



Disparity between the Reimbursement and Unit Cost for HIV/AIDS Antiretroviral Treatment for Migrant Patients Insured in the 'Health Insurance Card Scheme', Thailand, 2015-2017

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Abstract

The Health Insurance Card Scheme (HICS), a national insurance scheme for cross-border migrants in Thailand, provides a vast range of benefit packages, including antiretroviral treatment (ART) for HIV/AIDS. This study aimed to assess and compare the reimbursement claimed by the HICS for ART beneficiaries per person against the actual ART unit cost at district, provincial, and regional hospitals. Data were retrospectively collected from two main datasets. The first dataset was used for the calculation for ART reimbursement between 2015 and 2017. There were 148 public hospitals included in the reimbursement analysis. The second dataset was used for calculating the actual ART unit cost. Eight public hospitals were selected for unit-cost calculation. Findings showed that the average ART reimbursement amount per person per year varied between US\$ 191.9 and US\$ 235.1 while the actual ART unit cost ranged from average US\$ 135.8 to US\$ 421.0. Though the overall difference demonstrated non-statistical significance by Student t-test, this difference at provincial hospitals exhibited statistical significance ($p=0.03$) by Mann-Whitney U test. The Ministry of Public Health should update the fee schedule for ART reimbursement to better reflect the providers' actual unit cost and allow the ART reimbursement rate varying by facility types instead of applying the flat-rate system as per the status quo.

Keywords: antiretroviral treatment, HIV/AIDS, migrant, health insurance, costing, reimbursement, unit cost

Introduction

Thailand is a key migrant destination especially for those journeying from Cambodia, Lao People's Democratic Republic (PDR) and Myanmar, so-called CLM nations. The most common reasons for migration among these CLM migrants are seeking improved economic prospects, and accompanying family members. As of June 2018, there were approximately 2.2 million documented migrant workers living in Thailand, plus an unknown figure of those crossing the border without valid travel documents (undocumented migrants).¹ The International Labour Organization (ILO) reported that migrants (including undocumented ones)

contributed to about 4.3-6.6% of Thailand's gross domestic product (GDP) in 2010 and represented approximately 4.7% of the employed population.²

As migrants and their dependants are inextricably linked with the Thai economy, policies to protect the health of migrants have always been in the political spotlight of Thai governments. One of the most distinct policies on migrant health is the 'Health Insurance Card Scheme' (HICS), which was launched in 2004.^{3,4} The HICS is a premium-based insurance scheme under the regulation of the Division of Health Economics and Health Security (DHES), Ministry of Public Health (MOPH). Its target beneficiaries are undocumented migrants, who are mostly engaged in

informal work; while documented migrants, mostly in the formal sector, are already covered by the Social Health Insurance (SHI) like ordinary Thai workers. The MOPH assigns affiliated health facilities to sell the HICS to undocumented migrants. The benefits of HICS insurance are comprehensive, from basic outpatient (OP) and inpatient (IP) care, to high-cost treatment. In 2013, the MOPH expanded the HICS' benefit to cover antiretroviral treatment (ART) for HIV/AIDS⁵ with the annual premium at 2,200 Baht (US\$ 71) per individual, which was broken down into 1,300 Baht (US\$ 42) for general OP and IP care and 900 Baht (US\$ 29) for ART and high-cost care. The affiliated health facilities are obliged to transfer the 900-Baht revenue, earmarked for ART and high-cost care, to the MOPH. This serves as a re-insurance system where the MOPH manages the pooled fund for certain services at a national level and reimburses the facilities for ART expenses based on a fee schedule. An example of the fee schedule is presented in Table 1.

Table 1. Example of fee schedule for ART in the HICS, Thailand

Item	Unit	Reimbursed Cost in US\$
CD4 test	visit	12.85
Drug resistance test	visit	192.77
Viral load test	visit	43.37
Atazanavir 200 mg per cap (ATV)	tablet	4.53
Darunavir 300 mg per tab (DRV)	tablet	1.97
Lopinavir/Ritonavir (oral solution—60 ml)	bottle	20.84

It is worth noting that, in 2014, right after the coup, there was a significant change in the HICS premium⁴ since the government attempted to overhaul the registration process of undocumented migrants and aimed to enroll as many migrants into the HICS as possible. As a result, the HICS premium was reduced to 1,600 Baht (US\$ 52) per individual; comprising 1,300 Baht (US\$ 42) for general OP and IP care, and 300 Baht (US\$ 10) for ART and high-cost care. Another point that is worth mentioning is the 300-Baht ART in this case denotes to ART in OP care only, as the ART for admitted patients is already included in the 900-Baht IP care. Currently, the ART benefit under the HICS consists of antiviral drug treatment and laboratory tests for many HIV/AIDS-related items, including blood chemistry, HIV antibody, polymerase chain reaction (PCR), CD4 cell count, viral load and drug resistance.^{6,7}

The ART reimbursement amount was set in 2013 and has not been adjusted since. The 2014 change in premium was made rapidly, in order to recruit many more migrant beneficiaries, without a thorough cost analysis as to whether the HIV/AIDS or ART reimbursement amount really reflected the actual ART unit cost of treatment.⁸ This issue is of more concern in recent years because the Global Fund (GF) to Fight AIDS, Tuberculosis and Malaria, which is now supporting about 7,000 undocumented migrants who failed to register with the government, plans to terminate its support to Thailand very soon.⁹ This is because the Thai economy has passed the upper-middle income benchmark, making the country ineligible to apply for the next round of funding.¹⁰ To this end, it is very likely that many more HIV/AIDS migrant patients will soon enroll in the HICS.

Thus, the objective of this study was to assess and compare the ART reimbursement amount with the actual ART unit cost provided at health facilities. It is hoped that the results of this study could potentially inform policy makers to improve fee schedules and enable the contracted hospitals to effectively manage their activities and outputs on this budget.

Methods

Conceptual Framework

This study aims to identify the cost of HIV/AIDS across different levels of hospital care, namely district, provincial, and regional hospitals, which are the contracted facilities of the 'Health Insurance Card Scheme'. We calculated the reimbursement amount and compared it with the actual costs to health facilities. The annual ART reimbursement amount was determined by two factors: (1) exposure to risk (the insured migrant workers), and (2) claim payments covered by the ART benefit (antiviral drug treatment and laboratory tests). The actual cost of health facilities was divided into direct and indirect costs. Both the ART reimbursement amount and the actual ART unit cost are expressed in annual per person per year.

The reimbursement (claim) amount was determined by the exposure to risk and claims payments, which represents the number of claims made within a given period. HICS regulations,⁷ fixed the claim rate across health facilities. For the actual ART unit costs, it is assumed that the cost of care incurred by the providers varies by the level of facilities. Thus, the analysis of unit cost of care was sub-categorised into levels of care (district, provincial, and regional hospitals).

Study Design and Data Sources

Quantitative analysis of secondary data was used to assess the cost of HIV/AIDS treatment for the HICS. The population included undocumented migrant workers and their dependants aged 7 years and over, who were registered with the HICS. Data were retrospectively collected from two main datasets. The first dataset covered HICS claims between the fiscal years 2015 and 2017, drawn from hospital claims submitted to the DHES website (<http://fwf.cfo.in.th>). There were 148 public hospitals that made a claim for the HIV/AIDS benefit. The second dataset was obtained from a pilot project that gathered and calculated service unit cost data from volunteer hospitals in 2014.¹¹ Only eight public hospitals (four districts, two provincials, and two regionals) presented with enough data on HIV/AIDS services to make the analysis feasible.

The first dataset from the HICS data obtained beneficiaries' ID numbers, registration date, expiry date, reimbursement code, service provision date, number of claims and claim payments. In the second dataset, the costs to each hospital were drawn from its financial report, identifying revenues, expenses and service data related to OP HIV/AIDS care (including laboratory tests). The actual cost was further divided into labour cost, material cost and capital cost.

This analysis was based on the following assumptions. First of all, researchers used the diagnosis codes B20-B24, taken from the 10th revision of the International Classification of Diseases (ICD-10), to identify which visits were related to HIV/AIDS care. If an HIV/AIDS patient visited facilities for other purposes, those visits would not be counted in the claim dataset. Secondly, researchers assumed the same standard of care (medicine, human resources, and laboratories) for both Thai and migrant patients. This assumption was grounded in the fact that there was no regulation from the MOPH that indicated different treatments for Thai and migrant patients. Thus, in principle, the ART unit cost for Thai and migrant patients should be the same. Yet, it was difficult to validate this idea in the real clinical practice. This point is covered in the 'Discussion' section.

Data Analysis

ART reimbursement

The ART reimbursement amount expressed in US\$ per person per year was calculated as follows. All individual claims for HIV/AIDS in the relevant period were calculated. Then, the total claim was divided by accumulated person-years in the corresponding period.

The use of person-years instead of person was because each individual enrolled in the scheme at different time points. The following formula reflects the calculation idea of the ART reimbursement per person per year.

$$\text{ART reimbursement per person per year} = \frac{\text{Total reimbursement in year } t}{\text{Total time spent by insured people in year } t}$$

ART unit cost

For the ART unit cost estimation, a standard costing method stipulated by the MOPH was employed.⁷ The procedure was composed of the following steps: (i) cost centre assignment, dividing facility units into supporting cost centres (for instance, finance departments) and service cost centres (for instance, patient wards), (ii) direct cost estimation (including labour cost, material cost, and capital cost), (iii) allocation of cost from supporting cost centres to service cost centres to obtain total cost, and (iv) producing unit cost per visit by dividing the total cost by total number of patients, as demonstrated by the following formula.

$$\text{Unit cost per patient} = \frac{\text{Total cost of medicine and laboratory in year } t}{\text{Total patients in year } t}$$

The ART unit cost per patient was computed in each hospital. The researchers then estimated ART unit cost across hospitals; and compared this with the claim cost by Student t-test, using 95% confidence level as a cut-off. In addition to Student t-test, Mann-Whitney U test was applied to accommodate the non-normal distribution pattern of the cost data.

Results

Overall, there were 147 hospitals claims in 2015, with 1,221 persons and 768 patient-years. The number of hospitals making claims was quite stable in 2016 and 2017 comprising of 160 and 159 hospitals, respectively. However, the volume of patients and patient-time increased to 2,997 persons and 2,069 patient-years in 2016, and 1,845 persons and 1,112 patient-years in 2017, respectively. The amount of ART reimbursement amount increased from US\$ 164,660 in 2015 to US\$ 233,413 in 2016 and then decreased to US\$ 156,837 in 2017. The trend of the mean reimbursement amount was similar to the median reimbursement amount.

The hospitals used in this study were classified into district, provincial, and regional hospitals, which contain different 10-120 beds, 120-500 beds, and 500 beds or over, respectively. Overall approximately 34.2%-54.5% of patients with HIV/AIDS were

concentrated in district hospitals. Regional and district hospitals combined treated the majority of patients, especially in 2016-2017. The average cost per person per year varied between US\$ 191.9 and US\$ 235.1 in 2015, while the median cost per person-years ranged between US\$ 162.0 and US\$ 223.4. There was a remarkable fall in the reimbursement

amount per person per year over the study period, particularly in regional hospitals from US\$ 210.7 in 2016 to US\$ 172.7 in 2017: almost a one-fifth decrease. The highest reimbursement amount was found in district hospitals in almost all years. The mean reimbursement amount in 2017 was lower than the cost in other years for all facility types (Table 2).

Table 2. Reimbursement amount of HIV/AIDS antiretroviral treatment for outpatient care, Thailand, 2015-2017

Year	Hospital type	Number of hospitals	Number of patients	Total patient-years	Total ART reimbursement amount in US\$	ART reimbursement amount per person per year across hospitals in US\$	
						Mean (SD)	Median (95% CI)
2015	RH	18	261	173	31,376	207.7 (97.4)	223.4 (134.6, 267.5)
	PH	31	295	188	41,940	191.9 (166.8)	162.0 (92.1, 246.4)
	DH	98	665	407	91,344	235.1 (178.8)	203.9 (141.2, 315.8)
	Total	147	1,221	768	164,660	222.7 (168.5)	198.3 (127.9, 300.6)
2016	RH	21	1,607	1,116	59,693	177.7 (111.1)	174.4 (89.7, 232.4)
	PH	31	365	255	46,710	210.7 (150.3)	209.3 (86.9, 284.1)
	DH	108	1,025	698	127,010	240.1 (156.7)	248.6 (111.1, 315.5)
	Total	160	2,997	2,069	233,413	226.2 (151.1)	225.7 (97.5, 301.8)
2017	RH	20	884	576	36,168	172.4 (146.9)	148.5 (55.1, 306.1)
	PH	32	209	133	32,569	172.7 (127.3)	130.5 (71.0, 276.2)
	DH	107	752	463	88,100	204.9 (148.9)	196.6 (76.7, 314.3)
	Total	159	1,845	1,172	156,837	194.3 (144.5)	170.4 (72.8, 308.2)

Note: RH=Regional Hospitals, PH=Provincial Hospitals, DH=District Hospitals. Foreign exchange rate as of July 2013=31.1 Baht per US\$

As the cost data from 2015 onwards were lacking, table 3 shows only the actual ART unit cost in 2015. The overall ART unit cost was US\$ 234.2 across hospital types. Provincial hospitals shouldered the greatest unit cost compared to other facility types

(US\$ 421.0). In contrast, regional hospitals saw the lowest unit cost relative to other facility types (US\$ 135.8), likely due to the largest volume of patients. Medicine costs were greater than laboratory costs in almost all facilities (Table 3).

Table 3. Unit cost of HIV/AIDS antiretroviral treatment for outpatient care per individual per year, Thailand, 2015

Hospital types	Number of patients	Share of total cost		Unit cost per person in US\$	Unit cost per person across hospitals in US\$	
		Medicines	Labs		Mean (SD)	Median (SD)
RH1	1,779	56%	44%	111.3	135.8 (34.6)	246.7 (88.7)
RH2	2,107	86%	14%	160.2		
PH1	741	89%	11%	403.4	421.0 (24.8)	420.9 (24.8)
PH2	1,074	90%	10%	438.5		
DH1	191	92%	8%	304.8	250.2 (110.8)	135.7 (34.6)
DH2	363	49%	51%	161.9		
DH3	473	84%	16%	345.4		
DH4	253	73%	27%	188.7		
Total	6,981				234.2 (124.4)	246.7 (124.4)

Note: RH=Regional Hospitals, PH=Provincial Hospitals, DH=District Hospitals. Foreign exchange rate as of July 2013=31.1 Baht per US\$

Confining the analysis to 2014 and 2015, the ART unit cost per patient at health facilities was compared with the claim cost per person from the MOPH. It appeared that the mean unit cost of ART in provincial hospitals was almost double the reimbursement amount. While in district hospitals both costs were almost on par, in regional hospitals the claim cost was about 50% higher than the mean unit cost. However, Student t-test did not indicate a significant difference between the claim cost and the mean unit cost across facility types (Figure 1).

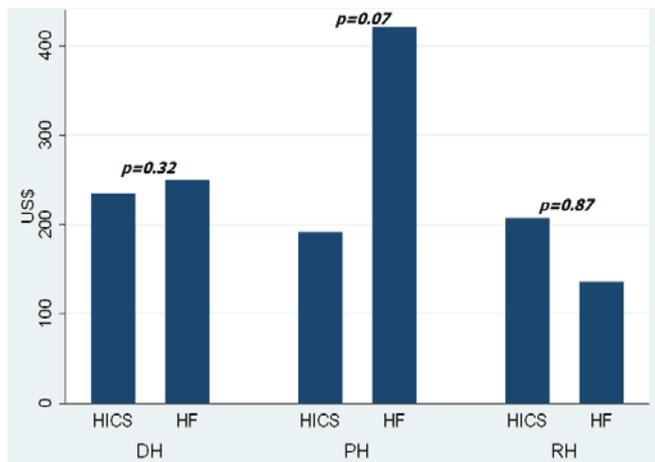


Figure 1. Comparing the mean reimbursement amount of Health Insurance Card Scheme (HICS) and the mean actual cost of Health Facilities (HF) for district hospitals (DH), provincial hospitals (PH), and regional hospitals (RH) for HIV/AIDS antiretroviral treatment by Student t-test, 2015

When median was used instead of mean with an application of Mann-Whitney U test, a statistical significance difference ($p=0.03$) was observed in provincial hospitals, but not in district and regional hospitals (Figure 2).

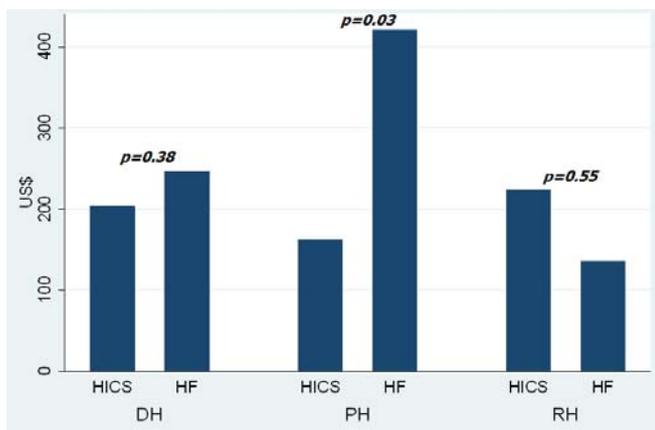


Figure 2. Comparing median reimbursement amount of Health Insurance Card Scheme (HICS) and median actual cost of Health Facilities (HF) for district hospitals (DH), provincial hospitals (PH), and regional hospitals (RH) for HIV/AIDS antiretroviral treatment by Mann-Whitney U test, 2015

Discussion

This research is probably one of the first studies that explored the ART reimbursement amount and the unit cost of care for HIV/AIDS migrant patients since the expansion of the HICS benefit package in 2013.¹² District hospitals appeared to face higher costs compared to other facility types. One possible explanation is that the volume of patients who made claims in district hospitals, although quite large in terms of raw numbers, was quite small relative to the total reimbursement amounts. For instance, in 2016, the total reimbursement in district hospitals amounted to US\$ 127,010 for 698 person-years. By contrast, the total reimbursement in regional hospitals amounted to US\$ 59,693 for 1,116 person-years, approximately half of the claim in district hospitals, with far larger person-years (1,116 person-years).

A probable reason for the drop in ART reimbursement amount across all facility types in 2017 is that, at the time of the study, claim data from health facilities had not been completely submitted to the MOPH. In other words, there was a lag between incurring the treatment at facilities and submitting the claim requests to the MOPH; thus the 2017 claim data were likely to be underestimates. This issue also points to room for improvement in the HICS reimbursement system. The data reporting system to MOPH should be capable of estimating the reserve account for any losses or events that have happened at local facilities but have not yet been reported.¹³

Despite some differences in ART reimbursement amount across facilities, such margins were trivial relative to the difference in the ART unit costs between facility types. The vast range of ART unit costs across facilities is likely due to (i) difference in cost distribution and (ii) difference in the volume of service users. Hospitals with a greater share of medicine costs tended to face larger unit costs and hospitals with relatively large volume of users (most likely regional hospitals) likely faced lower unit costs compared to others. Provincial hospitals received far fewer HIV/AIDS patients than regional hospitals. This might be because many patients by passed provincial hospitals and went directly to regional hospitals, leaving a smaller volume of patients at provincial hospitals. With the smaller volume of patients, a higher unit cost was likely to occur (as the denominator shrank). However, this assumption is still presumptive evidence and needs much more research to justify it.

No officially published study directly compares the unit cost of treatment among Thais and migrants.

However, theoretically, the unit costs of both populations are likely to be similar, conditional upon the same disease conditions. Nevertheless, in reality, each hospital always exercises its own discretion to set the service charge value. Thus it is likely that hospital charge exhibits remarkable difference across facilities even for the same disease condition.

International literature also indicated that the ART unit cost varied tremendously. Mean ART costs per person per year in sub-Saharan African countries was around US\$ 208-231, slightly lower than the findings in this study.^{14,15} South Africa had higher unit costs at about US\$ 682. The same situation was found in Indonesia, where the unit cost for ART was as high as US\$ 473-580.¹⁶ Note that the information here only suggested that service unit cost could vary across service sites. Therefore, it is difficult to judge whether the ART unit cost in this study was 'too high' or 'too low' compared to foreign studies, as each country had its own healthcare system and different studies applied different calculation methods.

Gaps between the ART unit cost and the claim requested can be explained in some ways. First, some treatment activities for HIV/AIDS patients are not codified in the fee schedule (for instance, prescribing antibiotics for opportunistic infections). Second, the current fee schedule does not keep pace with the advances in medicines and laboratory testing (as the fee schedule was set in 2013). Thus, it seems that the providers could not fully recoup the ART cost from the MOPH, which creates a moderate financial risk for the providers.^{17,18}

Limitations

First, as very few hospitals participated in the unit cost determining project of Health Insurance System Research Office (HISRO), limiting the generalisability of the findings. Besides, the limited number of hospitals containing unit cost data impeded the application of paired analysis (for example, paired Student t-test or Wilcoxon signed-rank test). Second, the interpretation of the results must be made with caution as this study did not include those beneficiaries who did not present at the hospitals. Therefore, it is difficult to be sure whether the current HICS premium is appropriately set from the actuarial point of view. In other words, this study did not indicate whether the existing premium is too low or too high and this point could not be answered merely by this study. An uplift in the reimbursement amount might address the providers' financial difficulty. However, in the same time it might create economic burden on the MOPH and discourage migrants from enrolling in the scheme. Thirdly, the

unit cost calculation in this study followed the MOPH standard guideline. In reality, however, there are many methods for calculating unit cost; for instance, micro-costing technique or activity-based costing technique. Hence, the different calculation methods might lead to different results. Last but not least, other qualitative aspects concerning HIV/AIDS care have not been explored. All of these limitation points warrant further studies.

Recommendations

The MOPH should update the fee schedule for ART and allow it to be adjusted according to the facilities' unit cost. This is like creating a tailor-made fee schedule instead of using the flat-rate schedule as per the status quo. Note that adjusting the fee schedule is not the complete solution to resolve disparities between the reimbursement amount and the facilities' unit cost. Since the calculation of unit cost derived from only eight hospitals (out of about a thousand hospitals affiliated with the MOPH), future studies should include many more hospitals if resources and time allow. A study that compares the present unit cost in other hospitals with the unit cost derived from the eight hospitals presented in this study is of great value. Moreover, here are many other issues that should be explored further in future studies. For instance, whether there is any barrier in accessing HIV/AIDS care across facility types; and what regulation the MOPH should implement to allow better (and more equitable) distribution of patients across different levels of care. Should all of these questions be resolved, it is likely that inequity problems originating from the gap between unit cost and reimbursement amount requested will be minimised.

Conclusion

This study illuminated gaps between reimbursement amount that HICS paid for ART for cross-border migrants and the actual ART unit cost at public facilities in Thailand. Overall, the total reimbursement amount at US\$ 222.7 was less than the total unit cost at US\$ 234.1 in 2015. The unit cost for HIV/AIDS treatment in provincial hospitals was notably greater than the average reimbursement amount submitted to the MOPH. In contrast, regional hospitals had unit cost of care less than reimbursement amount. The disparity of unit cost across facility types might be explained by inequitable distribution of patients in different levels of care. This study also recommended that the MOPH should update the fee schedule for ART reimbursement to better reflect the providers' actual

unit cost. Also, the ART reimbursement amount should be allowed to vary by facility types instead of adhering to the fixed fee schedule as per the existing situation.

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Declaration of Conflict of Interest

Authors declare no conflicts of interest.

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Ethics Approval

This study obtained ethics approval from the Institute for the Development of Human Research Protections in Thailand (IHRP 834/2561). All data are kept anonymous. Dissemination of the findings can be done only for academic interest without disclosing individual information.

Suggested Citation

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