

To examine how much UCS implementation increased health care use, this study conducted a preliminary analysis. By classifying health care use into four types (no care, informal care, public facility care [i.e., use of the UCS services], and private facility care), how each type of health care use changed before and after the UCS was explored. In contrast to our expectation, no significant increase was found in the use of public facility care after the UCS. It was because the UCS increased the use of public facility care for the previously uninsured, but at the same time, it similarly decreased the previously insured (MWS and VHCS beneficiaries) who were previous public facility care users.

As Table 1 shows, overall outpatient care use in public facilities before and after the UCS was 52.2% and 52.6%, and inpatient care use before and after the UCS was 89.6% and 89.6%, respectively. Specifically, for outpatient care, the UCS increased the use of public facility care for the uninsured group by 14.8%, in which the use was 36.7% and 51.5% before and after the UCS, respectively. Meanwhile, the MWS and VHCS groups had higher use of public facility care before the UCS (58.4% and 57.6%, respectively) than after the UCS (53.3% and 52.4%, respectively). It means that the UCS did not increase the use of public facility care for the MWS and VHCS groups; rather, it decreased the use by approximately 5% for both groups.

In contrast to the use pattern of public facility care, the use of other types of health care services was found to decrease in the uninsured group and increase in the MWS and VHCS groups after the UCS. For the uninsured group, the UCS decreased the use of both private facility care (e.g., use of health care services in private hospitals or clinics) and informal care (e.g., use of over-the-counter [OTC] drugs in pharmacies) by 10.0% and 4.7%, respectively. Meanwhile, for the MWS and VHCS groups, the UCS increased the use of private facility care by 5.6% and 6.2%, respectively. A similar pattern was found in inpatient care use.

The results of the preliminary analysis imply that there might be a composition change in public facility care users after the UCS. This means that, to some degree, the UCS

| Type of health care | Before the UCS (2001) | After the UCS (2003–2005) |
|---------------------|------------------------|---------------------------|
|                     | MWS | VHCS | UNIS | Overall | MWS | VHCS | UNIS | Overall |
| Outpatient care     |     |      |      |         |     |      |      |         |
| No care             | 4.9 | 6.4  | 5.2  | 5.4     | 4.8 | 4.5  | 5.1  | 4.8     |
| Informal care       | 22.8| 22.2 | 31.6 | 25.1    | 22.5| 23.0 | 21.6 | 22.4    |
| Public facility care| 58.4| 57.6 | 36.7 | 52.2    | 53.3| 52.4 | 51.5 | 52.6    |
| Private facility care| 13.9| 13.9 | 26.5 | 17.4    | 19.4| 20.0 | 21.8 | 20.3    |
| Inpatient care      |     |      |      |         |     |      |      |         |
| Public facility care| 93.9| 93.8 | 77.4 | 89.6    | 89.9| 90.2 | 88.2 | 89.6    |
| Private facility care| 6.1 | 6.3  | 22.6 | 10.4    | 10.1| 9.8  | 11.9 | 10.4    |

Note. UCS = Universal Coverage Scheme; MWS = Medical Welfare Scheme; VHCS = Voluntary Health Card Scheme; UNIS = the uninsured group.

| Variables          | OR  | 95% CI       |
|--------------------|-----|--------------|
| Overall            |     |              |
| Outpatient care    | 1.02| [0.94, 1.10] |
| Inpatient care     | 0.99| [0.87, 1.14] |
| By insurance status|     |              |
| Outpatient care    |     |              |
| Uninsured          | 2.25| [1.87, 2.72]^*|
| Insured (reference)| 1.00|              |
| Inpatient care     |     |              |
| Uninsured          | 3.66| [2.75, 4.86]^*|
| Insured (reference)| 1.00|              |

Note. UCS = Universal Coverage Scheme; OR = odds ratio; CI = confidence interval. ^*p < .05.
might increase the use of public facility care for certain people in the uninsured group, but at the same time, it might push certain previous public facility care users in the MWS and VHCS groups outside of the UCS service boundary. Thus, this study attempted to assess where and discuss why the composition change occurred by exploring health care use before and after the UCS based on socioeconomic factors.

**Literature Review**

Previous studies have examined how UCS implementation influenced health care use, especially the use of public facility care. First, Tangcharoensathien et al. (2007) explored the amount of outpatient and inpatient care services in public facilities before and after the UCS. Because health care delivery was regulated by the UCS, an increasing trend was found in primary health care units (i.e., primary health care providers) and district-level hospitals (i.e., secondary health care providers), whereas a decreasing trend was found in provincial-level hospitals (i.e., tertiary health care providers). Second, Panpiemras et al. (2011) examined the amount of outpatient and inpatient care services in 640 public hospitals from 1996 to 2006. The study results showed a minor increase in the amount of outpatient care services and a minor decrease in the amount of inpatient care services.

Third, Limwattananon et al. (2012), using the same data sets (years 2001 and 2003–2005) that this study used for the preliminary analysis, analyzed health care use before and after the UCS. They explored three types of health care use, informal care, public facility care, and private facility care, and found an increased use of public facility care after the UCS. Particularly for outpatient care, the UCS increased the use of public facility care and simultaneously decreased the use of informal care. The increased use of public facility care was significantly larger in lower income and older people. However, the degree of the increase appeared to be small, with a 2.7% increase for outpatient care use and a 1% increase for inpatient care use.

Finally, Gruber et al. (2014) used the same data sets and examined how the UCS implementation influenced the use of inpatient care services. They classified health care use into two types (public and private facility care) and divided the study sample into two groups (the MWS group and a combined group of the VHCS group and the uninsured group). The study results showed increased use of public facility care in both groups after the UCS. The increased use was more significant in lower income people. Particularly for the combined group, the UCS increased the use of public facility care and simultaneously decreased the use of private facility care. As in the previous study by Limwattananon et al. (2012), the policy impact was found to be small, with a 0.69% and 0.83% increase for the MWS and the combined groups, respectively.

Previous studies have shown that UCS implementation increased the use of public facility care. However, understanding of whether the increased use occurred with or without the composition change that this study found in the preliminary analysis remains limited. In particular, the small degree of the policy impact found in previous studies and in this study may imply a possibility of composition change. Thus, this study, combining the findings in previous studies, attempts to add to the body of knowledge on the impact of the UCS on health care use.

**Method**

**Data and Study Sample**

The Health and Welfare Survey (HWS), which comprises a nationally representative sample of Thailand with a wide range of socioeconomic variables, was used as the main data for the study analysis. Specifically, four HWS data sets (the years 2001 and 2003–2005) were used. Among the data sets, the HWS 2001 was collected before the UCS, and the other three data sets (the HWS 2003–2005) were collected after the UCS. The National Statistical Office of Thailand conducts the HWS annually.

For the study sample, this study first chose MWS/VHCS/uninsured people from the HWS 2001 and UCS beneficiaries from the HWS 2003 to 2005. Among the chosen people, those who reported an illness experience during a specific time frame were selected as the study sample. Specifically, those who answered that they had been sick during 1 month before the survey date and those who answered that they had a hospitalization during 1 year before the survey date were selected as the study samples for outpatient and inpatient care analyses, respectively.

Then, because the HWS data sets were not panel, this study used the propensity score matching (PSM) method to identify the three groups of insurance status prior to the UCS (the MWS, VHCS, and uninsured groups) among UCS beneficiaries in the HWS 2003 to 2005. By setting one-to-one matching with a caliper equal to 0.1 in the PSM method, a total of 3,000 matched cases in each data set were ultimately used for the study analysis. Descriptive statistics to summarize the study samples and variables are presented in the Appendix.

**Variables and Statistical Analysis**

Andersen’s health care utilization model was used as a theoretical framework in this study. According to the Andersen’s model, health care use is explained by three predictors which are predisposing, enabling, and need-for-care factors (Aday & Andersen, 1974; Bradley et al., 2002). By using the model and also considering the availability of variables in the HWS data sets, this study ultimately chose two demographic variables (age and gender) as predisposing factors and two socioeconomic variables (income as individual-level resource and region as community-level resource) as enabling factors.
Health care use, which is a dependent variable, was classified into four types in this study: no care, informal care, public facility care, and private facility care. “No care” was defined as situations in which people in the study sample did not use any type of health care services. “Informal care” was defined as situations in which people in the study sample used OTC drugs or traditional medicines/healers. For “public facility care,” when the UCS was first implemented, the benefit package was provided in public facilities only. Thus, in the HWS 2001, public facility care was defined as situations in which people in the study sample used health care services in public facilities. In the HWS 2003 to 2005, public facility care was defined as situations in which people in the sample used health care services in their designated facilities. Finally, “private facility care” was defined as situations in which people in the study sample used health care services in private hospitals or clinics.

In addition, four independent variables were used in this study: income, age, gender, and region. Income was measured in an individual-level income quintile rank ranging from 1 to 4. A higher quintile indicates a higher income level. Age was classified into four groups: younger (age below 20 years), youth (age 20–39 years), middle (age 40–59 years), and older (age more than 60 years) groups. Gender and region were measured as binary variables (female vs. male, and rural vs. urban).

For statistical analysis, descriptive analysis was primarily used. Specifically, the proportions of each type of health care use before and after the UCS were calculated and compared by the previous insurance groups (the MWS, VHCS, and uninsured groups) and the chosen independent variables. In addition, this study used pooled logistic regression analysis. By setting health care use and insurance status as binary variables (public facility care vs. others, and the uninsured vs. the insured [i.e., a combined group of the MWS and VHCS groups]), the pooled analysis was conducted to examine changes in use of public facility care before and after the UCS between the insured and the uninsured groups by including the independent variables one by one. All statistical analyses in this study were performed by using IBM SPSS Statistics version 20 software.

**Results**

**Health Care Use by Income**

Table 3 presents the results of health care use before and after the UCS by income quintile. For outpatient care, the uninsured group at all income quintiles clearly had lower use of public facility care and higher use of both private facility care and informal care before the UCS than after the UCS. Specifically, the use of public facility care increased by approximately 16% at lower income quintiles (Q1 and Q2) and 11% at higher income quintiles (Q3 and Q4) after the UCS. At the same time, the use of informal care dropped by approximately 16% at the lower income quintiles and 7% at the higher income quintiles. For the use of private facility care, there was no large change before and after the UCS.

The MWS and VHCS groups had a different use pattern. For lower income quintiles (Q1 and Q2), there was no large change in the use of all types of health care services before and after the UCS. However, for higher income quintiles (Q3 and Q4), the use of public facility care decreased by approximately 10% and 6%, whereas the use of private facility care increased by approximately 8% and 11%, respectively, after the UCS.

For inpatient care, like the results of outpatient care, the uninsured group at all income quintiles clearly had lower use of public facility care before the UCS than after the UCS. Specifically, the use increased by approximately 8% at quintiles Q1 and Q2 and 11% at quintiles Q3 and Q4 after the UCS. The MWS and VHCS had a different use pattern. For the quintile from Q1 to Q3, there was no large change in the use of public facility care before and after the UCS. However, for the highest quintile Q4, the use of public facility care decreased by approximately 9% for both the MWS and VHCS groups, after the UCS.

In addition, the results of pooled logistic regression analysis (Table 4) similarly show that increase in the use of public facility care after the UCS was significantly larger in the uninsured group than the insured group at all income quintiles. In addition, the increase was relatively large at lower income quintiles, as compared with higher income quintiles.

For the insured group, the UCS did not increase the use of public facility care or had a minor increasing impact on the use mostly at lower income quintiles.

In sum, the results overall (Table 3 and 4) indicate that the UCS had an increasing effect on the use of public facility care and a decreasing effect on the use of both private facility care and informal care for the uninsured group at all income quintiles. In addition, the degree of the effect was relatively larger in lower income people. Simultaneously, the UCS pushed previous public facility care users in the insured group, particularly those with higher income levels, mostly to the private facility care sector.

**Health Care Use by Age**

Table 5 shows the results of health care use before and after the UCS by age group. For outpatient care, the UCS increased the use of public facility care for the uninsured group at all age groups. Specifically, the increase was largest in the younger group (approximately 19%), followed by the older, middle, and youth groups (approximately 14%, 12%, and 7%, respectively). At the same time, the use of informal care dropped by approximately 7% to 11% at all age groups. And, the use of private facility care dropped by approximately 11% and 6% at the younger and older groups, respectively, after the UCS.

The MWS and VHCS groups had a different use pattern. For the younger, middle, and older groups, the UCS had only
### Table 3. Health care Use Before and After the UCS by Income Quintile (%).

| Income Type of health care | Before the UCS (2001) | After the UCS (2003–2005) |
|---------------------------|-----------------------|---------------------------|
|                           | MWS       | VHCS       | UNIS       | MWS       | VHCS       | UNIS       |
| **Outpatient care**       |           |            |            |           |            |            |
| Q1 No care                | 5.9       | 9.6        | 6.5        | 5.1       | 5.9        | 5.8        |
| Informal care             | 21.7      | 18.5       | 32.5       | 19.7      | 20.8       | 17.7       |
| Public facility care      | 60.6      | 60.7       | 49.4       | 64.5      | 61.4       | 62.7       |
| Private facility care     | 11.8      | 11.2       | 11.7       | 10.7      | 11.9       | 13.8       |
| Q2 No care                | 4.3       | 4.7        | 5.4        | 5.0       | 4.7        | 5.8        |
| Informal care             | 20.2      | 19.3       | 37.3       | 20.4      | 20.5       | 21.0       |
| Public facility care      | 61.9      | 60.2       | 35.7       | 57.7      | 57.5       | 53.5       |
| Private facility care     | 13.6      | 15.8       | 21.6       | 17.0      | 17.4       | 19.8       |
| Q3 No care                | 6.7       | 6.1        | 6.1        | 5.0       | 3.6        | 4.1        |
| Informal care             | 24.8      | 25.8       | 29.1       | 23.3      | 27.7       | 21.8       |
| Public facility care      | 56.3      | 57.7       | 38.0       | 48.6      | 46.2       | 50.4       |
| Private facility care     | 12.2      | 10.4       | 26.8       | 23.1      | 22.5       | 23.8       |
| Q4 No care                | 2.5       | 5.8        | 4.2        | 4.3       | 4.2        | 4.8        |
| Informal care             | 27.6      | 26.3       | 29.9       | 26.0      | 23.7       | 24.1       |
| Public facility care      | 49.8      | 51.1       | 33.8       | 44.3      | 45.6       | 44.2       |
| Private facility care     | 20.1      | 16.8       | 32.1       | 25.4      | 26.5       | 26.9       |
| **Inpatient care**        |           |            |            |           |            |            |
| Q1 Public facility care   | 97.0      | 94.4       | 88.6       | 95.5      | 95.3       | 95.3       |
| Private facility care     | 3.0       | 5.6        | 11.4       | 4.5       | 4.7        | 4.8        |
| Q2 Public facility care   | 94.7      | 95.7       | 84.7       | 94.0      | 94.5       | 93.4       |
| Private facility care     | 5.4       | 4.3        | 15.4       | 6.1       | 5.5        | 6.6        |
| Q3 Public facility care   | 89.9      | 92.3       | 73.5       | 90.8      | 88.6       | 87.4       |
| Private facility care     | 10.1      | 7.7        | 26.5       | 9.3       | 11.5       | 12.6       |
| Q4 Public facility care   | 91.9      | 91.5       | 71.9       | 82.5      | 82.4       | 80.8       |
| Private facility care     | 8.1       | 8.5        | 28.1       | 17.5      | 17.6       | 19.2       |

Note. Q1 to Q4 = income quintiles 1 to 4. UCS = Universal Coverage Scheme; MWS = Medical Welfare Scheme; VHCS = Voluntary Health Card Scheme; UNIS = the uninsured group.

### Table 4. Pooled Logistic Regression Analysis for Increase in Use of Public Facility Care Before and After the UCS by Income Quintile.

| Variables                  | OR          | 95% CI          |
|----------------------------|-------------|-----------------|
| **Outpatient care**        |             |                 |
| Uninsured Q1               | 2.16        | [1.27, 3.67]*   |
| Uninsured Q2               | 2.59        | [1.75, 3.84]*   |
| Uninsured Q3               | 2.07        | [1.41, 3.04]*   |
| Uninsured Q4               | 1.94        | [1.39, 2.72]*   |
| Insured Q1                 | 1.41        | [1.06, 1.88]*   |
| Insured Q2                 | 1.07        | [0.82, 1.41]    |
| Insured Q3                 | 0.87        | [0.64, 1.18]    |
| Insured Q4 (reference)     | 1.00        |                 |
| **Inpatient care**         |             |                 |
| Uninsured Q1               | 6.07        | [2.34, 15.73]*  |
| Uninsured Q2               | 6.05        | [3.32, 11.02]*  |
| Uninsured Q3               | 5.87        | [3.36, 10.26]*  |
| Uninsured Q4               | 3.86        | [2.41, 6.17]*   |
| Insured Q1                 | 2.04        | [1.13, 3.69]*   |
| Insured Q2                 | 1.97        | [1.16, 3.33]*   |
| Insured Q3                 | 2.05        | [1.23, 3.41]*   |
| Insured Q4 (reference)     | 1.00        |                 |

Note. UCS = Universal Coverage Scheme; OR = odds ratio; CI = confidence interval. *p < .05.
a small decreasing effect on the use of public facility care (approximately 3%–5%), whereas it had a large decreasing effect on the use for the youth group (approximately 15%). At the same time, the use of informal care increased by approximately 11% mostly at the youth group, and the use of private facility care increased by approximately 6% to 9% at all age groups, after the UCS.

For inpatient care, like the results of outpatient care, the UCS largely increased the use of public facility care for the uninsured group at all age groups. Specifically, the increase was largest in the older group (approximately 20%), followed by the middle, younger, and youth groups (approximately 14%, 10%, and 7%, respectively). For the MWS and VHCS groups, the UCS decreased the use of public facility care at all age groups. Furthermore, the decrease was relatively large in the middle and youth groups (approximately 5%), as compared with the younger and older groups (approximately 3%).

In addition, the results of pooled logistic regression analysis (Table 6) similarly show a significantly larger increase in the use of public facility care for the uninsured group than the insured group at all age groups. In addition, the increase was largest at the younger group for outpatient care and the older group for inpatient care. For the insured group, the UCS did not significantly change the use of public facility care at all age groups.

In sum, the results overall (Tables 5 and 6) indicate that the UCS had an increasing effect on the use of public facility care and a decreasing effect on the use of both private facility care and informal care for the uninsured group at all age groups. In addition, the effect was relatively larger in younger and older people, though it slightly varied between outpatient and inpatient care. Simultaneously, the UCS pushed previous public facility care users in the insured group, particularly middle-aged people (mostly those aged 20–39 years), to either the informal care or private facility care sector.

### Health Care Use by Gender and Region

Table 7 presents the results of health care use before and after the UCS by gender and region. For gender, the UCS largely increased both outpatient and inpatient care uses in public facility care sectors for the younger group (approximately 14% for outpatient, 20% for inpatient), and decreased for the older group (approximately 7% for outpatient, 5% for inpatient). For the medical welfare scheme (MWS), the UCS increased the use of public facility care for the younger group (approximately 12% for outpatient, 18.5% for inpatient), and decreased for the older group (approximately 3% for outpatient, 4% for inpatient). For the voluntary health card scheme (VHCS), the UCS increased the use of public facility care for the younger group (approximately 10% for outpatient, 18% for inpatient), and decreased for the older group (approximately 3% for outpatient, 5% for inpatient).
facilities for the uninsured group, regardless of gender. Especially for outpatient care, the increase was relatively larger in the female group than the male group. For the MWS and VHCS groups, the UCS decreased the use of public facility care and increased the use of either informal care or private facility care. Particularly for outpatient care, the degree of the decrease or increase was relatively larger in the male group than the female group.

For region, the UCS largely increased both outpatient and inpatient care uses in public facilities for the uninsured group, regardless of region, and the increase was relatively larger in rural than urban areas. For the MWS and VHCS groups, the UCS decreased the use of public facility care and increased the use of either informal care or private facility care. Especially for inpatient care, the degree of the decrease or increase was relatively large in urban areas, as compared with rural areas.

In addition, the results of pooled logistic regression analysis (Table 8) similarly reveal that increase in the use of public facility care after the UCS was significantly larger in the uninsured group than the insured group, regardless of gender and region. Furthermore, the increase was relatively larger in people who were female or lived in rural areas. For the insured group, the UCS did not increase the use of public facility care or had a small increasing effect on the use mostly in people who were female or lived in rural areas.

In sum, the results overall (Table 7 and 8) indicate that the UCS had an increasing effect on the use of public facility care and a decreasing effect on the use of either private facility care or informal care for the uninsured group, regardless of gender and region. In addition, the degree of the effect was relatively larger in female and rural people, though the degree slightly varied between outpatient and inpatient care. Simultaneously, the UCS pushed previous public facility care users in the insured group, particularly male and urban users, to either the informal care or private facility care sector.

### Discussion

The preliminary analysis that this study conducted showed a composition change of public facility care users after the UCS. That is, the UCS increased the use of public facility care for certain people in the uninsured group, but at the same time, it decreased for certain previous public facility care users in the MWS and VHCS groups at the same level. Thus, this study investigated where the composition change occurred by exploring health care use before and after the UCS based on four socioeconomic factors.

The study results indicated that the UCS largely increased the use of public facility care for the uninsured group. Furthermore, the degree of the increase was relatively larger in lower income, younger, older, female, and rural people. Though the degree varied slightly between outpatient and inpatient care analysis. Meanwhile, the UCS decreased the use of public facility care for MWS and VHCS beneficiaries who were mostly higher income, middle-aged (mostly age 20–39 years), male, and urban people. In sum, the UCS significantly increased the use of public facility care for almost all uninsured people, regardless of their socioeconomic status, but it simultaneously pushed previously insured people, particularly higher income, middle-aged, male, and urban people, to either private facility care or informal care.

The study results are consistent with previous studies, in which the impact of the UCS on use of public facility care was minor, whether the impact was positive or negative (Gruber et al., 2014; Limwattananon et al., 2012; Panpiemras et al., 2011). And, when the impact was positive, it was significantly larger in lower income and older groups (Gruber et al., 2014; Limwattananon et al., 2012). Furthermore, this study, by separating UCS beneficiaries into the MWS, VHCS, and uninsured groups by the PSM method, could provide additional understanding of how the UCS impact differed across the different insurance groups. It might explain the minor impact of the UCS found in previous studies. However, because analytical methods varied across the studies, systematic investigation of the difference of the UCS effects across the studies needs to be further performed to provide a better understanding of the policy impact.

We aim to discuss why such composition change occurred after the UCS. Health care use can be seen as a multidimensional construct that includes three components: availability, accessibility, and acceptability (Sanmartin et al., 2002). Availability-related problems of health care use are usually
caused by features of the health care system providing health care. Long waiting times and unavailability/limited availability of services are typical availability-related problems. Accessibility- or acceptability-related problems of health care use are usually caused by the circumstances of an individual seeking health care. Cost and transportation are typical accessibility-related problems, and knowledge of and attitude toward health care are typical acceptability-related problems (Chen & Hou, 2002; Sanmartin et al., 2002).

In this sense, the UCS can be seen as a policy to improve only the accessibility component, especially the cost of public facility care, which was probably less affordable for previously uninsured people before the UCS. However, the UCS may not yet be accountable for improving the other two components; thus, the composition change could occur in contrast to policy expectations. After the UCS, some previous public facility care users might change to informal care because of availability-related problems with the use of the UCS services (e.g., long waiting time), while others might change to private facility care because of acceptability-related problems in the use of the UCS services (e.g., perceived low quality of public facility care). Thus, the study results imply that a policy for health care use can lead to an unexpected consequence when it relies excessively on only one of the three components.

Indeed, many previous studies have long discussed inadequacy of the policy’s financing as a potential hampering factor for access and quality of the UCS services. Although these studies did not directly investigate causal relationship between the inadequate financing and access to the UCS services, insufficient health care resources and low participation of private health care providers in the public sector (HISRO, 2012; Sakunphanit, 2006; World Bank, 2007). Most likely due to the issues, public health care facilities were found to be congested in general (NaRanong & NaRanong,

Table 7. Health care Use Before and After the UCS by Gender and Region (%).

| Gender and Region | Type of health care | Before the UCS (2001) | After the UCS (2003–2005) |
|-------------------|---------------------|-----------------------|--------------------------|
|                   | MWS     | VHCS     | UNIS  | MWS     | VHCS     | UNIS  |
| **Gender**        |         |          |       |         |          |       |
| **Outpatient care**|         |          |       |         |          |       |
| Male              |         |          |       |         |          |       |
| No care           | 5.8     | 6.4      | 5.4   | 5.3     | 4.9      | 4.7   |
| Informal care     | 21.4    | 20.2     | 29.2  | 22.4    | 23.1     | 23.7  |
| Public facility care | 58.8   | 58.9     | 40.2  | 52.5    | 52.0     | 50.7  |
| Private facility care | 14.0   | 14.5     | 25.2  | 19.8    | 20.1     | 20.9  |
| Female            |         |          |       |         |          |       |
| No care           | 4.2     | 6.4      | 5.0   | 4.5     | 4.3      | 5.4   |
| Informal care     | 23.9    | 23.4     | 33.3  | 22.6    | 22.9     | 20.0  |
| Public facility care | 58.1   | 56.8     | 34.2  | 53.8    | 52.8     | 52.1  |
| Private facility care | 13.8   | 13.5     | 27.5  | 19.1    | 20.0     | 22.4  |
| **Inpatient care**|         |          |       |         |          |       |
| Male              |         |          |       |         |          |       |
| Public facility care | 92.6   | 92.8     | 76.5  | 90.0    | 90.9     | 87.3  |
| Private facility care | 7.5    | 7.2      | 23.5  | 10.0    | 9.1      | 12.7  |
| Female            |         |          |       |         |          |       |
| Public facility care | 94.9   | 94.2     | 77.9  | 89.8    | 89.7     | 88.8  |
| Private facility care | 5.1    | 5.8      | 22.1  | 10.2    | 10.3     | 11.2  |
| **Region**        |         |          |       |         |          |       |
| **Outpatient care**|         |          |       |         |          |       |
| Rural             |         |          |       |         |          |       |
| No care           | 4.9     | 6.0      | 5.4   | 4.2     | 5.2      | 5.0   |
| Informal care     | 20.7    | 15.3     | 29.8  | 20.8    | 20.6     | 19.8  |
| Public facility care | 62.8   | 68.7     | 45.7  | 58.6    | 57.4     | 58.2  |
| Private facility care | 11.6   | 10.1     | 19.0  | 16.4    | 16.8     | 17.0  |
| Urban             |         |          |       |         |          |       |
| No care           | 5.0     | 6.8      | 5.0   | 5.5     | 3.8      | 5.3   |
| Informal care     | 24.9    | 28.8     | 32.4  | 24.3    | 25.7     | 23.5  |
| Public facility care | 53.9   | 46.9     | 32.7  | 47.6    | 46.7     | 44.1  |
| Private facility care | 16.2   | 17.5     | 29.9  | 22.6    | 23.8     | 27.1  |
| **Inpatient care**|         |          |       |         |          |       |
| Rural             |         |          |       |         |          |       |
| Public facility care | 94.3   | 93.7     | 83.8  | 93.0    | 93.8     | 93.1  |
| Private facility care | 5.7    | 6.3      | 16.2  | 7.0     | 6.2      | 6.9   |
| Urban             |         |          |       |         |          |       |
| Public facility care | 93.4   | 93.8     | 74.6  | 87.0    | 86.9     | 82.9  |
| Private facility care | 6.6    | 6.2      | 25.4  | 13.0    | 13.1     | 17.1  |

Note. UCS = Universal Coverage Scheme; MWS = Medical Welfare Scheme; VHCS = Voluntary Health Card Scheme; UNIS = the uninsured group.
Another previous study showed no significant increase in public sector health care resources, especially the hospital bed-population ratio and the doctor-population ratio, around the period of the UCS implementation, particularly from 1995 to 2005 (HISRO, 2012, p. 27). Although the study showed that the resources drastically increased from 1965 to 1995, the increase might not be sufficient to meet all the health care needs of previous users (MWS and VHCS beneficiaries) and additional users (uninsured people) after the UCS. Particulars regarding private sector involvement, only a few private health care providers have been involved in the UCS program, most likely because of the low-profit margin of the UCS services. It was found that all private providers who joined the UCS program covered only 5.7% of all UCS beneficiaries. In 2007, the total number of private clinics and hospitals was 16,800 and 318, respectively, with 30,564 beds, while that of public clinics (known as public health centers) and hospitals was 9,758 and 1,020, respectively, with 156,494 beds (Sakunphanit & Suwanrada, 2011).

In addition, probably due to the insufficiency of health care resources in the public sector, the study results showed that the overall use of public facility care was quite low. Particularly for outpatient care, only 50% of all UCS beneficiaries used public facility care. This low use may have an issue similar to that of composition change. That is, the use of private services might be based on preference and choice for some people, but it might be based on force for others. Thus, it is important to examine how the UCS can improve both availability and acceptability components. In particular, expanding the public sector health care infrastructure and increasing private sector involvement in the UCS program would be the first policy priority.

Particularly regarding private sector involvement, only a few private health care providers have been involved in the UCS program, most likely because of the low-profit margin of the UCS services. It was found that all private providers who joined the UCS program covered only 5.7% of all UCS beneficiaries. In 2007, the total number of private clinics and hospitals was 16,800 and 318, respectively, with 30,564 beds, while that of public clinics (known as public health centers) and hospitals was 9,758 and 1,020, respectively, with 156,494 beds (Sakunphanit & Suwanrada, 2011).

### Table 8. Pooled Logistic Regression Analysis for Increase in Use of Public Facility Care Before and After the UCS by Gender and Region.

| Variables              | OR   | 95% CI          |
|------------------------|------|-----------------|
| By gender              |      |                 |
| Outpatient care        |      |                 |
| Uninsured male         | 1.81 | [1.37, 2.38]    |
| Uninsured female       | 2.48 | [1.93, 3.19]    |
| Insured male           | 0.91 | [0.75, 1.11]    |
| Insured female (reference) | 1.00 |                 |
| Inpatient care         |      |                 |
| Uninsured male         | 4.20 | [2.76, 6.40]    |
| Uninsured female       | 4.49 | [3.08, 6.55]    |
| Insured male           | 1.49 | [1.02, 2.19]    |
| Insured female (reference) | 1.00 |                 |
| By region              |      |                 |
| Outpatient care        |      |                 |
| Uninsured rural        | 1.95 | [1.44, 2.63]    |
| Uninsured urban        | 1.91 | [1.49, 2.45]    |
| Insured rural          | 0.89 | [0.73, 1.08]    |
| Insured urban (reference) | 1.00 |                 |
| Inpatient care         |      |                 |
| Uninsured rural        | 5.70 | [3.50, 9.30]    |
| Uninsured urban        | 3.61 | [2.52, 5.18]    |
| Insured rural          | 1.93 | [1.32, 2.84]    |
| Insured urban (reference) | 1.00 |                 |

Note: UCS = Universal Coverage Scheme; OR = odds ratio; CI = confidence interval. *p < .05.
Nevertheless, we observed positive effects of the UCS in the study results. First, the UCS largely increased the use of public facility care for uninsured people who probably had less access to public facility care before the UCS. Second, the overall use of public facility care after the UCS became arranged more by the income level in the ascending order. That is, the UCS increased the use of public facility care for lower income people and decreased it for higher income people. Assuming that low-income beneficiaries are likely to have greater health care needs, the rearrangement by the UCS could be considered an improvement of equity in health care use. The positive effects may be partly because the UCS integrated two separate insurance programs (the MWS and VHCS), and the integration may have improved administrative efficiency.

Limitations of the study must be stated. First, because the HWS data sets were not panel, this study used the PSM method to identify the MWS, VHCS, and uninsured groups among UCS beneficiaries in the HWS 2003 to 2005. Although the PSM method is for reducing a selection bias and accordingly improving comparability across the HWS data sets, the study results might unavoidably include undetected errors. Second, this study mainly used descriptive analysis, though partial pooled logistic regression analysis was additionally used. It suggests a comprehensive causal methodology with more diverse socioeconomic factors for future study. Third, types of health care use differ by the severity of illness in general, but the HWS data did not include medical or clinical information. Thus, merging the HWS data with other data sources such as hospital administration data including such information may offer a more accurate assessment of the policy effect on health care use.

Finally, the study results indicated that approximately 5% of the study sample did not use any health care services, regardless of the UCS implementation or socioeconomic factors. This unmet-health care-need group might have other problems of access to public facility care rather than service costs. Some people might not need health care because their symptoms were minor, whereas others might need health care but could not utilize it because of the previously mentioned problems (e.g., transportation or no available services where or when the services were required). However, using a secondary data analysis, this study provides limited understanding. A systematic investigation with a qualitative method approach, such as in-depth interviews or a case study, would be necessary for future studies. Such a qualitative method approach would provide a better understanding of whether the composition change and low use were due to the UCS beneficiaries’ own preferences and choices or due to force.

**Conclusion**

The study results imply that the success of universal access to health care may not be easily achieved by only making people eligible for health insurance (or reducing financial barriers of health care use). Rather, it depends on how multiple components of health care use are considered together. Of the components, the adequacy of health care resources in the public sector must be the first policy priority. In particular, in the context of an aging society and economic development in which health care needs are likely to increase and be more diverse, the resource adequacy issue is a more significant determinant of health care use.

The UCS rearranged overall health care use by the income level in the ascending order. Assuming that low-income people are likely to have greater health care needs, the rearrangement could be considered an improvement of equity in health care use. This may be partly because the UCS integrated multiple insurance programs, and the integration may have improved administrative efficiency. Currently, there is an ongoing discussion about change from the current multi-payer system to a single-payer system among policy makers and researchers in Thailand. The study results can be taken into consideration for this discussion, particularly with regard to equity in health care use.

**Appendix.** Descriptive Statistics of the Study Variables (%, n = 3,000 in Each Year).

| Variables              | Outpatient care | Inpatient care |
|------------------------|-----------------|----------------|
|                        | 2001  | 2003  | 2004  | 2005  | 2001  | 2003  | 2004  | 2005  |
| Type of health care    |       |       |       |       |       |       |       |       |
| No care                | 5.4   | 6.2   | 4.4   | 3.9   | 89.6  | 89.1  | 89.2  | 90.3  |
| Informal care          | 25.1  | 22.8  | 23.1  | 21.2  |       |       |       |       |
| Public facility care   | 52.2  | 53.8  | 49.6  | 54.2  | 10.4  | 10.9  | 10.8  | 9.7   |
| Private facility care  | 17.4  | 17.2  | 22.9  | 20.7  |       |       |       |       |

(continued)
Appendix. (continued)

| Variables          | Outpatient care | Inpatient care |
|--------------------|-----------------|----------------|
|                    | 2001  | 2003  | 2004  | 2005  | 2001  | 2003  | 2004  | 2005  |
| Income             |       |       |       |       |       |       |       |       |
| Q1                 | 22.6  | 19.2  | 20.0  | 18.0  | 23.0  | 20.0  | 19.3  | 16.6  |
| Q2                 | 30.1  | 30.3  | 30.3  | 28.7  | 31.0  | 30.6  | 29.2  | 26.5  |
| Q3                 | 21.0  | 21.2  | 22.1  | 22.4  | 20.9  | 21.9  | 22.4  | 22.8  |
| Q4                 | 26.2  | 29.3  | 27.5  | 30.9  | 25.2  | 27.5  | 29.0  | 34.1  |
| Age group          |       |       |       |       |       |       |       |       |
| Younger            | 29.1  | 26.9  | 32.4  | 30.9  | 23.1  | 27.0  | 25.6  | 24.1  |
| Youth              | 19.4  | 18.9  | 17.7  | 15.0  | 30.1  | 28.6  | 28.1  | 27.0  |
| Middle             | 29.4  | 31.7  | 30.5  | 31.4  | 25.9  | 24.1  | 25.7  | 26.3  |
| Older              | 22.1  | 22.5  | 19.4  | 22.8  | 20.9  | 20.3  | 20.6  | 22.5  |
| Gender             |       |       |       |       |       |       |       |       |
| Male               | 41.6  | 40.2  | 43.1  | 43.4  | 39.0  | 42.0  | 40.9  | 42.5  |
| Female             | 58.4  | 59.8  | 56.9  | 56.6  | 61.0  | 58.0  | 59.1  | 57.5  |
| Region             |       |       |       |       |       |       |       |       |
| Rural              | 44.7  | 52.2  | 51.5  | 53.1  | 45.4  | 49.1  | 50.8  | 47.5  |
| Urban              | 55.3  | 47.8  | 48.5  | 46.9  | 54.6  | 50.9  | 49.2  | 52.5  |
| Insurance status   |       |       |       |       |       |       |       |       |
| MWS                | 46.1  | 46.1  | 46.1  | 46.1  | 42.0  | 42.0  | 42.0  | 42.0  |
| VHCS               | 26.2  | 26.2  | 26.2  | 26.2  | 32.5  | 32.5  | 32.5  | 32.5  |
| Uninsured          | 27.8  | 27.8  | 27.8  | 27.8  | 25.5  | 25.5  | 25.5  | 25.5  |

Note. Q1 to Q4 = income quintiles 1 to 4. MWS = Medical Welfare Scheme; VHCS = Voluntary Health Card Scheme.

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Data Accessibility Statement
The data that support the findings of this study are available from the National Statistical Office of Thailand, but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the National Statistical Office of Thailand.

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