CHAPTER V

RESULTS AND DISCUSSIONS

In this study the costs for each method of case finding activity and effectiveness in terms of newly cases detected are analyzed from the provider's perspective as well as patient's perspective. The results are calculated from endemic and non endemic areas of the country. There are seven regions selected from endemic and non endemic areas of the country. DPCR 4, 8 and 11 as non-endemic and DPCR 5, 6, 7 and 10 as endemic areas. Actually the DPCR 12 is endemic area but it was not included the study area because of its unrest situation. These endemic areas are selected based on the number of newly detected leprosy cases.

Bang Len district as combined ACD and PCD, Muang Nakhon Pathom district as PCD alone of Nakhon Pathom province from DPCR 4. Banphot Phisai district as combined ACD and PCD, Phaisali district as PCD alone of Nakhon Sawan province from DPCR 8. Phrasaeng district as combined ACD and PCD, Muang SuratThani district as PCD alone of SuratThani province from DPCR 11. Satuek district as combined ACD and PCD, Prakhon Chai district as PCD alone of Burirum province from DPCR 5. Bueng Kan district as combined ACD and PCD, Si Chiang Mai district as PCD alone of Nong Khai province from DPCR 6. Uthumphon Phisai district as combined ACD and PCD, Kantharalak district as PCD alone of Sisaket province from DPCR 7. Fang district as combined ACD and PCD, Chiang Dao district as PCD alone of Chiang Mai province from DPCR 10. The selected areas are shown in Table 5.1.

Table 5.1 The selected 7 regions from endemic and non endemic areas of the country.

Area	DPCR	Province	District	
			Combined ACD &PCD	PCD alone
Non-endemic	4	Nakhon Pathom	Bang Len	Muang Nakhon Pathom
	8	Nakhon Sawan	Banphot Phisai	Phaisali
	11	Surat Thani	Phrasaeng	Muang Surat Thani
Endemic	5	Buriram	Satuek	Prakhon Chai
	6	Nong Khai	Bueng Kan	Si Chiang Mai
	7	Sisaket	Uthumphon Phisai	Kuntharalak
	10	Chiang Mai	Fang	Chiang Dao

The general characteristics of the selected districts are shown in Table 5.2.

Table 5.2 The general characteristics of the 14 selected districts.

District	Pop.	Area (sq-km.)	Pop.[10] density	No of Sub-district	No. of Village	Health Center	Community Hospital
Non-endemic:							
DPCR 4							
- Bang Len	90,620	588.836	153.90	15	180	18	1
- Muang Nakhon Pathom	270,498	417.44	648	25	217	31	1
DPCR 8							
-Banphot Phisai	87,669	909.9	96	13	117	17	1
-Phaisali	71,136	979	73	8	101	15	1
DPCR 11							
-Phrasaeng	62,833	980	66	7	72	13	1
-Muang Surat Thani	171,387	337.550	508	11	59	13	1
Endemic:							
DPCR 5							
-Satuek	109,438	803	136	12	190	18	1
-Prakhon Chai	132,720	890.121	149	16	182	16	1
DPCR 6							
-Bueng Kan	84,902	791.9	107	12	131	14	1
-Si Chiang Mai	31,183	198	157	4	43	6	1
DPCR 7							
-Uthumphon Phisai	108,104	407.9	265	19	232	21	1
-Kuntharalak	197,944	1,236.6	160	20	276	33	1

[10] Population density is the measure of the number per unit area. It is commonly represented as people per square mile (or square kilometer), which is derived simply by dividing total area population / land area in square miles (or square kilometers).(Geography.about.com, 6 July 2005)

District	Pop.	Area (sq-km.)	Pop. density	No of Sub-district	No. of Village	Health Center	Community Hospital
DPCR 10							
-Fang	123,487	888.164	139.04	8	102	15	1
-Chiang Dao	87,922	1,882.1	46.71	7	83	12	1

Source: 1. http://th.Wikipedia.org. Based upon the census of 2006. (6 October 2005)

2. Report on Health Resources, Bureau of Health Policy and Plan, MoPH.

From Table 5.2, as of the year 2006, in non-endemic area, the population density is the lowest and the highest between 66 to 648, the number of sub district is between 7 to 25, the number of village is between 59 to 217, the number of health center is between 13 to 31. In endemic area, the population density is the lowest and the highest between 47 to 265, the number of sub district is between 4 to 20, the number of village is between 83 to 276,the number of health center is between 6 to 33.Each district has only 1 community hospital in both areas. Obviously, the population density in non-endemic area is higher than in endemic area. This is because in non-endemic area is the urban area (most of township), and in endemic is the rural communities.

The number of sub-districts and villages in each study area is shown in Table 5.3.

Table 5.3 Number of sub-districts and villages in each study area

Area	Province	District ACD+PCD	No. of sub-district/ village by combined ACD & PCD		District PCD alone	No. of sub-district /village by PCD alone
			ACD	PCD		
Non- endemic:						
-DPCR 4	-Nakhon Pathom	-Bang Len	2 /2	15 /18	-Muang NakhonPathom	25 / 31
- DPCR 8	-Nakhon Sawan	-Banphot Phisai	13 /17	13 /17	-Phaisali	8 /15
- DPCR11	-Surat Thani	-Phrasaeng	2/2	7 /13	-Muang Surat Thani	11 /13
Endemic:						
- DPCR 5	-Buriram	-Satuek	5 / 8	12 /18	-Prakhon Chai	16 /16
- DPCR 6	-Nong Khai	-Bueng Kan	1 / 1	12 /14	-Si Chiang Mai	4 / 6
- DPCR 7	-Sisaket	-Uthumphon Phisai	1 / 3	19 / 21	-Kantharalak	20 /33
- DPCR10	-Chiang Mai	-Fang	1 / 2	8 / 15	-Chiang Dao	7 /12

From Table 5.3, in non-endemic area, the number of sub district and village of combined ACD and PCD method, consist of Bang Len district in Nakhon Pathom province has 17 sub districts and 20 villages, Banphot Phisai district in Nakhon Sawan province has 26 Sub districts and 34 villages, and Phrasaeng district in Surat Thani province has 9 sub districts and 15 villages. In PCD alone method, consist of Muang Nakhon Pathom has 25 sub districts and 31 villages, Phaisali district in Nakhon Sawan province has 8 sub districts and 15 villages, and Muang Surat Thani has 11 sub districts and 13 villages. In endemic area, the number of sub district and village of combined ACD and PCD method, consist of Satuek district in Buriram province has 17 sub districts and 26 villages, Bueng Kan district in Nong Khai province has 13 Sub districts and 15 villages, Uthumphon Phisai district in Sisaket province has 20 sub districts and 24 villages, and Fang district in Chiang Mai province has 9 sub districts and 17 villages. In PCD alone method, consist of Prakhon Chai district in Buriram

province has 16 sub districts and 16 villages, Si Chiang Mai district in Nong Khai province has 4 sub districts and 6 villages, Kantharalak district in Sisaket province has 20 sub districts and 33 villages, and Chiang Dao district in Chiang Mai province has 7 sub districts and 12 villages.

The number of newly detected case in each study areas are expressed in Table 5.4.

Table 5.4 The number of new case detection and the number of new case detection with disability grade 2 for study areas during the year of 2006

Area	Combined ACD and PCD		PCD alone		Total
	No. of newly detected case	No. of Grade 2	No. of newly detected case	No. of Grade 2	
Non-endemic:					
DPCR 4	2 (Bang Len)	1 (PCD)	2 (Muang Nakhon Pathom)	0	4
DPCR 8	9 (Banphot Phisai)	1 (RVS)	3 (Phaisali)	1	12
DPCR 11	5 (Phrasaeng)	0	3 (Muang Surat Thani)	1	8
Total	16	2	8	2	24
Endemic:					
DPCR 5	4 (Satuek)	0	4 (Prakhon Chai)	0	8
DPCR 6	0 (Bueng Kan)	0	0 (Si Chiang Mai)	0	0
DPCR 7	8 (Uthumphon Phisai)	1 (RVS)	3 (Kantharalak)	0	11
DPCR 10	7 (Fang)	2 (PCD)	1 (Chiang Dao)	0	8
Total	19	3	8	0	27

Source: Annual report and direct interview from Regional Leprosy Coordinator (RLC) & Provincial Leprosy Coordinator (PLC)

From Table 5.4 Most of combined ACD and PCD method was two times higher than PCD alone method. During RVS, 8.33% of all RVS new cases (24 cases) already had disability grade 2. The newly detected case with disability grade2 was

14.3% and 12.5% in combined ACD and PCD method and PCD alone method respectively. We had to know whether the newly detected cases were associated to the endemic of the area or not.

Chi-square test:

Area	Combined ACD and PCD (cases)	PCD alone (cases)	Total (cases)
Non-endemic	16 (66.7%)	8 (33.3%)	24
Endemic	19 (70.4%)	8 (29.6%)	27
Total	35	16	51

H_O = Case detection of combined ACD and PCD method is not associated with endemic area

H_a = Case detection of combined ACD and PCD method is associated with endemic Area

$$X^2 = \sum \frac{(O - E)^2}{E} = \sum \frac{(16-8)^2}{8} = 8 \text{ .....(non-endemic)}$$

$$X^2 = \sum \frac{(O - E)^2}{E} = \sum \frac{(19-8)^2}{8} = 15.13 \text{ .....(endemic)}$$

Where: O = Observed (combined ACD and PCD)

E = Expected (PCD alone)

degree of freedom = (n-1)

$$X^2_{cal} = 23.13$$ [11]

The table value for Chi-square in the correct box of *1 df* and *p= 0.050*, level of significance is 3.84.

So we rejected the null hypothesis, accepted the alternative hypothesis. Therefore case detection of combined ACD and PCD method is associated with endemic area.

[11] The calculation is shown in Appendix 8

5.1 Analyzing costs and effectiveness (Provider's perspective)

5.1.1. Calculation of costs for each method of case finding activities.

Total costs in each method of case finding activity is shown in Table 5.5 and Table 5.6. The detailed calculation of total costs for case finding activity from provider perspective is shown in Appendix 5

Table 5.5 The personnel cost, the number of village, and time spent in each DPCR which carried out combined ACD&PCD and PCD alone

Area	Combined ACD&PCD			PCD alone		
	Personnel cost / year (baht)	No. of village	Time spent/year (hr.)	Personnel cost / year (baht)	No. of village	Time spent/year (hr.)
Non-endemic:						
DPCR 4	269,276	18	540	259,215	31	528**
DPCR 8	119,997	17	308	95,038	15	288**
DPCR 11	145,674	13	306	353,087	13	528
Total	534,147	48	1,154	707,340	59	1,344
Endemic:						
DPCR 5	156,249	18	336	139,647	16	288
DPCR 6	132,778	14	294	122,388	6	288
DPCR 7	156,137	21	297	146,272	33	288
DPCR 10	138,295	15	297	124,857	12	288
Total	583,459	68	1,224	533,164	67	1,152

** Time spent of provincial hospital is 528 hrs. , time spent of community hospital is 288 hrs.

The personnel costs differ depend on the income while time spent remains the same because the personnel cost in each area are different. Especially, in DPCR4 (Muang Nakhon Pathom hospital) and DPCR11 (Muang Surat Thani hospital) are provincial hospital, it's different of time spent between provincial and community

hospital, and different level of salary and fringe benefit of the dermatologist higher than the general medical practitioner in community hospital.

Table 5.6 Total costs of case finding activities for each area.

(Provider's perspective)

Area	Total costs (Baht)	
	Combined ACD and PCD	**PCD alone**
Non-endemic:		
DPCR 4	279,268.00	266,311.00
DPCR 8	163,734.00	112,825.60
DPCR 11	237,336.40	361,368.80
Total	680,338.40	740,508.40
Endemic:		
DPCR 5	203,113.07	148,283.20
DPCR 6	159,691.00	123,467.00
DPCR 7	185,139.60	167,358.00
DPCR 10	199,518.16	160,613.60
Total	747,461.83	599,721.80

From Table 5.6 in non-endemic area, the total cost of combined ACD and PCD was higher than the total cost of PCD alone in DPCR 4 and 8. The total cost of combined ACD and PCD was lower than the total cost of PCD alone in DPCR11, because the personnel cost of staffs in provincial hospital (different level of salary and fringe benefit) that higher than those of the other region and different of time spent between the community hospital and provincial hospital were more than the cost of combined ACD and PCD. In endemic area the total cost of combined ACD and PCD was higher than the total cost of PCD alone in DPCR 5, 6, 7 and 10. When we compared the total cost from provider perspective among endemic area, the combined ACD & PCD in endemic was 1.1 times higher than non-endemic area and the PCD alone in non-endemic was 1.23 times higher than endemic area.

5.1.2. Calculation of cost-effectiveness for each method of case finding activity (Provider's perspective)

The cost-effectiveness ratio calculated by dividing the total costs for each method by number of new cases detected by each method (the number of new cases detected by each method is given in Table 5.4) is shown in Table 5.7.

Table 5.7 Cost effectiveness of case finding activities for each DPCR (Provider's perspective)

(1 US$ = 39.69 baht)

Area	Combined ACD & PCD			PCD alone		
	C/E ratio (baht)	No. of case	US$	C/E ratio (baht)	No. of case	US$
Non-endemic:						
DPCR 4	139,634.00	2	3,518.12	133,155.50	2	3,354.89
DPCR 8	18,192.67	9	458.37	37,608.53	3	947.56
DPCR 11	47,467.28	5	1,195.95	120,456.27	3	3,034.93
Total[12]	42,521.15	16	1,071.33	92,563.55	8	2,332.16
Endemic:						
DPCR 5	50,778.27	4	1,279.37	37,070.80	4	934.01
DPCR 6	-	0	-	-	0	-
DPCR 7	23,142.45	8	583.08	55,786.00	3	1,405.54
DPCR 10	28,502.59	7	718.13	160,613.60	1	4,046.70
Total	39,340.10	19	991.18	74,965.23	8	1,888.77
Grand total[13]	**40,794.29**	**35**	**1,027.82**	**83,764.39**	**16**	**2,110.47**

[12] Calculated from the total cost of each methods divided by the number of newly detected case of each methods in each areas.

[13] Calculated from the total cost of both endemic areas in each methods divided by the number of newly detected case in each methods.

From Table 5.7, in combined ACD and PCD method, the cost-effectiveness ratio of DPCR8 was lowest among them. It depends on the total number of newly detected case and personnel cost. In PCD alone method, the cost-effectiveness ratio of DPCR5 was lowest among them. It depends on the number of newly detected case and personnel cost. We already proved that the case detection of combined ACD&PCD is associated with endemic area.

When we analyze the cost-effectiveness ratio of combined ACD and PCD versus PCD alone method, the cost-effectiveness ratio of PCD alone method was 2.07,2.54,2.41 and 5.64 times higher than the cost-effectiveness ratio of combined ACD and PCD method in DPCR8, DPCR11, DPCR7, and DPCR 10 respectively. Except for DPCR4 and DPCR5 the cost-effectiveness ratio of combined ACD and PCD method is 1.05 and 1.37 times higher than PCD alone. It depends on the number of newly detected case. In DPCR6, we could not calculate the cost-effectiveness ratio because no new cases were detected. Therefore, most of the cost-effectiveness ratio of PCD alone was higher than the cost-effectiveness ratio of combined ACD and PCD method.

When analyzing the cost-effective ratio of combined ACD and PCD versus PCD alone method in each endemic area, then we found out. In non-endemic areas, the cost-effective ratio of PCD alone is 2.2 times higher than that of combine ACD and PCD, and the cost-effective ratio of PCD alone in endemic area is 1.9 times higher than that of combine ACD and PCD. It means that the combined ACD and PCD method more effective than PCD alone method in both endemic areas.

5.2 Incremental cost analysis of combined ACD and PCD versus PCD alone

The incremental cost analysis calculated by dividing the total cost of combined ACD and PCD minus the total cost of PCD alone by the number of newly case detected from combined ACD and PCD minus the number of newly case detected from PCD alone is shown in Table 5.8.

Table 5.8 Incremental cost analysis of combined ACD and PCD vs. PCD alone

Area	Combined ACD & PCD		PCD alone		ICA	US$
	Total cost	No. of new case	Total cost	No. of new case	(Baht)	
Non-endemic:						
DPCR 4	279,268.00	2	266,311.00	2	-	-
DPCR 8	163,734.00	9	112,825.60	3	8,484.73	213.78
DPCR 11	237,336.40	5	361,368.80	3	-62,016.20	-1,562.51
Total	680,338.40	16	740,508.40	8	-7,521.25	-189.50
Endemic:						
DPCR 5	203,113.07	4	148,283.20	4	-	-
DPCR 6	159,691.00	0	123,467.00	0	-	-
DPCR 7	185,139.60	8	167,358.00	3	3,556.32	89.60
DPCR 10	199,518.16	7	160,613.60	1	6,484.09	163.37
Total	747,461.83	19	599,721.80	8	13,430.91	338.40

The results in DPCR4 and 5, ICA ratio were 0. This is because they are the same number of newly detected case in both combinations. But in DPCR4, the total cost of combined ACD and PCD method was higher than the total cost of PCD alone was 12,957 Baht, it mean that if the leprosy program would to detect 1 case, the leprosy program would need to pays 12,957 Baht more than PCD alone method. In DPCR6, ICA ratio was 0, because no newly case was detected. But the total cost of combined ACD and PCD method was 159,691 Baht, and the total cost of PCD alone method was 123,467 Baht. It means that in combined ACD and PCD method if the leprosy program pay 159,691 Baht may not be found the new patient. In PCD alone method if the leprosy program pay 123,467 Baht may not be found the new patient.

The results in DPCR8, ICA ratio was 8,484.73 Baht, it mean that if the leprosy program want to detect additional 1 new case, the combined ACD and PCD method would need to pay 8,484.73 Baht. In DPCR11, ICA ratio was -62,016.20 Baht. It means that, if the leprosy program wants to detect additional 1 new case, the PCD alone method need to pay 62,016.20 Baht more than the combined ACD and PCD

method. In DPCR7 and DPCR10, ICA ratio was 3,556.32 Baht and 6,484.09 Baht; it means that if the leprosy program wants to detect additional 1 new case, the combined ACD and PCD method would need to pay 3,556.32 Baht and 6,484.09 Baht respectively. When we analyze the ICA ratio between non-endemic and endemic areas, in non-endemic areas, ICA ratio was –7,521.25 Baht, it means that, if the leprosy program wants to detect additional 1 new case, the PCD alone method would need to pay 7,521.25 Baht more than the combined ACD and PCD method. In endemic area, ICA ratio was 13,430.91 Baht, it means that if the leprosy program wants to detect additional 1 new case, the combined ACD and PCD method would need to pay 13,430.91 Baht.

If we now assume that the population of each area is the same 100,000 populations, in which two case finding methods are implemented. The cost-effectiveness analysis of combined ACD and PCD, and PCD alone in the non-endemic and endemic area is shown in Table 5.9 and Table 5.10.

Table 5.9 The cost-effectiveness analysis of the combined ACD&PCD, and PCD alone in non-endemic area.

Variables	Combined ACD&PCD	PCD alone
• Effectiveness		
- population	241,122	513,021
- newly case detected	16	8
- expected no. of newly case detected if populations are 100,000	(100,000*16)/241,122= 6.64	(100,000*8)/513,031= 1.56
• Costs (Baht)	680,338.40/241,122=	740,508.40/513,021=
- unit cost per person	2.82	1.44
- total cost	282,000	144,000
• C/E ratio (Baht)	17,625	18,000
• US$	444.07	453.51

Table 5.10 The cost-effectiveness analysis of the combined ACD&PCD, and PCD alone in endemic area.

Variables	Combined ACD&PCD	PCD alone
• Effectiveness		
- population	425,931	449,769
- newly case detected	19	8
- expected no. of newly case detected if populations are 100,000	(100,000*19)/425,931= 4.46	(100,000*8)/449,769= 1.78
• Costs (Baht)	747,461.83/425,931=	599,721.80/449,769=
- unit cost per person	1.75	1.33
- total cost	175,000	133,000
• C/E ratio (Baht)	9,210.53	16,625
• US$	232.06	418.87

In Tables 5.9 and Table 5.10, if the population is the same, 100,000 population and expected number of newly case detected and cost-effectiveness ratio are calculated. In this case, the result of non-endemic and endemic areas not changed significant, the C/E ratio of combined ACD&PCD in non-endemic area is 1.9 times higher than endemic area and the C/E ratio of PCD alone in non-endemic area is 1.1 times higher than endemic area.

Cost-effectiveness analysis of case finding activities from provider' perspective

In this study, cost of each method of case finding activities is calculated from the provider's perspective as well as the patient's perspective.

The total cost of combined ACD and PCD and PCD alone method from the provider' perspective in each area is shown in Table 5.6

The total costs of combined ACD and PCD method are higher than the total costs of PCD alone method in all DPCRs, except in DPCR11, where the total cost of PCD alone is higher than the total cost of combined ACD and PCD. This is because the personnel cost of staffs in provincial hospital (different level of salary and fringe benefit)

is higher than that of the other regions and differences in time spent between the community hospital and the provincial hospital.

When I analyze the C/E (cost-effectiveness is a form of economic analysis that compares the relative costs and outcomes (effect) of two case finding methods. C/E ratio calculated by dividing the total costs for each method by number of new cases detected by each method) ratio of combined ACD and PCD versus PCD alone method between non-endemic and endemic areas, I found that in non-endemic areas it is higher than in endemic areas. The reason is that, in endemic areas many case stay in that area and the cases are detected easily by doing PCD alone method, but in non-endemic areas, even though the leprosy program finds the case actively, the cases are not as many as are found in endemic areas, because many case did not stayed in that area.

The number of newly detected cases and the number of newly detected cases with disability grade 2 for study areas during the year of 2006 is shown in Table 5.4. The cost effectiveness of case finding activities for each DPCR from provider's perspective is shown in Table 5.7

According to the data, newly detected cases from combined ACD and PCD is 2.2 times higher than the total cost of PCD alone method. It indicates that combined ACD and PCD successfully detected a large number of cases. Especially the ACD method (by using rapid village survey) found earlier cases of leprosy with no disabilities, backlog cases, and a fast method of case finding with in a relatively short period of time and increase awareness of the disease in the community.

5.3 Analyzing costs and effectiveness (Patient's perspective).

5.3.1. Calculation of costs for each method of case finding activities.

Total cost for each method of case finding activities are shown in Table 5.11. The detailed calculation of total costs for case finding activities from patient's perspective is shown in Appendix 6.

Table 5.11 Total costs of case finding activity in each area. (Patient's perspective)

Area	Total costs	
	Combined ACD and PCD (Baht)	**PCD alone** (Baht)
Non-endemic:		
DPCR 4	1,220	520
DPCR 8	976	1,096
DPCR 11	3,149	1,380
Total	5,345	2,996
Endemic:		
DPCR 5	60	2,108
DPCR 6	0	0[14]
DPCR 7	160	340
DPCR 10	1,049	0[15]
Total	1,269	2,448

5.3.2. Calculation of cost-effectiveness for each method of case finding activities (Patient's perspective).

The costs and effectiveness for each method of case finding activity from patient point of view is calculated by equation explained in chapter 4.

The cost-effectiveness of different case finding activities across different areas is shown in Table 5.12.

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[14] DPCR 6: No newly detected case may be due to: 1. their carried out by RVS in last year (2005) in the same district, [it is target of core leprosy control activity for RVS (DDC, 2005): every village is any indicator of leprosy epidemiological, survey 1 time/year consecutive 5 year, i.e. the survey is repeated the same area for 5 consecutive years as a result in some years may not newly detected case] 2. No case stays in area. 3. Providing health education and public relation did not cover the target group. 4. Inadequate skill of health provider in screening of suspected case. 5. Unreported cases because of stigma.(Brakel WH Van,2006)

[15] DPCR 10: 1 newly detected case in PCD alone but not interviewed because she went to other province, therefore; we could not calculate the patient's cost.

Table 5.12 Cost-effectiveness of case finding activities in each area

Area	Method	Cost (Baht)	Poverty line* (Baht/person/ month)	No. of patient interviewed	C/E (Baht)	US$
Non-endemic:						
DPCR 4	- Combined ACD&PCD	1,220	Nakhon Pathom 1,434	2	610	15.37
	- PCD alone	520		1	520	13.10
DPCR 8	- Combined ACD&PCD	976	Nakhon Sawan 1,267	8	122	3.07
	- PCD alone	1,096		3	365.33	9.20
DPCR 11	- Combined ACD&PCD	3,149	Surat Thani 1,388	5	629.80	15.87
	- PCD alone	1,380		3	460	11.59
Total	- Combined ACD&PCD	5,345		15	1,361.18	34.31
	- PCD alone	2,996		7	1,345.33	33.90
Endemic:						
DPCR 5	- Combined ACD&PCD	60	Buriram 1,215	2	30	0.76
	- PCD alone	2,108		3	702.67	17.70
DPCR 6	- Combined ACD&PCD	0	Nong Khai 1,248	0	0	0
	- PCD alone	0		0	0	0
DPCR 7	- Combined ACD&PCD	160	Sisaket 1,209	6	26.67	0.67
	- PCD alone	340		3	113.33	2.86
DPCR 10	- Combined ACD&PCD	1,049	Chiang Mai 1,320	6	174.83	4.40
	- PCD alone	0		0	0	0

Area	Method	Cost (Baht)	Poverty line* (Baht/person/ month)	No. of patient interviewed	C/E (Baht)	US$
Total	- Combined ACD&PCD	1,269		14	231.50	5.83
	- PCD alone	2,448		6	816	20.56

* Source: Office of the National Economic and Social Development Board

Table 5.12 shows the cost of patients for case finding activities compared with the poverty line (a level of personal income defining the state of poverty) in each province.

In DPCR4, the poverty line of Nakhon Pathom province is 1,434 Baht/person/month, the cost effectiveness of patient for case finding activities in combined ACD and PCD was 610 Baht (42.5% of poverty line), in PCD alone was 520 Baht (36.26% of poverty line). The cost effectiveness of patient for case finding activities in combined ACD and PCD is higher than PCD alone method. This is because the patient's time cost of combined ACD and PCD is higher than PCD alone method.

In DPCR8, the poverty line of Nakhon Sawan province is 1,267 Baht/person/month, the cost effectiveness of patient for case finding activities in combined ACD and PCD was 122 Baht (9.6% of poverty line), in PCD alone was 365.33 Baht (28.8% of poverty line). The cost effectiveness of patient for case finding activities in PCD alone is higher than in combined ACD and PCD method. This is because the patient's traveling cost of PCD alone is higher than combined ACD and PCD method.

In DPCR11, the poverty line of Surat Thani province is 1,388 Baht/person/month, the cost effectiveness of patient for case finding activities in combined ACD and PCD was 629.8 Baht (45.4% of poverty line), in PCD alone was 460 Baht (33.2% of poverty line). The cost effectiveness of patient for case finding activities in combined ACD and PCD is higher than in PCD alone method. This is because the patient's traveling cost of combined ACD and PCD is higher than PCD alone method.

In DPCR5, the poverty line of Buriram province is 1,215 Baht/person/month, the cost effectiveness of patient for case finding activities in combined ACD and PCD was 30 Baht (2.5% of poverty line), in PCD alone was 702.67 Baht (57.8% of poverty line). The cost effectiveness of patient for case finding activities in PCD alone is higher than in combined ACD and PCD method. This is because the patient's time cost, the patient's traveling cost, the relative's time cost, and the relative's traveling cost of PCD alone are higher than combined ACD and PCD method.

In DPCR6, the poverty line of Nong Khai province is 1,248 Baht/person/month, we can not calculate the cost effectiveness because no newly detected case.

In DPCR7, the poverty line of Sisaket province is 1,209 Baht/person/month, the cost effectiveness of patient for case finding activities in combined ACD and PCD was 26.67 Baht (2.2% of poverty line), in PCD alone was 113.3 Baht (9.4% of poverty line). The cost effectiveness of patient for case finding activities in PCD alone is higher than in combined ACD and PCD method. This is because the patient's traveling cost of PCD alone is higher than combined ACD and PCD method.

In DPCR10, the poverty line of Chiang Mai province is 1,320 Baht/person/month, the cost effectiveness of patient for case finding activities in combined ACD and PCD was 174.83 Baht (13.2% of poverty line), in PCD alone was 0 Baht because no patient interviewed.

The cost effectiveness ratio of combined ACD and PCD method in DPCR11 (Surat Thani province), is higher than other region; this is because the patients went to the hospital by private vehicle, most of them are wealthy people, who own rubber plantations. In DPCR5 (Buriram province), the cost effectiveness ratio of PCD alone method is higher than other region; the reason is the patients went to the hospital by the hired car in the village, and preferred to travel to provincial hospital more than health center because of their confidence in diagnosis and treatment of provincial hospital.

In each area, intangible costs (stigma of leprosy) are excluded as mentioned earlier.

Cost-effectiveness analysis of case finding activities from patient's perspective

When I analyze the cost-effectiveness of combined ACD and PCD method versus PCD alone method, in DPCR 8, 5, and 7 the cost-effectiveness of PCD alone was 3, 23.4, and 4.2 times higher than combined ACD and PCD method. In DPCR4 and 11 the cost-effectiveness of combined ACD and PCD was 1.2 and 1.4 times higher than PCD alone method respectively. For DPCR6, we could not analyze cost-effectiveness because no newly case detected. In DPCR10, we could not calculate the patient' cost because 1 newly detected case in PCD alone method but not interviewed, because she went to other province When we compare the cost-effectiveness from patient perspective among endemic area, in non-endemic area the cost-effectiveness was 2.6 times higher than endemic area. It depends on income of patient and relative.

5.4 Sensitivity Analysis of social mobilization

In this study, the social mobilization (during Raj Pracha Samasai week or National leprosy awareness week) covers 9% to 24% by the total number of villages in one district. These numbers are only made by assumption (from the providers interviewed). Therefore, we need to do a sensitivity analysis. If we change the number of villages which are covered by social mobilization, there will be a change in cost-effectiveness ratio in each area from provider perspective. Detailed cost calculation is shown in Appendix 7. The cost-effectiveness ratio of combined ACD and PCD method is shown in Table 5.13, and PCD alone method, is shown in Table 5.14.

Table 5.13 Sensitivity analysis of social mobilization in combined ACD and PCD

The coverage of village	Cost-effectiveness ratio (Baht)						
	Non-endemic			Endemic			
	DPCR4	DPCR8	DPCR11	DPCR5	DPCR6	DPCR7	DPCR10
50%	142,813	20,634	63,505	59,565	-	24,007	28,849
75%	144,850	22,377	76,438	65,057	-	24,535	29,103
100%	146,888	24,121	89,372	70,549	-	25,062	29,358

Table 5.14 Sensitivity analysis of social mobilization in PCD alone

The coverage of village	Cost-effectiveness ratio (Baht)						
	Non-endemic			Endemic			
	DPCR4	DPCR8	DPCR11	DPCR5	DPCR6	DPCR7	DPCR10
50%	137,931	41,377	123,120	41,219	-	67,945	187,474
75%	141,342	44,142	125,680	43,748	-	75,944	207,224
100%	144,753	46,910	128,241	46,277	-	83,944	226,974

The social mobilization (during Raj Pracha Samasai week or National leprosy awareness week) covers 9% to 24% of the total number of villages in one district; the total cost and cost-effectiveness ratio for provider's perspective.

In the combined ACD and PCD method

If we expanded the coverage of the village by social mobilization up to 50% in each area, then in non-endemic areas, DPCR4, DPCR8, and DPCR11, 142,813 Baht, 20,634 Baht, and 63,505 Baht / detected case would be needed respectively. In endemic areas, DPCR5, DPCR7, and DPCR10, 59,565 Baht, 24,007 Baht, and 28,849 Baht / detected case would be needed respectively. It means that if we want to expand the coverage of village by social mobilization up to 50% in combined ACD and PCD method, we have to pay 142,813 baht more in DPCR4, 20,634 baht more in DPCR8, 63,505 baht more in DPCR 11, 59,565 baht more in DPCR5, 24,007 baht more in DPCR7, and 28,849 baht more in DPCR 10 per detected case.

If we expanded the coverage of the village by social mobilization from 50% to 75% in each area, then in non-endemic areas, DPCR4, DPCR8, and DPCR11, 144,850 Baht, 22,377 Baht, and 76,438 Baht / detected case would be needed respectively. In endemic areas, DPCR5, DPCR7, and DPCR10 65,057 Baht, 24,535 Baht, and 29,103 Baht/ detected case would be needed respectively. It means that if we want to expand the coverage of village by social mobilization up to 75% in combined ACD and PCD method, we have to pay 144,850 baht more in DPCR4, 22,377 baht more in DPCR8, 76,438 baht more in DPCR 11, 65,057 baht more in DPCR5, 24,535 baht more in DPCR 7, and 29,103 baht in DPCR10 per detected case.

If we expanded the coverage of the village by social mobilization from 75% to 100% in each area, then in non-endemic areas, DPCR4, DPCR8, and DPCR11, 146,888 Baht, 24,121 Baht, and 89,372 Baht / detected case would be needed respectively. In endemic areas, DPCR5, DPCR7, and DPCR10, 70,549 Baht, 25,062 Baht, and 29,358 Baht / detected case would be needed respectively. If we want to expand the coverage of village by social mobilization up to 100% in combined ACD and PCD method, we have to pay 146,888 baht more in DPCR4, 24,121 baht more in DPCR8, 89,372 baht more in DPCR 11, 70,549 baht more in DPCR5, 25,062 baht more in DPCR 7, and 29,358 baht in DPCR10 per detected case.

In PCD alone method

If we expanded the coverage of the village by social mobilization up to 50% in each area, then in non-endemic areas, DPCR4, DPCR8, and DPCR11, 137,931 Baht, 41,377 Baht, and 123,120 Baht / detected case would be needed respectively. In endemic areas, DPCR5, DPCR7, and DPCR10, 41,219 Baht, 67,945 Baht, and 187,474 Baht / detected case would be needed respectively. It mean that if we want to expand the coverage of village by social mobilization up to 50% in PCD alone method, we have to pay 137,931 baht more in DPCR4, 41,377 baht more in DPCR8, 123,120 baht more in DPCR 11, 41,219 baht more in DPCR5, 67,945 baht more, and 187,474 baht more in DPCR 10 per detected case.

If we expanded the coverage of the village by social mobilization from 50% to 75% in each area, then in non-endemic areas, DPCR4, DPCR8, and DPCR11, 141,342 Baht, 44,142 Baht, and 125,680 Baht / detected case would be needed respectively. In endemic areas, DPCR5, DPCR7, and DPCR10, 43,748 Baht, 75,944 Baht, and 207,224 Baht / detected case would be needed respectively. It mean that if we want to expand the coverage of village by social mobilization up to 75% in PCD alone method, we have to pay 141,342 baht more in DPCR4, 44,142 baht more in DPCR8, 125,680 baht more in DPCR 11, 43,748 baht more in DPCR5, 75,944 baht more in DPCR 7, and 207,224 baht in DPCR10 per detected case.

If we expanded the coverage of the village by social mobilization from 75% to 100% in each area, then in non-endemic areas, DPCR4, DPCR8, and DPCR11, 144,753 Baht, 46,910 Baht, and 128,241 Baht / detected case would be needed respectively. In endemic areas, DPCR5, DPCR7, and DPCR10, 46,277 Baht, 83,944

Baht, and 226,974 Baht / detected case would be needed respectively. It mean that if we want to expand the coverage of village by social mobilization up to 100% in PCD alone method, we have to pay 144,753 baht more in DPCR4, 46,910 baht more in DPCR8, 128,241 baht more in DPCR 11, 46,277 baht more in DPCR5, 83,944 baht more in DPCR 7, and 226,974 baht in DPCR10 per detected case.

For DPCR6, we could not calculate the cost-effectiveness ratio because no newly case detected.

Therefore; the health providers can use the solution for proper and efficient planning in the social mobilization activities as described in Section 6.3.

5.5 Weighted calculation of cost-effectiveness ratio of combined ACD & PCD versus PCD alone.

When we use weighed calculation as shown in Appendix9, in which two case finding methods are implemented, the cost-effectiveness analysis of combined ACD and PCD versus. PCD alone method in non-endemic areas, endemic areas and region level are shown in Table 5.16.

The detailed calculation of the cost-effectiveness of total cost for case finding activities from patient's perspective and provider's perspective is shown in Appendix 9.

Table 5.15 The cost-effectiveness ratio of case finding activities for each region before use weight calculation.

Area	Studied provinces	Studied districts				No. of Patients interviewed (N = n)				Total of patients interviewed	Cost/1 case (Baht)	
		ACD&PCD		PCD alone		ACD&PCD		PCD alone				
		N	n	N	n	N	n	N	n		ACD& PCD	PCD alone
Non-endemic: (7Regions)												
DPCR4	Nakhon Pathom	2	1	7	1	2	2	1	1	3	140,244	133,676
DPCR8	Nakhon Swan	2	1	15	1	8	8	3	3	11	18,314	37,974
DPCR11	Surat Thani	1	1	19	1	5	5	3	3	8	48,098	120,916
Total	**3 provinces**	**5**	**3**	**41**	**3**	**15**	**15**	**7**	**7**	**22**	**206,656**	**292,566**
Endemic: (4 Regions)												
DPCR5	Buriram	8	1	23	1	2	2	3	3	5	50,808	37,773
DPCR6	Nong Khai	4	1	17	1	0	0	0	0	0	-*	-*
DPCR7	Sisaket	1	1	22	1	6	6	3	3	9	23,169	55,899
DPCR10	Chiang Mai	1	1	24	1	6	6	0	0	6	28,678	160,614
Total	**4 provinces**	**14**	**4**	**86**	**4**	**14**	**14**	**6**	**6**	**20**	**102,655**	**254,286**
Grand Total	**7 Provinces**	**18**	**7**	**127**	**7**	**29**	**29**	**13**	**13**	**42**	**309,311**	**546,852**

* DPCR6: no newly detected case, but the total cost of provider's perspective in ACD&PCD is 159,691 Baht; in PCD alone is 123,467 Baht.

Table 5.16 The cost-effectiveness ratio of two case finding method in each level by use weighed calculation.

Level	C/E ratio	
	ACD & PCD (Baht)	**PCD alone** (Baht)
Non-endemic	73,041.20	92,749.90
Endemic	78,362.50	93,630.60
Region	74,976.22	93,070.15

In Table 5.16, we use weighted calculation the number of newly case detected and cost-effectiveness ratio are calculated. In this case, both non-endemic and endemic area, the C/E ratio of PCD alone is 1.3 times and 1.2 times higher than combined ACD & PCD method respectively. In region level, the C/E ratio of PCD alone is 1.24 times higher than combined ACD & PCD method.

When we use weighted calculation, results from the used weight found that the previous result do not differ from those used weight. Namely, before used weight calculation, both non-endemic and endemic area, the C/E ratio of PCD alone is 2.2 times and 1.9 times higher than combined ACD & PCD method respectively. When we use weighted calculation, both non-endemic and endemic area, the C/E ratio of PCD alone is 1.3 times and 1.2 times higher than combined ACD & PCD method respectively.