CHAPTER IV

RESULTS

This chapter depicts all findings on assessments of disparity in practice patterns and efficiency of health care services provided to patients with different health insurance scheme and payment methods. There are five parts of the findings – general information, access to care, equity care, quality dimension of practice patterns, and efficiency of health care services.

General Information

From electronic databases of the three selected hospitals during the fiscal year 2003 – 2005, information of health care services of patients satisfied the inclusion criteria of the four tracer diseases was retrieved, as shown in Table 4.1. For the tracer disease of acute low back pain (ALBP), data of 5,339 patients were obtained for assessments of the effects of health insurance payment methods on access to new drugs and drugs in dosage form with high technology and on the equality in costs of treatment. For the tracer disease of acute upper gastro-intestinal bleeding (AUGIB), data of 379 patients were recruited for assessments of the access to required drugs and high cost and high technology equipment and for evaluation of the equity care. In addition, 170 of these 320 fee-for-service patients were selected by random sampling method and all data of patients in the 30-Baht Scheme and the SSS (44 patients) were obtained for assessments of the quality dimensions of practice patterns and the efficiency of health care services. Similarly, the data of 333 patients with the tracer disease of lung cancer was retrieved to assess the access to new drugs and palliative drugs and to evaluate the equity care. And 127 of these 260 fee-for-service patients were selected by random sampling method and all data of patients in the 30-Baht Scheme and the SSS (38 patients) were obtained for assessments of the quality dimensions of practice patterns, and the efficiency of health care services. For the last tracer disease of epilepsy, 913 patients were recruited for assessments of the access to

new drugs and for evaluation of the equity care. Additionally, 256 of these 913 patients were selected by stratified random sampling method for determination of the quality dimensions of practice patterns and 666 episodes of the 256 patients were engaged in the calculations of efficiency of health care services.

Table 4.1: Number of patients recruited for each tracer disease in the study

Tracer diseases	Number of patients (or episodes) for each assessment			
	Access to care	Equity care	Quality dimensions of practice patterns	Efficiency of health care services
ALBP	5339	5339	-	-
AUGIB	379	379	214	214
Lung cancer	333	333	175	175
Epilepsy	913	913	256	666*

* *number of episodes of epilepsy in the 256 selected patients*

Access to Care

The findings in this part of the study were comprised of the effect of health insurance payment methods on access to new drugs, required drugs, palliative drugs, drugs in dosage form with high technology, and equipment with high cost and high technology.

1. Access to new drugs

New drugs in the study were identified as

- COX II inhibitors for ALBP, including meloxicam, celecoxib, valdecoxib, parecoxib, and etoricoxib.
- New antiepileptic drugs for epilepsy, including lamotrigine, topiramate, gabapentin, oxcarbazepine, and levetiracetam.
- New generation of antineoplastic drugs for lung cancer, including docetaxel, gemcitabine, paclitaxel, vinorebine, irinotecan, and topotecan

Percentages of patients with each tracer diseases who were prescribed new drugs were calculated. Chi-square statistic was exploited for comparisons of the percentages among patients covered by different health insurance systems with different payment methods, as shown in Table 4.2. For patients covered by open-ended payment system, the percentages of patients who were prescribed new drugs were statistically significant higher than for patients covered by close-ended payment system, for all three tracer diseases, p-value = 0.000.

It was inferred that the associations between the payment methods and the access to new drugs were existed. The associations of higher access to new drugs for treatments of ALBP and lung cancer in patients with open-ended system were strong, odds ratios = 36.92 and 11.40 respectively, while the association for treatment of epilepsy was quite weak, odds ratio = 2.47.It was inferred that the associations between the payment methods and the access to new drugs were existed. The associations of higher access to new drugs for treatments of ALBP and lung cancer in patients with open-ended system were strong, odds ratios = 36.92 and 11.40 respectively, while the association for treatment of epilepsy was quite weak, odds ratio = 2.47.

Table 4.2: Effects of health insurance payment methods on access to new drugs

	Access to new drugs in each tracer diseases	**Health insurance payment methods**	
		Close-ended	**Open-ended**
Acute low back pain (ALBP)	Number of all ALBP patients	923	4416
	Number of ALBP patients who were prescribed COX II inhibitors	15	1747
	Percentage of ALBP patients with access to COX II inhibitors	1.63%	39.55%
	p-value	< 0.0001	
	Odds ratio	39.62 (23.703-66.232)	
Lung cancer	Number of all lung cancer patients	73	260
	Number of lung cancer patients who were prescribed new generations of antineoplastic drugs	11	174
	Percentage of lung cancer patients with access to new generations of antineoplastic drugs	15.07%	66.92%
	p-value	< 0.0001	
	Odds ratio	11.40 (5.712-22.766)	
Epilepsy	Number of all epileptic patients	184	729
	Number of epileptic patients who were prescribed new antiepileptic drugs	28	224
	Percentage of epilepsy patients with access to new antiepileptic drugs	15.22%	30.73%
	p-value	< 0.0001	
	Odds ratio	2.47 (1.604-3.806)	

* statistical significance at $p < 0.05$

1.1. Subgroup analysis of access to COX-II inhibitors: differentiated by generations of COX II inhibitors and patients' age

COX II inhibitors were developed into two generation: the early generation which was selective COX II inhibitors, including meloxicam, and the new generation with less gastro-intestinal side effects which was specific COX II inhibitors, including meloxicam, celecoxib, valdecoxib, parecoxib, and etoricoxib During fiscal year 2003 – 2005, meloxicam was the only one COX II inhibitor classified in the National Essential Drug List. Numbers and percentages of patients in different health insurance systems with different payment methods who were prescribed COX II inhibitors with different generations for treatments of ALBP are shown in Table 4.3.

For specific COX II inhibitors, only six out of 923 patients accounted for 0.65% in close-ended payment schemes could gain access to specific COX II inhibitors, whereas 1,193 out of 4,416 patients, accounted for 27.01% in open-ended payment schemes could. Regarding selective COX II inhibitors, only 1.08% of patients in close-ended payment schemes could gain access to meloxicam, whereas 12.93% of patients in open-ended payment schemes could.

As for Chi-square tests, patients in open-ended payment schemes were prescribed both selective and specific COX II inhibitors remarkably statistical significant more than patients in close-ended payment schemes, p-value = 0.000. The magnitude of association between payment methods and the access to specific COX II inhibitors (odds ratio = 56.57) was more intense than the access to selective COX II inhibitors (odds ratio = 13.54).

Table 4.3: Effects of health insurance payment methods on access to selective and specific COX II inhibitors

Access to COX II inhibitor in treatments of acute low back pain	**Health insurance payment methods**	
	Close-ended	Open- ended
Number of all patients with acute low back pain	923	4416
Number of patients who were prescribed selective COX II inhibitors	10	570
Percentage of patients with access to selective COX II inhibitors	1.08%	12.93%
p-value	< 0.0001	
Odds ratio	13.54 (7.211-25.390)	
Number of patients who were prescribed specific COX II inhibitors	6	1193
Percentage of patients with access to specific COX II inhibitors	0.65%	27.01%
p-value	< 0.0001	
Odds ratio	56.57 (25.280-126.598)	

Table 4.4 presents the percentage of elderly patients in each health insurance payment method who were prescribed COX II inhibitors in treatment of acute low back pain. The interesting information obtained from the study shows that only 1 percentage of elderly patients in close-ended payment scheme could gain access to COX II inhibitor drugs as contrast with 46 % for open-ended payment scheme.

Table 4.4: Effects of health insurance payment methods on access to COX II inhibitor drugs in elderly patients

Access to COX II inhibitor drugs in treatment of acute low back pain	**Health insurance payment methods**	
	Close-ended	Open ended
Number of elderly patients (Age≥ 60) patients with acute low back pain	104	1029
Number of elderly patients with access to COX II inhibitors	1	473
Percentage of elderly patients with access to COX II inhibitors of patients	0.96%	46.06%
p value	< 0.0001	
Odds ratio	87.94 (12.180-630.381)	

Table 4.5 presents the percentage of patients in each health insurance payment method who were prescribed new drugs. Chi-square test presented a statistically significant difference among the numbers of patients who were prescribed COX II inhibitors in 30-Baht Scheme the SSS and the CSMBS. The analysis indicates that there were associations between types of health insurance payment methods and access to COX II inhibitors, to new antiepileptic drugs, and to new antineoplastic drugs. Regarding this, the percentages of patients who were prescribed new drugs in the CSMBS scheme were statically significant higher than the percentage of patients in the 30-Baht Scheme and the SSS for all three tracer diseases.

The interesting information obtained from the study only 2 patients out of 391 patients in the 30-Baht Scheme and only 13 patients out of 116 patients in the SSS were prescribed COX II inhibitors whereas nearly 1,800 patients out of 4,416 patients in the CSMBS that paid by fee-for-service were prescribed COX II inhibitors. Furthermore, all patients who were prescribed COX-II inhibiters in the 30-Baht Scheme paid the hospitals by out-of-pocket whereas only 3 patients out of 13 patients with COX-II inhibiters in the SSS paid by themselves. As for epileptic

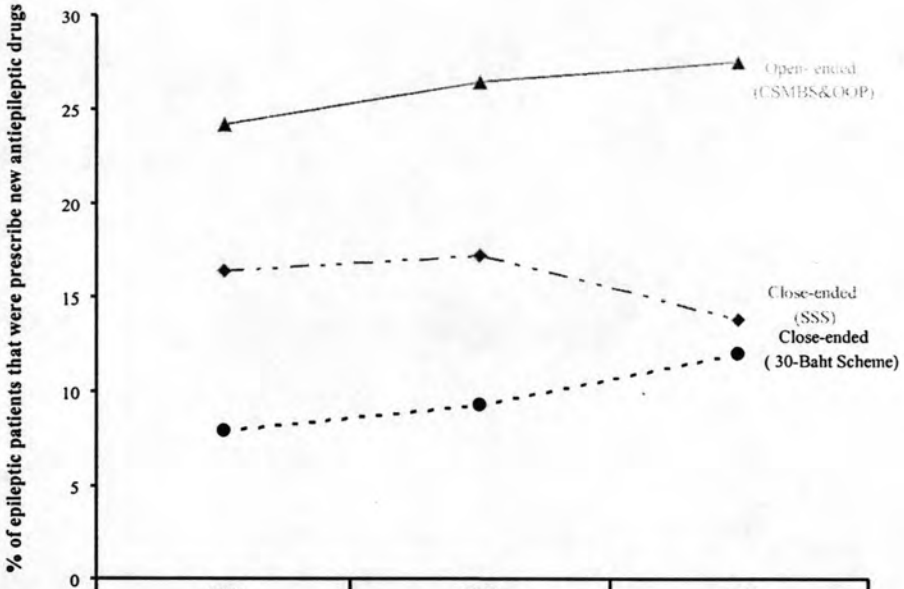
patients, the only one patient out of 15 patients could gain to new epileptic drugs by subsidy form the 30-Baht Scheme whereas only 4 patients out of 13 patients in the SSS paid by themselves. All lung cancer patients (3 patients) in the SSS could gain access to new antineoplastic for free but only 3 patients out of 8 patients in the 30-Baht Scheme allowed free access to new antieoplastic drugs

Table 4.5: Effects of health insurance payment methods in each scheme on access to new drugs

Access to new drugs in each tracer diseases	**Health insurance payment methods**		
	30 baht scheme	SSS	CSMBS
	Capitation	Capitation	Fee-for-service
Number of patients with ALBP	391	532	4416
Number of ALBP patients with access to COX II inhibitors	2	13	1747
Percentage of ALBP patients in access to COX II inhibitors	0.51%	2.45%	39.55%
p value	< 0.0001		
	Capitation + DRG	Capitation	Fee-for-service
Number of epileptic patients	116	68	729
Number of epileptic patients with access to new antiepileptic drugs	15	13	224
Percentage of epileptic patients with access to new antiepileptic drugs	12.93%	19.12%	30.73%
p value	< 0.0001		
	Per item with ceiling	Per item with ceiling	Fee-for-service
Number of lung cancer patients	42	31	260
Number of lung cancer patients with access to new generations of antineoplastic drugs	8	3	174
Percentage of lung cancer patients with access to new generations of antineoplastic drugs	19.05%	9.68%	66.92%
p value	< 0.0001		

1.2. Longitudinal analysis of access to new antiepileptic drugs

Exhibit 4.1 shows the percentage of epileptic patients who could gain access to new epileptic drugs during 3 fiscal years. As can be seen in exhibit 4.1, the percentage of patients in the 30-Baht Scheme that paid by capitation and DRG payment method had a tendency to increase during 3 fiscal years. Likewise, the percentage of patients in scheme which paid by fee-for-service had a tendency to increase. On the contrary, the percentage of patients in the SSS that paid by capitation only had a tendency to decrease in the third year. However, the percentage of patients who were prescribed new antiepileptic drugs in open-ended payment scheme was higher than the percentage of patients in close-ended payment scheme.



	2003	2004	2005
Close-ended (30-Baht Scheme)	7.89	9.28	11.96
Close-ended (SSS)	16.36	17.19	13.79
Open- ended (CSMBS&OOP)	24.16	26.48	27.55

Exhibit 4.1: Summary of the percentage of epileptic patients in each scheme who were prescribed new antiepileptic drugs during three fiscal years

2. Access to required drugs

Required drugs in the study were identified as Proton pump inhibitor drugs, including omeprazole, pantoprazole, lansoprazole and esomeprazole. Percentages of patients with AUGIB who were prescribed required drugs were calculated. Monte Calo test was performed for comparisons of the percentages among patients covered by different health insurance systems with different payment methods, as shown in Table 4.6. For patients covered by open-ended payment system, the percentages of patients who were prescribed required drugs were no statistically significant for patients covered by close-ended payment system.

It was inferred that the associations between the payment methods and the access to required drugs were no existed.

Table 4.6: Effect of health insurance payment methods on access to required drugs

Access to required drugs in AUGIB treatment	**Health insurance payment methods**	
	Close-ended	Open ended
Number of AUGIB patients	59	320
Number of AUGIB patients with access to PPIs	59	319
Percentage of AUGIB patients with access to PPIs	100.00%	99.69%
p value	> 0.05	
Odds ratio	1.003 (0.997-1.009)	

2.1. Subgroup analysis of proton pump inhibitors: differentiated by dosage form and originator's of PPIs

As costs per day of PPIs were various, started from 5 baht to 350 baht depending on dosage form and originator's product, payment incentives might have highly potential effects on equal opportunities to access the different types of the drugs. Therefore, subgroup analyses of PPIs was

appropriate for determination of access to this kind of drugs

Numbers and percentages of patients in different health insurance systems with different payment methods who were prescribed PPIs for treatments of AUGIB are shown in Table 4.7. For oral form of PPIs, 53 out of 59 patients accounted for 89.83% in close-ended payment schemes could gain access to specific COX II inhibitors, and 296 out of 320 patients, accounted for 92.50% in open-ended payment schemes could. Regarding oral form of PPIs, only 56.90% of patients in close-ended payment schemes could gain access to PPIs, whereas 83.13% of patients in open-ended payment schemes could.

As for Chi-square tests, patients in open-ended payment schemes were prescribed injection form of PPIs remarkably statistical significant more than patients in close-ended payment schemes, p-value = 0.000. It was inferred that the associations between the payment methods and the access to injection form of PPIs were existed. However, the association between type of insurance payment methods and access to injection form of PPIs was quite weak, odds ratio = 2.47.

As for the findings of access to oral form of proton pump inhibitors, Monte Calo test presented there was no statistically significant difference between the percentages of patients who were prescribed oral form of proton PPIs in close-ended payment schemes and in open-ended payment schemes. It was inferred that the associations between the payment methods and the access to oral form of PPIs was no existed

Table 4.7: Effect of health insurance payment methods on access to different dosage form of proton pump inhibitors

Access to required drugs in AUGIB treatment	**Health insurance payment methods**	
	Close-ended	Open ended
Number of AUGIB patients	59	320
Number of AUGIB patients with access to PPIs (oral form)	53	296
Percentage of AUGIB patients with access to PPIs (oral form)	89.83%	92.50%
p value	> 0.05	
Odds ratio	1.40 (0.545-3.578)	
Number of AUGIB patients with access to PPIs (injection form)	33	266
Percentage of AUGIB patients with access to PPIs (injection form)	56.90%	83.13%
p value	< 0.0001	
Odds ratio	3.73 (2.056-6.775)	

As for originator's product, cost of originator's PPIs were 35-50 baht per capsule whereas costs of local-made were not more than 5 baht per capsule.

Numbers and percentages of patients in different health insurance systems with different payment methods who were prescribed PPIs with different dosage form for treatments of AUGIB are shown in Table 4.8. The 34 out of 58 patients accounted for 58.62 % in close-ended payment schemes could gain access to originator's PPIs, whereas 271 out of 317 patients, accounted for 85.49% in open-ended payment schemes could.

As for Chi-square tests, patients in open-ended payment schemes were prescribed originator's PPIs remarkably statistical significant more than

patients in close-ended payment schemes, p-value = 0.000. It was inferred that the associations between the payment methods and the access to injection form originator's PPIs were existed. However, the association between type of insurance payment methods and access to originator's PPIs was quite weak, odds ratio = 4.16.

Table 4.8: Effect of health insurance payment methods on access to originator's proton pump inhibitor drugs

Access to required drugs in AUGIB treatment	**Health insurance payment methods**	
	Close-ended	Open ended
Number of AUGIB patients	58	317
Number of AUGIB patients with access to originator 's PPIs	34	271
Percentage of AUGIB patients with access to originator 's PPIs	58.62%	85.49%
p value	< 0.0001	
Odds ratio	4.16 (2.262 – 7.645)	

Table 4.9 presents the percentage of patient in each payment method who were prescribed required drugs. Monte Calo test was performed to compare the difference in number of patients under the different payment scheme who were prescribed PPI drugs. It was inferred that the associations between the payment methods and the access to required drugs were no existed.

Table 4.9: Effect of health insurance payment methods in each scheme on access to required drugs

Access to required drugs in AUGIB treatment	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	DRG	Capitation	Fee-for-service
Number of AUGIB patients	41	18	320
Number of AUGIB patients with access to PPIs	41	18	319
Percentage of AUGIB patients with access to PPIs	100.00%	100.00%	99.69%
p value	> 0.05		

2.2. Subgroup analysis of proton pump inhibitors differentiated by dosage form and originator's of PPIs

Numbers and percentages of patients in different health insurance systems with different payment methods who were prescribed PPIs with different dosage form for treatments of AUGIB are shown in Table 4.10. The 266 out of 320 patients accounted for 83.13 % in CSMBS could gain access to injection form of PPIs, whereas 21 out of 41 patients in the 30-Baht Scheme and 12 out of 17 patients in the SSS could. Regarding oral form of PPIs, 87.80% of patients in the 30-Baht Scheme and 94.44% of patients in SSS and 92.50 % of patients in CSMBs could gain access to oral PPIs.

As for the Monte Calo test, the CSMBS patients were prescribed injection form of PPIs remarkably statistical significant more than patients in both schemes, p-value = 0.000. It was inferred that the associations between the payment methods and the access to injection form of PPIs were existed

As for Chi-square tests,, the p value was higher than 0.05. It indicates that there was no association between schemes and access to oral dosage form of proton pump inhibitor drugs.

Furthermore, the only 8 patients out of 21 patients in the 30-Baht

Scheme could gain to injection PPIs for free whereas 10 patients out of 12 patients in the SSS allowed free access to injection PPIs.

Table 4.10: Effect of health insurance payment methods in each scheme on access to different dosage form of proton pump inhibitors

Access to required drugs in AUGIB treatment	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	DRG	Capitation	Fee-for-service
Number of AUGIB patients	41	18	320
Number of AUGIB patients with access to PPIs (oral form)	36	17	296
Percentage of AUGIB patients with access to PPIs (oral form)	87.80%	94.44%	92.50%
P value	> 0.05		
Number of UGIB patients	41	17	320
Number of UGIB patients with access to PPIs (injection form)	21	12	266
Percentage of UGIB patients with access to PPIs (injection form)	51.22%	70.59%	83.13%
p value	< 0.0001		

Numbers and percentages of patients in different health insurance systems with different payment methods who were prescribed PPIs for treatments of AUGIB are shown in Table 4.11. Monte Calo test was performed to compare the difference in number of patients under the different payment scheme who were prescribed originator's PPI drugs. The analysis indicates the percentage of patients were prescribed original proton pump inhibitors drugs in the 30-Baht Scheme were statistically significant lowest compared in other schemes. Furthermore, the only 8 patients out of 21 patients in the 30-Baht Scheme could gain to originator's PPIs for free whereas 9 patients out of 12 patients in the SSS allowed free access to injection PPIs.

Table 4.11: Effect of health insurance payment methods in each scheme on access to original proton pump inhibitor drugs

Access to required drugs in AUGIB treatment	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	DRG	Capitation	Fee-for-service
Number of AUGIB patients	41	18	317
Number of AUGIB patients with access to originator 's PPIs	22	12	271
Percentage of UGIB patients with access to originator 's PPIs	53.66%	70.59%	85.49%
p value	< 0.0001		

3. Access to palliative drugs

Palliative drugs in the study were identified as

- Anti-emetic drugs for lung cancer, including dimenhydrinate, metoclopramide, ondansetron, granisetron, and ramosetron.
- G_CSF drugs, including lenograstim, molgramostim, and filgrastim.

Percentages of patients with lung cancer who were prescribed palliative drugs were calculated. Chi-square statistic was exploited for comparisons of the percentages among patients covered by different health insurance systems with different payment methods, as shown in Table 4.12. For patients covered by open-ended payment system, the percentages of patients who were prescribed supoortive drugs were no statistically significant for patients covered by close-ended payment system.

It was inferred that the associations between the payment methods and the access to palliative drugs were no existed.

Table 4.12: Effect of health insurance payment methods on access to palliative drugs

Access to palliative drugs in lung cancer treatment	**Health insurance payment methods**	
	Close-ended	Open ended
Number of lung cancer patients	73	260
Number of lung cancer patients with access to anti-emetic drugs	65	235
Percentage of lung cancer patients with access to anti-emetic drugs	89.04%	90.08%
p value	> 0.05	
Odds ratio	1.157 (0.498-2.686)	
Number of lung cancer patients with access to G-CSF drugs	4	30
Percentage of patients with access to G-CSF drugs	5.48%	11.54%
p value	> 0.05	
Odds ratio	2.250 (0.766-6.608)	

3.1. Subgroup analysis of anti-emetic drugs

As costs of anti-emetic were various, started from 25 baht to 1,090 baht depending on originator's product, payment incentives might have highly potential effects on equal opportunities to access the originator's and local-made products. Therefore, subgroup analyses of anti-emetic drugs was appropriate for determination of access to this kind of drugs

Table 4.13 presents the percentage of patient in each payment method who were prescribed originator's anti-emetic drugs such as Zofran®. Chi square test was performed to compare the difference in number of patients who were prescribed originator's anti-emetic drugs in each payment method. As shown in table 4.13, only 5 patients (7 %) in close-ended payment schemes could gain access to originator's anti-emetic drugs whereas over half

of patients (59 %) in open-ended payment schemes were prescribed the drugs. The analysis indicates that there was the strong association between type of payment method and access to originator's anti-emetic drugs with odds ratio = 19.758.

Table 4.13: Effect of health insurance payment methods on access to originator's anti-emetic drugs

Access to palliative drugs in lung cancer treatment	**Health insurance payment methods**	
	Close-ended	Open ended
Number of lung cancer patients	73	260
Number of lung cancer patients with access to originator's anti-emetic drugs	5	154
Percentage of lung cancer patients with access to originator's anti-emetic drugs	6.85%	59.23%
p value	< 0.0001	
Odds ratio	19.758 (7.709 – 50.645)	

Chi Square test was performed to compare the difference in number of patients under difference payment schemes who were prescribed anti-emetic drugs and G-CSF drugs. The analysis presented there were no statistically significant differences among number of patients who were prescribed palliative drugs in the 30-Baht Scheme, the SSS and the CSMBS.

Table 4.14: Effect of health insurance payment methods in each scheme on access to palliative drugs

Access to palliative drugs in lung cancer treatment	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	Per item with ceiling	Per item per year with ceiling	Fee-for-service
Number of lung cancer patients	42	31	260
Number of lung cancer patients with access to anti-emetic drugs	38	27	235
Percentage of lung cancer patients with access to anti-emetic drugs	90.48%	87.10%	90.38%
p value	> 0.05		
Number of lung cancer patients with access to G-CSF drugs	0	4	30
Percentage of patients with access to G-CSF drugs	0.0%	12.90%	11.54%
p value	> 0.05		

3.2. Subgroup analysis of anti-emetic drugs

Numbers and percentages of patients in different health insurance systems with different payment methods who were prescribed originator's banti-emetic drugs with different generations for treatments of lung cancer are shown in Table 4.15. Only 3 out of 42 patients accounted for 7.14% in the 30-Baht Schemes and only 2 out of 31 SSS patients could gain access to originator's anti-emetic drugs, whereas 154 out of 260 patients, accounted for 59.23% in CSMBS could. Furthermore, all patients (3 patients) in the 30-Baht Scheme could gain to originator's anti-emetic drugs paid hospitals by themselves whereas all patients (2 patients) in the SSS allowed free access to originator's anti-emetic drugs.

As for Chi-square tests, patients in CSMBS were prescribed originator's remarkably statistical significant more than patients in both close-ended payment schemes, p-value = 0.000. The analysis inferred that there was an association between scheme and access to the originator's drugs.

Table 4.15: Effcect of health insurance payment methods in each scheme on access to palliative drugs

Access to palliative drugs in lung cancer treatment	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	Per item with ceiling	Per item per year with ceiling	Fee-for-service
Number of lung cancer patients	42	31	260
Number of lung cancer patients with access to originator's anti-emetic drugs	3	2	154
Percentage of lung cancer patients with access to originator's anti-emetic drugs	7.14%	6.45%	59.23%
p value	< 0.0001		

4. Access to drugs in dosage form with high technology

Chi-square was performed to compare the difference in number of patients under the different payment schemes who were prescribed drugs in dosage form with high technology such as Feldene D®, Voltaren SR ®, Indocid R®. As shown in table 4.17, the p value was less than 0.05. It indicates that there was the association between type of health insurance payment methods and access to drugs in dosage form with high technology. Furthermore, the interesting information obtained from the study showed that only a few patients (3.77 %) in open-ended payment schemes were prescribed the drugs whereas all patients in close-ended payment schemes could not gain access to the drugs However, the magnitude of the association was quite low (odds ratio = 1.039) indicating that the association between type of health insurance payment methods and access to drugs in dosage form with high technology was weak.

Table 4.16: Effect of health insurance payment methods on access to drugs in dosage form with high technology

Access to drugs in dosage form with high technology in treatment of acute low back pain	**Health insurance payment methods**	
	Close-ended	Open ended
Number of patients with acute low back pain (ALBP)	923	4416
Number of ALBP patients with access to conventional NSAIDS in dosage form with high technology	0	240
Percentage of ALBP patients with access to conventional NSAIDS in dosage form with high technology	0%	3.77%
p value	< 0.0001	
Odds ratio	1.057 (1.050- 1.065)	

Table 4.17 presents the percentage of patients in each payment method who were prescribed conventional non steroidal anti-inflammatory drugs with high technology of dosage form. The p value was computed by Chi-square test revealed that there was a statistically significant difference among the number of patients who were prescribed the drugs in the 30-Baht Scheme, the SSS and the CSMBS. Regarding this, only patients in the CSMBS that payer paid by fee-for-service payment method were prescribed drugs in dosage form with high technology.

Table 4.17: Effect of health insurance payment methods in each scheme on access to drugs in dosage form with high technology

Access to drugs in dosage form with high technology in treatment of acute low back pain	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	Capitation	Capitation	Fee-for-service
Number of patients with acute low back pain (ALBP)	391	532	4416
Number of ALBP patients with access to conventional NSAIDS in dosage form with high technology	0	0	240
Percentage of ALBP patients with access to conventional NSAIDS in dosage form with high technology	0.00%	0.00%	5.43%
p value	< 0.0001		

5. Access to high cost and technology equipment

Chi-square was performed to compare the difference in number of patients under different payment schemes who were prescribed equipment with the high cost and high technology. As shown in table 4.18, the percentage of patients were examined by high cost and high technology equipments in open-ended payment schemes were significantly higher than the percentage of patients in close-ended payment schemes. It indicates that there were associations between type of health insurance payment methods and access to high cost and high technology equipment with p value < 0.05. However, magnitude of access to high cost and high technology equipment was quite low (1.839, and 3.021) indicating that the associations was weak.

Table 4.18: Effect of health insurance payment methods on access to the equipment with high cost and high technology

Access to the equipment with high cost and high technology in each tracer diseases	**Health insurance payment methods**	
	Close-ended	Open-ended
Number of AUGIB patients	59	318
Number of AUGIB patients with access to the gastroscope	32	218
Percentage of AUGIB patients with access to the gastroscope	54.24%	68.55%
p value	< 0.05	
Odds ratio	1.839 (1.046 – 3.234)	
Number of lung cancer patients	73	260
Number of lung cancer patients with access to either the CT scan or the MRI in diagnosis of lung cancer	36	194
Percentage of lung cancer patients with access to either the CT scan or the MRI in diagnosis of lung cancer	49.32%	74.62%
p value	< 0.0001	
Odds ratio	3.021 (1.766-5.169)	

Chi-square test was performed to compare the difference in number of patients under different payment schemes who were diagnosed by the gastroscope. The analysis indicates that there was no association between the type of health insurance payment methods and access to the gastroscope.

Table 4.19: Effect of health insurance payment methods in each scheme on access to a gastroscope

Access to the equipment with high cost and high technology in AUGIB diagnosis	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	DRG	Capitation	Fee-for-service
Number of AUGIB patients	41	18	318
Number of AUGIB patients with access to the gastroscope	22	10	218
Percentage of AUGIB patients with access to the gastroscope	53.56%	55.56%	68.55%
p value	> 0.05		

Chi-square test was performed to compare the difference in number of patients under different payment schemes who were prescribed either CT scan or MRI. The analysis showed that there were statistically significant differences among number of patients who were prescribed either CT scan or MRI in the 30-Baht Scheme, the SSS and the CSMBS with p value =0.000. Furthermore, the percentage of patients was examined by high cost and high technology equipments in the SSS were significantly lowest compared with other schemes.

Table 4.20: Effect of health insurance payment methods in each scheme on access to equipment with high cost and high technology

Access to high cost and high technology equipments in lung cancer diagnosis	**Health insurance payment methods**		
	30-Baht Scheme capitation	SSS capitation	CSMBS Fee-for-service
Number of lung cancer patients	42	31	260
Number of lung cancer patients with access to either CT scan or MRI in diagnosis of lung cancer	25	11	194
Percentage of lung cancer patients with access to either CT scan or MRI in diagnosis of lung cancer	59.52%	35.48%	74.62%
p value	< 0.0001		

Equity Care

The values of Shorrocks index of order 2 are shown in Table 4.21. The values of Shorrocks index were over zero in all four tracer diseases. It was inferred that drug cost distributed unequally for all tracer diseases. Furthermore, the calculated Shorrock indexes reveal that the inequality in the treatments of UGIB was highest whereas the inequality in the treatments of ALBP was lowest.

Table 4.21: Shorrocks indices in order 2 in each tracer disease.

Tracers	Shorrocks indices
ALBP	0.6781
AUGIB	2.3278
Lung cancer	0.8341
Epilepsy	1.2998

2-way ANOVA calculated to detect factors including payment method and age group that influenced variance of the drug treatment costs in each tracer disease, as shown in Table 4.22. For ALBP, it was found that payment method and interactions between payment method and age group had influences on distribution of costs of drug treatment while just the age group factor had no such influences, p-value < 0.05. Because the value of F test of payment method was more than the value of interaction, it was inferred that payment method had influence on drug cost of treatment more than the interaction.

As for AUGIB and epilepsy, it was found that all factors of payment method, age group, and interaction between payment method and age group had statistically significant influences on the costs, p-value < 0.05. In AUGIB, the value of F test of interaction between age group and payment method was highest. It was inferred that the interaction between payment method and age group affected inequality of drug cost of treatment the most. In epilepsy, the F test value of payment method was much more than the age group and the interaction. It was inferred that payment method had influence inequality of drug cost of treatment more than others.

For lung cancer, only factors of payment method had statistically significant influences on the costs distributions, p-value = 0.05.

Table 4.22: Factors related inequality of drug cost

Tracers	Factors	F	sig.
ALBP	*Payment method*	28.537	*< 0.0001*
	Age group	1.168	> 0.05
	Payment method age group*	2.196	*< 0.05*
AUGIB	*Payment method*	3.047	*< 0.05*
	Age group	3.161	*< 0.05*
	Payment method age group*	4.280	*< 0.0001*
Epilepsy	*Payment method*	6.004	*< 0.005*
	Age group	3.448	*< 0.01*
	Payment method age group*	2.945	*< 0.01*
Lung cancer	*Payment method*	3.031	*< 0.05*
	Age group	0.376	> 0.05
	Payment method age group*	0.276	> 0.05

Table 4.23 summarizes the ranking factors that affected distribution of drug costs in each tracer diseases. As for ALBP, payment methods influenced inequality of distribution of drug cost more than interaction between payment method and age group. In AUGIB, interaction between payment method and age group had effect on inequality of drug cost more than age group and payment method. For epilepsy, payment method had impacts on inequality of drug cost more than age group and interaction between payment method and drug cost. In lung cancer, only payment method affected inequality of drug cost.

Table 4.23: The ranking factors effect on inequality of drug costs

Rank	ALBP	AUGIB	Epilepsy	Lung cancer
1	Payment method	*Payment method* age group*	*Payment method*	Payment method
2	*Payment method* age group*	Age group	*Age group*	
3		Payment method	*Payment method* age group*	

Quality Dimension of Practice Patterns

1. Adherence to standard practice guidelines

2.1 Acute upper gastrointestinal bleeding (AUGIB)

Monte Calo test was performed to compare the percentage of patients that their practices of physician complied with indispensable recommendations of standard practice guideline in each payment method. As shown in table 4.24, there were no statistically significant differences between percentage of patients with AUGIB that their physicians diagnosed them by the gastroscope in close-ended payment scheme and in open-ended payment scheme. In addition, there were no statistically significant differences between number of patients with AUGIB that were prescribed proton pump inhibitor drugs in close-ended payment scheme and in open-ended payment scheme. All analyses above indicate that there were no association between type of health insurance payment methods and adherence to standard practice guideline in diagnosis and treatment of AUGIB.

Table 4.24: Effcect of health insurance payment methods on adherence to standard practice guideline of AUGIB

Adherence to indispensable recommendations of standard practice guideline of AUGIB	**Health insurance payment methods**	
	Close-ended	Open ended
Number of AUGIB patients	44	170
Number of AUGIB patients who were diagnosed by a gastroscope	37	151
Percentage of AUGIB patients who were diagnosed by a gastroscope	86.05%	90.42%
p value	> 0.05	
Odds ratio	1.530 (0.560 - 4.180)	
Number of AUGIB patients	44	170
Number of AUGIB patients who were prescribed PPI drugs	41	168
Percentage of AUGIB patients who were prescribed PPI drugs	93.18%	98.82%
p value	> 0.05	
Odds ratio	6.146 (0.994 - 37.990)	

**The recommendation of the Gastroenterological Association of Thailand*

Table 4.25 presents percentage of patients in each payment method who were diagnosed by a gastroscope and prescribed proton pump inhibitor drugs. Monte Calo test was performed to compare the number of patients that their practices of physician complied with critical recommendations in the guideline in each payment method. All analyses above indicate that there were no association between type of health insurance payment methods and adherence with standard practice guideline in diagnosis and treatment of AUGIB.

Table 4.25: Effcect of health insurance payment methods on adherence to standard practice guideline of AUGIB

Adherence to indispensable recommendations of standard practice guideline of AUGIB	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	DRG	Capitation	Fee-for-service
Number of UGIB patients	29	15	170
Number of UGIB patients who were diagnosed by gastroscope	26	11	151
Percentage of UGIB patients who were diagnosed by gastroscope	89.66%	75.87%	90.42%
p value	> 0.05		
Number of UGIB patients	29	15	170
Number of UGIB patients who were prescribed PPI drugs	26	15	168
Percentage of UGIB patients who were prescribed PPI drugs	66.67%	100.00%	100.00%
p value	> 0.05		

**The recommendation of the Gastroenterological Association of Thailand*

2.2 Lung cancer

Chi-square was performed to compare the number of patients that their practices of physician complied with indispensable recommendations in the standard practice guidelines in each payment method. As shown in table 4.26, the percentage of patients who were first diagnosed by chest CT scan in close-ended payment schemes were significantly higher than in open-ended payment schemes. On the contrary, there were no statistically significant differences between the number of treatment course that lung cancer patients was prescribed appropriate drug regimens in close-ended payment scheme and in open-ended payment scheme.

The analyses indicate that there were no associations between type of health insurance payment methods and adherence with standard practice guideline in lung cancer *treatment* whereas there was the association

between type of health insurance payment methods and adherence with standard practice guideline in lung cancer *diagnosis*.

Table 4.26: Effcect of health insurance payment methods on adherence to standard practice guideline of lung cancer

Adherence to indispensable recommendations of standard practice guideline of lung cancer*	**Health insurance payment methods**	
	Close-ended	Open ended
Number of lung cancer patients	38	127
Number of lung cancer patients who were firstly diagnosed by a CT scan	37	94
Percentage of lung cancer patients who were firstly diagnosed by CT scan	97.40%	74.00%
p value	< 0.005	
Odds ratio	0.077 (0.010 – 0.584)	
Number of lung cancer patients	38	127
Number of treatment course	49	183
Number of treatment course that lung cancer patients were prescribed appropriate drug regiments	40	167
Percentage of treatment course lung cancer patients who were prescribed appropriate drug regiments	81.63%	91.25%
p value	> 0.05	
Odds ratio	2.528 (0.980-6.519)	

**The recommendation of the national collaborating centre for acute care*

Table 4.27 presents percentage of patients in each payment method who were first diagnosed by chest CT scan and prescribed appropriately multi-drug regiments of antineoplastic drugs. Chi-square was performed to compare the number of patients that their practices of physician complied with

indispensable recommendations in the standard practice guidelines in each payment method. The analyses present that the percentage of patients were appropriately diagnosis in the CSMBS were significantly lower than the percentage of patients in the 30-Baht Scheme and the SSS. Furthermore, the analyses indicate that there was no statically significant difference between the number of treatment course that lung cancer patients were prescribed appropriate drug regiments among schemes.

In summary, there was no association between type of health insurance payment methods and adherence with standard practice guideline in lung cancer treatment whereas there was no association between type of health insurance payment methods and adherence with standard practice guideline in lung cancer diagnosis.

Table 4.27: Effcect of health insurance payment methods on adherence to standard practice guideline of lung cancer in each scheme

Adherence to indispensable recommendations of standard practice guideline of lung cancer	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	Capitation	Capitation	Fee-for-service
Number of lung cancer patients	23	15	127
Number of lung cancer patients who were firstly diagnosed by CT scan	22	15	94
Percentage of lung cancer patients who were firstly diagnosed by CT scan	95.70%	100%	74.00%
p value	< 0.01		
	Per item with ceiling	Per item per year with ceiling	Fee-for-service
Number of lung cancer patients	23	15	127
Number of treatment course	28	21	183
Number of treatment course that lung cancer patients were prescribed appropriate drug regiments	24	16	167
Percentage of treatment course lung cancer patients who were prescribed appropriate drug regiments	85.71%	76.19%	91.26%
p value	> 0.05		

**The recommendation of the national collaborating centre for acute care*

2. The management patterns ADRs

2.1 ADR rate

The Chi-square was performed to compare the difference in number of patients under the different payment schemes who suffered from side-effect of antiepileptic drugs. As shown in table 4.28, the percentage of patients who suffered from side-effect of antiepileptic drugs in open-ended payment scheme were significantly lower than the percentage of patients in close-ended payment scheme (p value = 0.011).

Table 4.28: Number of patients with ADRs in each payment method

ADR rate	**Health insurance payment methods**	
	Close-ended	Open ended
Number of epileptic patients	65	191
Number of epileptic patients with ADRs	19	24
Percentage of patients with ADRs	29.23%	12.57%
p value	< 0.005	
Odds ratio	0.348 (0.175-0.690)	

Table 4.29 shows p value that was computed by Chi-square test and the percentage of patients who suffered from side-effect of antiepileptic drugs. The analysis presented that the percentage of patients who suffered from side-effect of antiepileptic drugs in the CSMBS were significantly lowest compared with the 30-Bath Scheme and the SSS.

Table 4.29: Number of patients with ADRs in each scheme

ADR rate	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	Capitation and DRG	capitation	Fee-for-service
Number of epileptic patients	40	25	191
Number of epileptic patients with ADRs	9	10	24
Percentage of patients with ADRs	22.50%	40.00%	12.57%
p value	< 0.001		

2.2 Patterns in ADR management

Chi-square was performed to compare the difference in number of patients under the different payment schemes that their practices of physician complied with recommendations in management of ADRs. As shown in table 4.30, the percentage of patients with appropriate management of ADRs in open-ended payment scheme was significantly higher than the percentage of patients in close-ended payment schemes.

Table 4.30: Effcects of health insurance payment methods on appropriate management of ADRs

Pattern in ADRs management	**Health insurance payment methods**	
	Close-ended	Open ended
Number of epileptic patients	65	191
Number of epileptic patients with ADRs	19	24
Number of epileptic patients who were appropriate management of ADRs	11	20
Percentage of epileptic patients who were appropriate management of ADRs	57.89%	86.96%
p value	< 0.010	
Odds ratio	0.206 (0.045-0.940)	

Table 4.31 presents the percentage of patients in each payment method under the different payment schemes that their practices of physician complied with recommendations in management of ADRs. Monte Calo test indicates that the percentage of patients with appropriate management of ADRs in the CSMBS was significantly higher than the percentage of patients in other schemes.

Table 4.31: Effcects of health insurance payment methods on appropriate management of ADRs

Pattern in ADR management	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	Capitation and DRG	capitation	Fee-for-service
Number of epileptic patients	40	25	191
Number of epileptic patients with ADRs	9	10	24
Number of epileptic patients with appropriate management of ADRs	5	6	20
Percentage of epileptic patients with appropriate management of ADRs	55.56%	60.00%	86.96%
p value	> 0.05		

Efficiency of Health Care Services

1.1. Acute upper gastrointestinal bleeding

The analysis indicates that cost which physicians used to treat a cured patient in close-ended payment scheme (1,737 baht) was lower than costs in open-ended payment scheme (5,038 baht).

Table 4.32: The efficiency of health care services in UGIB treatment in each payment method

	Health insurance payment methods	
	Close-ended	Open ended
Number of AUGIB patients with outcome data	42	160
Average drug cost (baht) per patient	1,695.37	4,848.90
p value	< 0.01	
Number of cured patient	41 (97.62%)	154 (96.25%)
p value	> 0.05	
Average drug cost (baht) per cured patient	1,736.73*	5,037.82

As for the efficiency of health care services, cost per cured case in the SSS (1,591 baht) was lowest compared with costs in other schemes. Controversy, costs in the CSMBS was highest compared with costs in other schemes.

Table 4.33: The efficiency of health care services in UGIB treatment in each payment scheme

Efficiency of UGIB treatment in each severity	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	DRG	Capitation	Fee-for-service
Number of UGIB patients with outcome data	29	13	160
Average drug cost (baht) per patient	1,742.31	1,590.67	4,848.90
p value	< 0.05		
Number of cured patient	28 (96.55%)	13 (100.00%)	154 (96.25%)
p value	> 0.05		
Average drug cost (baht) per cured patient	1,804.54	1,590.67*	5,037.82

1.2. Epilepsy

The analysis of finding seemed to provided that cost which physicians used to treat a patient with seizures free in open-ended payment scheme were less than costs in close-ended payment scheme.

Table 4.34: The efficiency of health care services in epilepsy treatment in each health insurance payment method

Efficiency of epileptic treatment	**Health insurance payment methods**	
	Close-ended	Open ended
Number of epileptic patients with outcome data	151	288
Average drug cost (baht) per patient	7,211.59	5,956.56
p value	> 0.05	
Number of patient with seizures free	110 (72.85%)	259 (89.93%)
p value	< 0.0001	
Average drug cost (baht) per patient with seizures free	9,899.59	6623.55*

Table 4.35 presents that cost which physicians used to treat an epileptic patient with seizures free in the CSMBS was lowest compared with costs in other schemes.

Table 4.35: The efficiency of health care services in epilepsy treatment in each scheme

Efficiency of epileptic treatment	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	Capitation and DRG	capitation	Fee-for-service
Number of epileptic patients with outcome data	89	62	288
Average drug cost (baht) per patient	5,755.96	9,301.13	5,956.56
p value	< 0.05		
Number of patient with seizures free	70 (78.65%)	40 (64.52%)	259 (89.93%)
p value	< 0.0001		
Average drug cost (baht) patient with seizures free	7,318.29	14,416.76	6,623.55*

1.3. Lung cancer

Table 4.36 shows cost that physicians used to treat patient with success outcome in close -ended payment scheme was less than costs in open-ended payment scheme. However, the numbers of patient with success outcome in open-ended payment scheme was significantly higher than in close-ended payment scheme.

Table 4.36: The efficiency of health care services in lung cancer treatment in each payment method

Efficiency of lung cancer treatment	**Health insurance payment methods**	
	Close-ended	Open ended
Number of lung cancer patients	38	127
Number of lung cancer patients with outcome data	33	85
Average drug cost (baht) per patient	48,357.15	156,282.86
p value	< 0.0001	
Number of success patient	11 (33.33%)	52 (61.18 %)
p value	> 0.05	
Average drug cost (baht) per success patient	145,071.45*	255,462.36

Table 4.37 presents cost that physicians used to treat a patient with success outcome in each scheme. The analysis indicates that cost per patient with success outcome in the 30-baht Scheme was lowest compared with costs in other schemes. However, the numbers of patient with success outcome in the CSMBS was significantly higher than other schemes.

Table 4.37: The efficiency of health care services in lung cancer treatment in each scheme

Efficiency of lung cancer treatment	**Health insurance payment methods**		
	30-Baht Scheme	SSS	CSMBS
	Per item with ceiling	Per item with ceiling	Fee-for-service
Number of lung cancer patients	23	15	127
Number of lung cancer patients with outcome data	20	13	85
Average drug cost (baht) per case	44,268.82	54,646.89	156,282.86
p value	< 0.0001		
Number of success case	8 (40.00%)	3 (23.08%)	52 (61.18%)
p value	< 0.05		
Average drug cost (baht) per success case	110,672.05*	236,803.18	255,462.36