CHAPTER 5

RESULTS AND ANALISIS

This chapter provides the result as well as discussion. The result follows the conceptual framework of the study and are presented in four parts:

1). Hospital cost and patients utilization

2). Hospital revenue

3). Hospital cost recovery

4). Sensitivity analysis

The assumptions set for the analysis are as following:

- Growth rate of population, and price elasticity are constant
- The currency of next year (year 2003) year will be the same as year 2002
- For the capital cost, which is old age of useful lifetime, we did not include in the capital cost calculation it cost is zero.
- The poor people will get free of charge about 20% of the total volume patients (Exemption from payment to the services).

5.1 Hospital cost and patient's utilization

5.1.1 Capital cost:

The components of capital cost of the Takeo hospital were 80.01% from building, 10.79% from medical and non-medical equipments, and 9.202% from vehicle cost as show in table 5.1.

Takeo hospital is a public hospital; the government has been support some budget for hospital capital cost, but some capital cost supported from NGOs such as Swiss Red Cross (SRC). The resources of funds paid for capitals were from government, and Swiss Read cross. The capital cost of the Takeo hospital has a small amount, because all most of building and medical equipments were very old (Over useful lifetime).

The annual capital costs of the hospital were about US$19, 272.68 (US$ 15, 420.51 building cost, US$ 2,079.88 medical & equipment cost, US$ 1, 772.24 vehicle cost).

IPD (C2) was the cost center has a highest capital costs (US$ 9, 796.64). Most of C2 capital costs were from building, especially surgery (C_3) ward was a new construction in year 2001 it cost about US48$, 800 (300 sqm^2) the annual cost is US$6261.98, the other capital cost of C2 were the cost the renovation of a maternity (annual cost is US$ 978.55) and ICU departments (annual cost is $US 2.556.10). C3 was the second of higher cost center, the annual cost about US$ 5216.14.

Some cost center such as A2, B1, and C1 capital cost were zero, because there were a very old age building and the last renovation was over useful lifetime. The detail of capital cost of the Takeo hospital shows in the table 5.2 (next pages).

The studies of capital cost in this case, which items are over useful lifetime, have no more cost, and this cost will be zero. So that, the calculation of capital costs of Takeo hospital in this study just for the other items that still have useful lifetime. The method use to calculate capital cost is automatically incorporates both the depreciation aspect and the opportunity cost aspect of the capital cost (Michael F. Drummond).

Table 5.1: Capital Cost of Takeo hospital, for year 2003

Code	Departments	Building	Medical and non medical equipments	Vehicle	Total cost
A1	Administration	0	784.93	1,772.29	2,557.22
A2	Catering & supplies	0	0		0
A3	Laundry	407.73	0		407.73
B1	Pharmacy	0	0		0
B2	Laboratory	0	216.61		216.61
B3	X-ray & Ultrasound	0	1078.34		1,078.34
C1	OPD	0	0		0
C2	IPD	9,796.64	0		9,796.64
C3	Bloc	5,216.14	0		5,216.14
Total		**15,420.51**	**2,079.88**	**1,772.29**	**19,272.68**
%		**80.01%**	**10.79%**	**9.20**	**100.00%**

Table 5.2:Capital cost investments

I. Building				**Purchase**	**Useful life**	**Current**	**Annulization**	**Annual**
Code	Departments	**Sqm²**	**Year of construct/Renovation**	**Prices ($)**	**Time**	**Value ($)**	**Factor**	**Cost ($)**
A1	Administration	458.00	Last major renovation 1993	NA	5 years	0		0
A2	Catering	159.00	Construct 1980	NA	30 years	0		0
A3	Laundry	16.00	Construction 1999	2,626.00	30 years	3,844.73	9.4296	407.73
B1	Pharmacy	160.00	Last major renovation 1982	NA	5 years	0		0
B2	Laboratory	64.00	Last major renovation 1996	NA	5 years	0		0
B3	X-ray & Ultrasound	90.00	Last major renovation 1996	NA	5 years	0		0
C1	OPD	180.00	Last major renovation 1989	NA	5 years	0		0
C2	IPD	1,686.00	Construction & renovation 2001	59,595.00	5-30 years	60,219.00	3.7908 & 9.4296	9,796.64
C3	Bloc (Surgery)	410.00	Last major renovation 2000	14,856.00	5 years	19,773.34	3.7908	5,216.14
Total		**3,223.00**						**15,420.51**

II. Medical and non medical equipment:				Useful life	Current value	Annualization	Annual cost
Code		Purchase year	Purchase price ($US)	Time	(US$)	Factor	(US$)
A1	Administration	1995	2,250.00	10	4,823.07	6.1446	784.93
A2	Catering	1986	1,200.00	10	0	6.1446	0
A3	Laundry	1995	160.00	5	0	3.7908	0
B1	Pharmacy	1989	1,375.00	10	0	6.1446	0
B2	Laboratory	2001	1,100.00	10	1,331.00	6.1446	216.61
B3	X-ray & Ultrasound	2001	5,476.00	10	6,625.96	6.1446	1078.34
C1	OPD	1989-1995	1,425.46	5-10 years	0	3.9708-6.1446	0
C2	IPD	1989-1995	13,150.00	5-10years	0	3.9708-6.1446	0
C3	Bloc (Surgery)	1980-87	10,704.00	10	0	6.1446	0
Total							**2079.88**

Table 5.2Capital cost (cont.)

III. Vehicle

		Quantity per facility	Year of purchase	Unit Price US$	Total cost US$	Useful life Time	Current value US$	Annualization factor	Annual cost US$
	Toyota Land Cruiser (Second hand)	1	1986	NA	NA	10	0	6.1446	0
	4 Runner (Second hand)	1	2000	9,000.00	9,000.00	10	10,890.00	6.1446	1,772.29
	Toyota Land Cruiser (UN provided)	1	1991	NA	NA	10	0	6.1446	0
	Ambulance	1	1998	NA	NA	10	0	6.1446	0
	Boat	1	1985	2,000.00	2,000.00	10	0	6.1446	0
	Ambulance	1	1989	35,000.00	35,000.00	10	0	6.1446	0
Subtotal 2									1,772.29
Total									3,852.17

	Cost (US$)	%
Building	15,420.51	80.01
Medical & non medical equipment	2,079.88	10.79
Vehicle	1,772.29	9.20
Total capital cost	19,272.68	100.00

N.B:
The studies of capital cost in this case which item are over useful life time have no more cost, the cost will be zero.
So the calculations of the capital cost in this studies just for the other item that still have cost (Useful life time).
The useful life of capital cost are 30 years for construction building, 5-10 years for renovation of the building, medical and non-medical equipments.
Current price was calculated as a following formula:

$$C_{2003} = C_t (1 + r)^{2003-t}$$

Where C_{2003}: Current price, C_t: purchase price, r: discount rate, t: year since
Depreciation value of capital or annual cost was calculated by dividing value in year 2003 of item by the annualization factor obtain from the table or by multiplying the value in year 2002 of the item to the factor obtain from the annualization formula as the following equation.
Annual economic cost = Current value / Annualization factor.

5.1.2 Labor cost:

The estimation of the total labor cost of the Takeo hospital for year 2003 is the average of last 3 years of the salary and bonus in the hospital, it costs about US$ 196,818.64. There were two components of labor cost, 88% from non-government revenue, it costs about US$ 173,188.00 spent for incentives or bonus to the hospital staff, and 12% from government spent for salary, it costs about US$ 23,630.64.

Table 5.3 Component of labor cost of Takeo hospital,

Labor costs	Year 1998	Year 1999	Year 2000	Average 3 years (US$)	%
Salary	22,094.00	24,455.00	24,343.00	23,630.64	12
Bonus	178,596.00	177,900.00	163,068.00	173,188.00	88
Sub total 2	**200,690.00**	**202,355.00**	**187,411.00**	**196,818.64**	**100**

- IPD (C2) was the cost center has 79 staff, it costs about US$ 101,027.53, 51.33% of total labor cost of the hospital, and the average labor cost was about US$ 106.57 pr staff per month.
- Surgery (C3): was the cost center contained 14 staff. The total cost of C3 were about costs about US$ 22,705.23, 11.54% of the total labor costs. The average labor cost of C3 is about US$ 135.15 per staff per month.
- OPD (C1): contained 13 staff it's cost about US$ 17,802.93 (9.05%) of the total labor cost of the hospital; the average labor cost is US$ 114.12 per staff per month.
- Administration (A1): contained 13 staff numbers it costs about US$ 17,413.49 (8.85%); the average labor cost was US$ 111.62 per staff per month.
- Laboratory (B2): contained 13 staff it costs about US$ 14,363.50, account foe 7.30% of the total labor cost of the hospital; the average labor cost was about US$ 92.07.

- Pharmacy (B1): was the cost center contained 6 staffs; it costs about US$ 7,669.06 3.90% of the total labor cost of the hospital; the average labor cost was US$ 159.77 pr staff per month.

- X -ray & Ultrasound (B3): contained 5 staffs it costs were about US$ 7,524.56 or 3.82% of the total labor cost of the hospital.

- Catering (A2) contained 4 staffs, it costs were about US$ 4,541.56, account for 2.11% of total labor cost, and the average labor cost is US$ 120.28.

- Laundry (A3), contained 4 staffs, it costs were about US$ 4,541.56, account for 2.11% of total labor cost, the average labor cost is US$ 120.28. The total labor cost were about US$ 4, 156.17 or 2.11% of the total labor cost of the hospital, the average labor cost was US$ 86.59 per staff per month.

The total average labor cost of the hospital was about US$ 110.08 per staff per month, the detail of labor cost shown in the table 5.4.

Table 5.4 Distribution labor costs by departments

	Salary		1998		1999		2000		Average of 3 years	
Code	**Departments**	# Personnel	Salary	%	Salary	%	Salary	%	Salary	%
A1	Administration	13	1,927.66	8.72	2,133.66	8.72	2,123.89	8.72	2,061.74	8.72
A2	Catering & supplies	4	593.13	2.68	656.51	2.68	653.50	2.68	634.38	2.68
A3	Laundry	4	593.13	2.68	656.51	2.68	653.50	2.68	634.38	2.68
B1	Pharmacy	4	593.13	2.68	656.51	2.68	653.50	2.68	634.38	2.68
B2	Laboratory	13	1,927.66	8.72	2,133.66	8.72	2,123.89	8.72	2,061.74	8.72
B3	X - ray & ultrasound	5	741.41	3.36	820.64	3.36	816.88	3.36	792.98	3.36
C1	OPD	13	1,927.66	8.72	2,133.66	8.72	2,123.89	8.72	2,061.74	8.72
C2	IPD	79	11714.27	53.02	12966.07	53.02	12,906.69	53.02	12,529.01	53.02
C3	Bloc (Surgery)	14	2,075.95	9.40	2,297.79	9.40	2,287.26	9.40	2,220.33	9.40
Total		**149**	**22,094.00**	**100.00**	**24,455.00**	**100.00**	**24,343.00**	**100.00**	**23,630.67**	**100.00**

	Bonus		1998		1999		2000		Average of 3 years	
Code	**Departments**	# Personnel	Bonus	%	Bonus	%	Bonus	%	Bonus	%
A1	Administration	13	15,394.98	8.62	16,082.00	9.04	14,578.28	8.94	15,351.75	8.86
A2	Catering & supplies	4	3,732.66	2.09	3,522.42	1.98	3,310.28	2.03	3,521.79	2.03
A3	Laundry	4	3,732.66	2.09	3,522.42	1.98	3,310.28	2.03	3,521.79	2.03
B1	Pharmacy	4	7,465.31	4.18	7,116.00	4.00	6,522.72	4.00	7,034.68	4.06
B2	Laboratory	13	13,037.51	7.30	12,453.00	7.00	11,414.76	7.00	12,301.76	7.10
B3	X - ray & ultrasound	5	6,572.33	3.68	7,116.00	4.00	6,506.41	3.99	6,731.58	3.90
C1	OPD	13	16,520.13	9.25	16,011.00	9.00	14,692.43	9.01	15,741.19	9.09
C2	IPD	79	91,601.89	51.29	90,729.00	51.00	83,164.68	51.00	88,498.52	51.10
C3	Bloc (Surgery)	14	20,538.54	11.50	21,348.00	12.00	19,568.16	12.00	20,484.90	11.83
Total		**149**	**178,596.00**	**100.00**	**177,900.00**	**100.00**	**163,068.00**	**100.00**	**173,188.00**	**100.00**

Table 5.4 Distribution labor cost continue:

			Salary		Bonus		Total LC		Average/staff
Code	**Departments**	**# Personal**	**(US$)**	**%**	**(US$)**	**%**	**(US$)**	**%**	/month (US$)
A1	Administration	13	2,061.74	8.72	15,351.75	8.86	17,413.49	8.85	111.62
A2	Catering & supplies	4	634.38	2.68	3,521.79	2.03	4,156.17	2.11	86.59
A3	Laundry	4	634.38	2.68	3,521.79	2.03	4,156.17	2.11	86.59
B1	Pharmacy	4	634.38	2.68	7,034.68	4.06	7,669.06	3.90	159.77
B2	Laboratory	13	2,061.74	8.72	12,301.76	7.10	14,363.50	7.30	92.07
B3	X - ray & ultrasound	5	792.98	3.36	6,731.58	3.90	7,524.56	3.82	125.41
C1	OPD	13	2,061.74	8.72	15,741.19	9.09	17,802.93	9.05	114.12
C2	IPD	79	12,529.01	53.04	88,498.52	51.10	101,027.53	51.33	106.57
C3	Bloc (Surgery)	14	2,220.33	9.40	20,484.90	11.83	22,705.23	11.54	135.15
Total		**149**	**23,630.67**	**100.00**	**173,188.00**	**100.00**	**196,818.67**	**100**	**110.08**

	Cost	**%**
Salary	23,630.67	12
Bonus	173,188.00	88
Total	**196,818.66**	**100**

5.1.3 Material cost

The total material cost of the Takeo hospital for year 2003 is the average material cost of last three years (1998-2000) it was about US$ 270.141.33. The components of material costs were drugs & medical supplies and non-drugs & material cost.

Drugs and medical supplies cost: it cost about US$ 200,524.00, 74.23% of the total material cost of the hospital.

Non-drugs and material supplies cost:

- Administration cost cover (the stationeries cost, printing of documents, photocopies, phone cost, guest reception meeting, in-services training, Reimbursement, other expenses) it cost about US$ 40,272.91, 14.91% of the total material cost.

- Catering cost: Cost cover (Patient meals, Water, electricity, Oxygen, fuel generator and vehicle, other expenses) it cost was US$ 28,576.14 about 10.58% of the total material cost of the hospital.

- Laundry: it's cost about US$ 768.27, 0.28% of the total material cost of the hospital, this amount of this cost spent for hygiene supplies in the hospital. The detail of material cost shown in the next page table 5.6, and 5.7.

Table 5.5 Total material cost

Material costs	Year 1998	Year 1999	Year 2000	Average 3 years	%
Drugs & Medical supplies	142,872.00	243,768.00	214,932.00	200,524.00	74.23
Non drugs and medical supplies	55,222.00	74,701.00	78,928.99	69,617.33	25.77
Subtotal 3	**198,094.00**	**318,469.00**	**293,860.99**	**270,141.33**	**100**

Table 5.6 Material cost of the Takeo hospital

Drugs & medical supplies and non drugs and medical supplies cost by services in basic year 1998-2000									
Drugs & medical supplies:		1998		1999		2000		Average 3 yrs	
Code	**Departments**	Cost (US$)	%	Cost (US$)	%	Cost (US$)	%	Cost (US$)	%
C1	OPD Consultation	14,666.33	10.27	21,939.12	9.00	17,192.56	8.00	17,932.67	8.94
C2	IPD	112,868.24	79.00	196,147.04	80.46	175,990.56	81.88	161,668.61	80.62
C3	Bloc (Surgery)	14,287.60	10.00	24,376.80	10.00	19,340.52	9.00	19,334.97	9.64
B2	Laboratory	146.85	0.10	134.00	0.05	658.36	0.31	313.07	0.16
B3	X-ray & Ultrasound	902.98	0.63	1,171.04	0.48	1,750.00	0.81	1,274.67	0.64
Subtotal 1		**142,872.00**	**100.00**	**243,768.00**	**100.00**	**214,932.00**	**100.00**	**200,524.00**	**100.00**
Non drugs and medical supplies cost									
		1,998		1999		2000		Average/3 years	
Code	**Departments**	**Cost (US$)**	**%**	**Cos$ ($US)**	**%**	**Cost (US$)**	**%**	**Cost (US$)**	**%**
A1	Administration	34,149.42	61.84	35,841.41	47.98	50,827.93	64.40	40,272.92	57.85
A2	Catering	20,469.90	37.07	37,888.10	50.72	27,370.43	34.68	28,576.14	41.05
A3	Laundry	602.68	1.09	971.49	1.30	730.63	0.93	768.27	1.10
Subtotal 2		**55,222.00**	**100.00**	**74,701.00**	**100.00**	**78,928.99**	**100.00**	**69,617.33**	**100.00**
Total		**198,094.00**		**318,469.00**		**293,860.99**		**270,141.33**	

		1,998		1999		2000		Average/3 years	
Code	**Departments**	**Cost ($US)**	**%**	**Cost ($US)**	**%**	**Cost ($US)**	**%**	**Cost ($US)**	**%**
A1	Administration	34,149.42	17.24	35,841.41	11.25	50,827.93	17.30	40,272.92	14.91
A2	Catering	20,469.90	10.33	37,888.10	11.90	27,370.43	9.31	28,576.14	10.58
A3	Laundry	602.68	0.30	971.49	0.31	730.63	0.25	768.27	0.28
B1	Pharmacy	142,872.00	72.12	243,768.00	76.54	214,932.00	73.14	200,524.00	74.23
Total		**198,094.00**	**100.00**	**318,469.00**	**100.00**	**293,860.99**	**100.00**	**270,141.33**	**100.00**

Table 5.7: Non-drugs and medical supplies material cost

	Year	1998		1999		2000		Average 3 years	
No	Item	Costs (US$)	%	Costs (US$)	%	Costs (US$)	%	Costs (US$)	%
1	Hygiene supplies	602.68	1.09	971.49	1.30	730.63	0.93	768.27	1.10
2	Water	16.86	0.03	38.86	0.05	56.20	0.07	37.31	0.05
3	Electricity	5,386.39	9.75	10,140.53	13.57	7,047.12	8.93	7,524.68	10.81
4	Oxygen	861.88	1.56	1,554.38	2.08	1,152.14	1.46	1,189.47	1.71
5	Fuel for vehicle & generator	1,359.20	2.46	2,525.87	3.38	1,770.37	2.24	1,885.15	2.71
6	Patient meals	9,893.50	17.92	17,896.66	23.96	12,988.94	16.46	13,593.03	19.53
7	Maintenance medical equipment	122.22	0.22	194.30	0.26	157.37	0.20	157.96	0.23
8	Maintenance furniture	18.97	0.03	233.16	0.31	140.51	0.18	130.88	0.19
9	Maintenances building	1,102.11	2.00	2,098.42	2.81	1,782.95	2.26	1,661.16	2.39
10	Maintenances building vehicle	1,186.40	2.15	2,137.28	2.86	1,559.61	1.98	1,627.76	2.34
11	Maintenance water system	90.61	0.16	174.87	0.23	122.30	0.15	129.26	0.19
12	Maintenance sewage	103.26	0.19	155.44	0.21	129.26	0.16	129.32	0.19
13	Maintenance electricity	223.36	0.40	505.17	0.68	337.21	0.43	355.25	0.51
14	Maintenance generator	105.36	0.19	233.16	0.31	126.45	0.16	154.99	0.22
15	Stationeries	2,537.30	4.59	2,616.42	3.26	3,659.61	4.64	2,937.78	4.22
16	Printing of documents	2,301.67	4.17	2,437.22	3.26	3,303.82	4.19	2,680.90	3.85
17	Photocopies	1,000.58	1.81	1,075.24	1.44	1,626.49	2.06	1,234.10	1.77
18	Phone costs	730.80	1.32	788.51	1.06	1,169.04	1.48	896.12	1.29
19	Guest reception	751.29	1.36	1,075.24	1.44	1,778.98	2.25	1,201.84	1.73
20	Meeting	51.22	0.09	71.68	0.10	101.66	0.13	74.85	0.11
21	In-services training	3,312.49	6.00	3,584.14	4.80	6,099.35	7.73	4,331.99	6.22
22	Reimbursements	1,550.38	2.81	1,612.86	2.16	2,236.43	2.83	1,799.89	2.59
23	Other expenses	21,913.47	39.68	22,580.10	30.23	30,852.6	39.09	25,115.38	36.08
	Total	**55,222.00**	**100.00**	**74,701.00**	**100.0**	**78,929.00**	**100.00**	**69,617.33**	**100.00**

5.1.4 Total hospital cost:

Total cost of the Takeo hospital for year 2003 was the summation of the Capital cost (CC) labor cost (LC) and material cost (MC), it cost about $US 486,232.65. This hospital spent about 40.48% on labor cost (LC), 55.56% for material cost (MC), and 3.96% of the total hospital cost per year for capital cost (CC).

Components	Cost (US$)	%
LC	196,818.64	40.48
MC	270,141.33	55.56
CC	19,272.68	3.96
Total	**486,232.65**	**100.00**

5.1.5 Total cost of each cost centers:

Most of cost of each cost centers were direct cost, the amount of total direct cost was about US$ 486, 232.65.

Table 5.8: Total cost of each patient service cost centers

Cost center code	LC (US$)	MC (US$)	CC (US$)	TDC (US$)
A1	17413.49	40,272.92	2,557.22	60,243.63
A2	4156.17	28,576.14	-	32,732.31
A3	4156.17	768.27	407.73	5,332.17
B1	7669.06	200,524.00	-	208,193.06
B2	14363.50	-	216.61	14,580.11
B3	7524.56	-	1,078.34	8,602.90
C1	17802.93	-	-	17,802.93
C2	101027.53	-	9,796.64	110,824.17
C3	22705.23	-	5,216.14	27,921.37
Total	**196,818.64**	**270,141.33**	**19,272.68**	**486,232.65**

The above table there was 4 cost centers (B2, B3, C1, C2, C3), have no material cost, but all of these cost centers received material from revenue producing cost centers and non-revenue producing cost centers A1, A2, A3, and B1. Also there were three main cost centers (A2, B1, C1) don't have capital cost, because of the capital cost of these cost centers were over useful lifetime, but all of these cost centers still using building and medical equipments, therefore these cost centers will get capital cost from these others cost centers by step-down allocation. For better in cost allocation, we was separate capital cost in to space related cost center.

5.1.6 Total costs of each patient service cost centers and unit cost:

Total costs and unit of each PS compose of direct and indirect cost, which were allocated from RPCC and NRPCC by step down allocation method.

All of hospital costs relevant to curative care, it's cost about US$ 486,232.65 as shown in the table 4.10, 4.11, and 4.12 (step down allocation method).

Hospital Unit cost = Total cost / Output (# patients visit)

Unit cost of each PSCC = Total cost of each PSCC / Output of each PSCC

To get the above unit cost, we have to estimate the demand for year 2003

Estimate demand for year 2003

To calculate the unit cost of each patient service we have to estimate the output of year 2003. In this study we use cost of the secondary data, but the output we will estimate by using the demand estimation formula as below:

Demand this year = Demand last year * e^r

Where r : is the annual growth rate of population

e : is the natural value

Assume that growth rate of population and price elasticity is constant

$\widehat{\ln Q_{2001}} = \ln Q_{2000} + r$

Where $\widehat{Q_{2001}}$ is the demand in year 2001, if then were no price change

Estimate price elasticity

The difference between $\widehat{Q_{2001}}$ and actual demand Q_{2001} is due to price elasticity.

$$E = [\ln Q_{2001} - \widehat{\ln Q_{2001}}] / [\ln(P_{2001}/ P_{1999})]$$

Where E is price elasticity

Estimate demand for year 2003

$$\ln Q_{2003} = [(2^* r) + \ln Q_{2001}] + [E * \ln(P_{2003}/ P_{2001})]$$

$$Q_{2003} = e^{\ln Q_{2003}}$$

Where Q_{2003} : is quantity of the demand estimation year 2003

P_{2003} is Price of services year 2003

r : 2.3% per year, r is growth rate of population (The national socio-economic survey, 1999. Ministry of planning)

e: is the natural value (e = 2.7183)

The detail of the demand estimation calculation shown in the Appendix 3, the output estimated for year 2003, shown as bellowed:

PS	**Patients visit**
OPD	9,390
IPD	8,5534
Surgery	1,707
Total	**19,651**

Step down allocation

This method compensates for one weakness in the direct apportionment method that non-revenue cost centers does provide services to other non-revenue cost centers and patient services cost centers.

The first step is to allocate cost related space to all of cost centers that use building, medical equipment, and vehicle. This allocation base on the percentage sqm^2 of each cost centers.

The second step in this process that allocate the administration cost to all other centers that have received the administration services (this allocation based on a percentages of the salary & Bonus). After this has been done, the administration center is considered to be close and no further cost allocated to it.

The third step, the process is to allocate the supplies & catering costs that now include a portion of administration costs as to all remaining centers such as laundry, pharmacy, radiology, laboratory, and patient services. After this allocation has been performed the supplies & catering center has been closed.

The fourth step is step down laundry is to allocate from the last remaining cost center to the RPCC and PS. At this point, all NRPCC are considered closed.
The fife step is NRPCC pharmacy allocates to other NRPCC and PS such as X-ray & Ultrasound, laboratory, and PS (OPD, IPD, Surgery). After this allocate has been perform, the pharmacy center is considered to be close.

The sixth step is laboratory, this step down allocate to PS centers such as OPD, IPD, Surgery. At this point X-ray is considered to be close.

Last step is X-ray & Ultrasound allocate to all PS centers such as OPD, IPD, and Surgery. After this allocate has been perform the laboratory considered closed.
At the end we get the total cost of each PSCC, then we will calculate to find out the unit cost of each PSCC (base on the above demand that we have been estimated), the formula to calculate the unit cost as bellow:

Unit cost of each PSCC = Total cost of each PSCC / Output of each PSCC
The detail of step down allocation, shown in the appendix 8.

Table 5.9 Total cost of each patient service cost centers:

Components/ PSCC	LC (US$)	MC (US$)	CC (US$)	Total cost (US$)
OPD	17,802.93	35,562.98	1076.35	54,442.26
IPD	101,027.53	250,274.12	10081.83	361,383.48
Surgery	22,705.23	45,250.00	2451.69	70,406.92

PS	LC %	MC %	CC %	Total %
OPD	32.70	65.32	1.98	100.00
IPD	27.96	69.25	2.79	100.00
Surgery	32.25	64.27	3.48	100.00

Table 5.10 Unit cost of each patient service cost centers

PSCC	Total cost (US$)	No. of patients.	Unit cost (US$)
OPD	54,442.26	9,390.00	**5.80**
IPD	361,383.48	8,5534.00	**42.25**
Bloc	70,406.92	1,707.00	**41.25**
Total	**486,232.65**	**19,651.00**	**24.74**

After step down allocation, we have a full cost of each PSCC, total cost of OPD is US$ 54,442.26, the total cost of IPD is US$ 361, 383.48, and the total cost of Surgery is US$ 70,406.92. The unit cost of each PSCC such as unit cost of OPD visit is US$ 5.80 per visit, unit cost of IPD is US$ 42.25, and unit cost of surgery intervention is US$ 41.25. The components of unit cost are MC, LC, CC. MC is higher than LC and CC, about 40 %, second is LC 56% and third is CC 4% in average.

Table 5.11 Components of unit cost:

Components/ PSCC	Unit cost/ /Output	LC		MC		CC		Total
		(US$)	%	(US$)	%	(US$)	%	%
OPD	5.80	1.90	33	3.79	65	0.11	2	100
IPD	42.25	11.81	28	29.26	69	1.18	3	100
Surgery	41.25	13.30	32	26.51	64	1.44	3	100
Total	**24.74**	**10.02**	**40**	**13.75**	**56**	**0.98**	**4**	**100**

PSCC	LC	MC	CC
OPD	0.33	0.65	0.02
IPD	0.28	0.69	0.03
Surgery	0.32	0.64	0.03
Total	0.40	0.56	0.04

5.2 Hospital revenue:

Sources and hospital revenue in last 3 years (1998 – 2000) in US$

	1998	1999	2000	Average 3 years
Government	94,827.00	245,362.00	212,169.00	184,119.33
SRC	103,000.00	70,340.00	63,948.00	79,096.00
User Fees	151,366.00	162,060.00	151,713.00	155,046.33
Others	49,591.00	43,062.00	53,442.00	48,698.33
Total	**398,784.00**	**520,824.00**	**481,272.00**	**466,960.00**

During last few years, source of hospital revenue were from government, donation from Swiss Red Cross, User fees, and other revenue (Blood bank, training, transportations etc). This revenue was spent to recurrent cost, did not cover the capital cost. In year 2003 SRC withdraw the support to the hospital, so that in year 2003

hospital will get the revenue from government, user fees, and the other sources to run the hospital. The estimate revenue of the hospital shown as bellow:

5.2.1 Revenue from user fees

Revenue = Q_{2003} * P_{2003}

Where Q_{2003} : is the quantity of demand estimated

P_{2003}: is Price of services

Base on the above result of demand estimation, and prices are constant, the revenue of user fees is approximately equal to US$ 182, 012.91 it's about 709,850,360.70 Riels. If 20% of the total volume patient did not charge (exemption), the revenue of user fees will be less than this value.

Table 5.12 List of fee for services:

Package of services	**Q.estimated**	**Price**	**Revenue**	**Revenue estimated (US$)**
OPD	**Q_{2003}**	**constant**	**estimated (Riels)**	
Generalist consultation	3,811.35	6,240.00	23,782,824.00	6,098.16
Specialist	1,498.36	8,190.00	12,271,568.40	3,146.56
Minor surgery	1,043.93	20,670.00	21,578,033.10	5,532.83
Dentist Category I	811.48	9,360.00	7,595,452.80	1,947.55
Dentist Category II	5.24	20,670.00	108,310.80	27.77
Physiotherapy	36.65	4,680.00	171,522.00	43.98
X-ray, Echo, ECG	1,552.81	12,480.00	19,379,068.80	4,968.99
Laboratory	630.34	4,680.00	2,949,991.20	756.41
IPD			-	-
Hospitalization Up to 1 week	5,915.97	39,000.00	230,722,830.00	59,159.70
Hospitalization More than 1 week	575.89	84,240.00	48,512,973.60	12,439.22
Maternity Delivery	2,061.69	39,000.00	80,405,910.00	20,616.90
Surgery			-	-
Minor surgery	376.95	71,760.00	27,049,932.00	6,935.88
Medium surgery	465.95	143,520.00	66,873,144.00	17,146.96
Major surgery	863.84	195,000.00	168,448,800.00	43,192.00
Total	**19,651.00**		**709,850,360.70**	**182,012.91**

5.2.2 Revenue from government:

The national budget spent for health care in year 2001 was US$3.1 per capitation (Table 2 in chapter 1). In Health Sector Reform (Health coverage plan), Daun Keo Operational district is the one-district cover 4 administration districts (Daun Keo, Treang, Samrong, Tramkak), it has one Referral hospital and 15 Health centers. The populations under catchment area were 180,678.00.

Base on total population under catchment area, Daun Keo operational district should receive US$ 3.1* 180,678 = US$ 562,101.80, Takeo hospital received only **US$ 184, 119.33** in average pr year, it about 32.87% of the amount total OD budget, 67.13% of total budget were spent for OD (Operational district) office and 15 Health centers.

5.2.3 Revenue from the other

The revenue from the other in average of last three years is US$ 48,698.33, the amounts of this budget were from renting parting space, training, transportation etc.

The total hospital revenue

Total Revenue = User Fees + Government + Others

5.3 Hospital cost recoveries

CRR = Revenue/ Cost

User fees cost recovery:

If 100 percent of patients visit pay, the total revenue will equal to US$ 182,012.91; cost recovery ratio will be equal to 0.37.

Takeo hospital introducing user fees with equity, the financial projections allowed a proportion of fee exemption for 10-20% of the volume of patients (HFS).

Assume that, 20% of patients visit are very poor will not pay for services, mean that 3,930.00 patients free of charge, the total revenue from user fees will reduce from US$ 182,012.91 to 145,570.53, cost recovery will equal to 0.30

Government cost recovery:

The revenue from government is US$ 184,119.33, total cost US$ 486,232.65, so the proportion revenue to cost is 0.37.

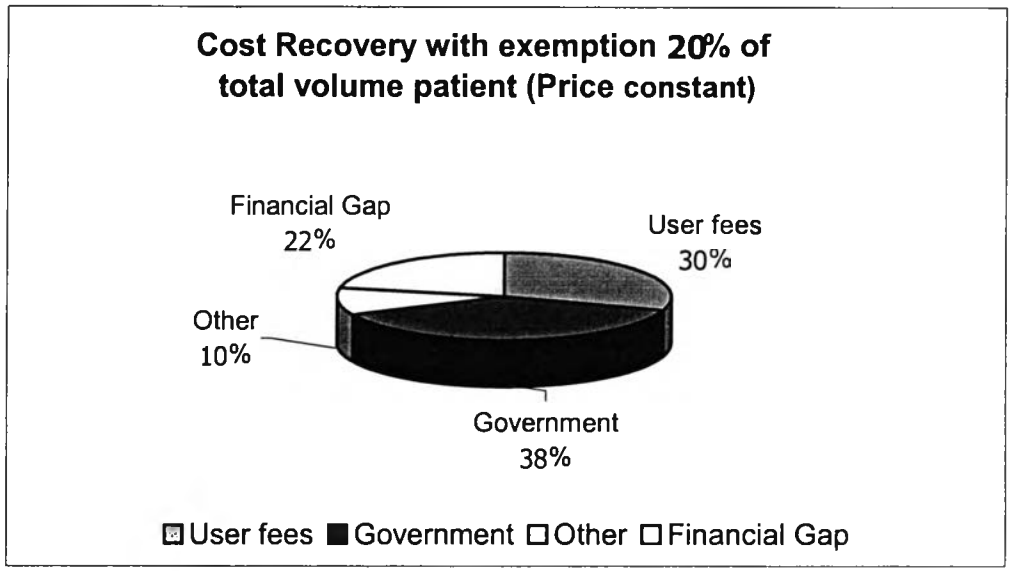
Other cost recovery

Usually the revenue from the other in average about US$ 48, 698.33 per year, assume that this cost is constant until year 2003, so the proportion of the revenue to cost is 0.10. The total hospital cost recovery without donor support show as below: (Other hospital revenue: Blood bank, training, transportation etc).

CRR with constant price			
OPD	9,390	Revenue from user fees estimated	182,012.91
IPD	8,554	Revenue UF. with exemption 20%	**145,570.53**
Surgery	1,707	Revenue Government	184,119.33
Total patients visit	19,651	Revenue from other	48,698.33
Patient exempted 20%	3,930	UF.CRR	0.37
Average Unit cost	24.74	UF.CRR with exemption 20%	**0.30**
Total cost	**486,232.65**	CRR (Government)	0.38
Average Unit revenue	**9.26**	CRR (Other)	0.10
Total revenue with exemption	**378,388.19**	Total CRR with equity	**0.78**
		Financial gap	**0.22**

(UF.CRR: User fee cost recovery, exemption 20% of total volume patient)

Figure 5.1



5.4 Sensitivity analysis

Sensitivity analysis is performed in various scenario settings under assumption that the others remain constant.

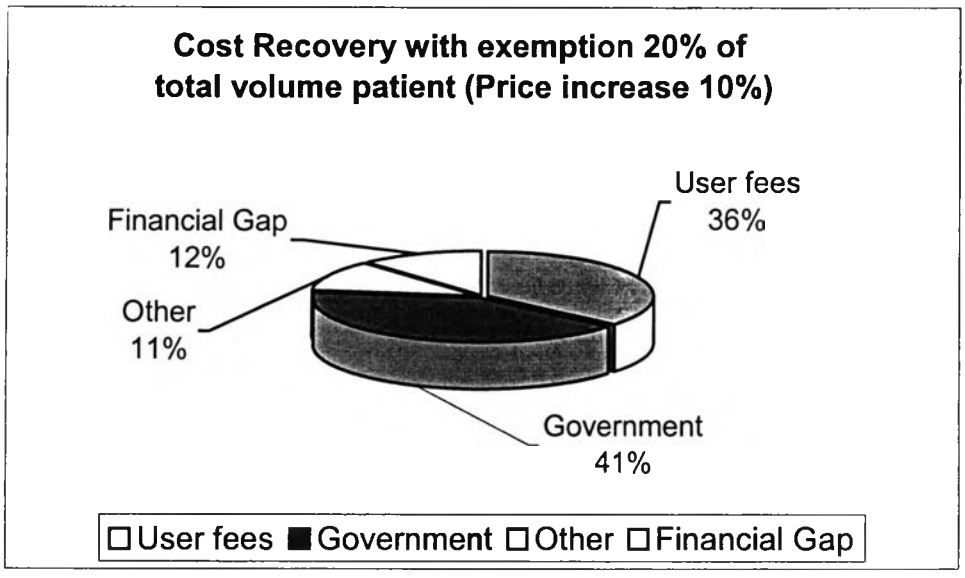
5.4.1 Scenario 1: Changing price by 10%

If hospital wants to increase price by 10%, the demand for health care will change, also total cost and revenue will change, cost recovery change from 0.30 to 0.45, cost recovery ratio shown as bellows:

Price increase 10%			
OPD	7,096	Revenue from user fees estimated	200,767.69
IPD	9,262	Revenue UF. with exemption 20%	**160,653.74**
Surgery	1,636	Revenue Government	184,119.33
Total patients visit	17,994	Revenue from other	48,698.33
Patient exempted 20%	3,599	UF.CRR	0.45
Average Unit cost	24.74	UF.CRR with exemption 20%	**0.36**
Total cost	**445,180.71**	CRR (Government)	0.41
Average Unit revenue	**11.16**	CRR (Other)	0.11
Total revenue with exemption	**393,471.40**	Total CRR with equity	**0.88**
		Financial gap	**0.12**

(UF.CRR: User fee cost recovery, exemption 20% of total volume patient)

Figure 5. 2



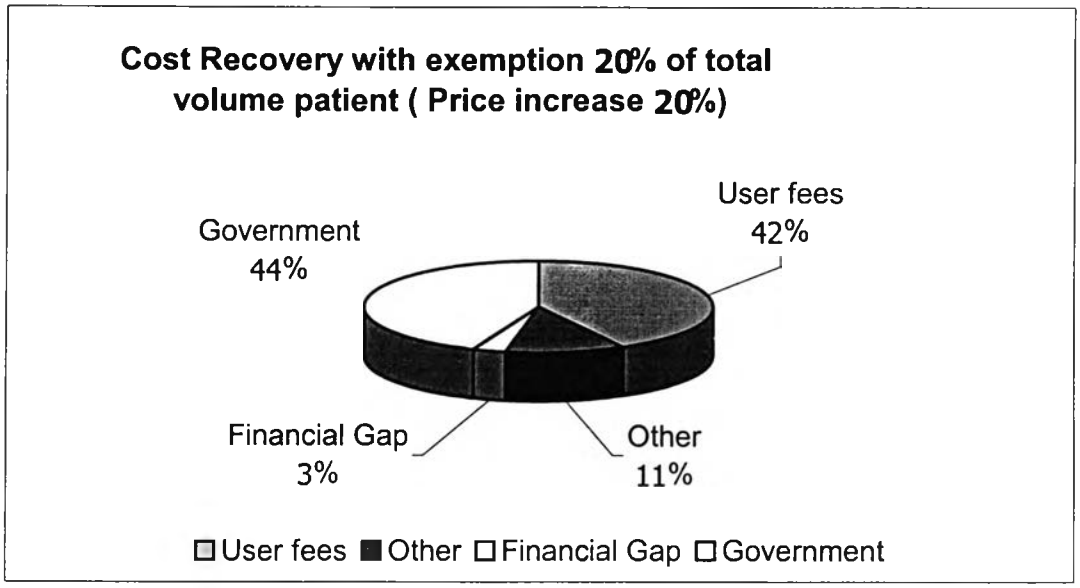
5.4.2 Scenario 2: Changing price by 20%

If price increase by 20% the demand for health care will decrease more, total cost also decrease, but revenue increase, because of high price, so that cost recovery ratio will change from 0.30 to 0.52.

Price increase 20%			
OPD	5,616	Revenue from user fees estimated	222,905.34
IPD	9,998	Revenue UF with exemption 20%	178,342.79
Surgery	1,575	Revenue Government	184,119.33
Total patients visit	17,188	Revenue from other	48,698.33
Patient exempted 20%	3,438	UF.CRR	0.52
Average Unit cost	24.74	UF.CRR with exemption 20%	**0.42**
Total cost	**425,231.37**	CRR (Government)	0.43
Average Unit revenue	12.97	CRR (Other)	0.11
Total revenue with exemption	**411,160.45**	Total CRR with equity	0.97
		Financial gap	0.03

(UF.CRR: User fee cost recovery, exemption 20% of total volume patient)

Figure 5. 3



5.4.3 Scenario 3: Changing price by 50%:

If hospital continues to increase price by 50%, the demand for health care will reduce to 17182.50, hospital cost recovery will increase from 0.52 to 0.73.

Price increase 50%			
OPD	3,380	Revenue from user fees estimated	307,821.88
IPD	12,375	Revenue UF. with exemption 20%	246,190.86
Surgery	1,427	Revenue Government	184,119.33
Total patients visit	17,183	Revenue from other	48,698.33
Patient exempted 20%	3,437	UF.CRR	0.72
Average Unit cost	24.74	UF.CRR with exemption 20%	**0.58**
Total cost	425,095.05	CRR (Government)	0.43
Average Unit revenue	17.91	CRR (Other)	0.11
Total revenue with exemption	**479,008.52**	Total CRR with equity	1.13
		Financial gap	-0.13

(UF.CRR: User fee cost recovery, exemption 20% of total volume patient)

Table 5.13 Comparing hospital cost recoveries with various changes in price:

Exemption 20% of total volume patient	Total Demand	Actual demand pay	Pt. (20%) exemption	UF.CRR Non exemp.	UF.CRR With exemp.
Baseline (Price constant)	19,651	15,721	3,930	0.37	0.30
Changing price by 10%	17,994	14,396	3,599	0.45	0.36
Changing price by 20%	17,188	13,750	3,438	0.52	0.42
Changing price by 50%	17,183	13,746	3,437	0.72	0.58

Table 5.14 Total hospital cost recovery with exemption:

Exemption 20% of total volume patient	Patients Estimated	Patients (20%) will be exempted	Patients will pay	CRR (U.F)	**Total** Hosp. CRR
Baseline Price constant)	19,650	3,930	15,720	0.30	**0.78**
Changing price by 10%	17,994	3,599	14,395	0.36	**0.88**
Changing price by 20%	17,188	3,438	13,750	0.42	**0.97**
Changing price by 50%	17,183	3,437	13,747	0.58	**1.13**