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APPENDICES

APPENDIX I

EXAMPLE OF FOUR COST FINDING METHODS

The following example demonstrates the various methods of cost finding techniques. Suppose we wish to determine the full cost of patient service areas such as out-patient, in-patient service and emergency room. For simplicity, let us assume that there are 1 NRPCC, 2 RPCC and 3 PS and the amount of services that each NRPCC and RPCC provides to other departments. This data will be used to demonstrate how the four methods allocate the direct cost of NRPCC and RPCC to PS. The percentages of service supplied would be developed from hospital statistics.

Exhibit 1 : Data used in cost finding

			services supplied		
		TDC	Dept. A	Dept. B	Dept. C
NRPCC	Dept. A	฿4,000	-	15%	25%
RPCC	Dept. B	฿5,000	30%	-	15%
	Dept. C	฿6,000	20%	15%	-
Total services to NRPCC and RPCC			50%	30%	40%
PS	Dept. W	฿10,000	25%	40%	30%
	Dept. X	฿6,000	15%	10%	20%
	Dept. Y	฿8,000	10%	20%	10%
Total services to PS		฿39,000	50%	70%	60%

Exhibit 2 uses the direct method to allocate the cost of NRPCC and RPCC (Dept. A, B and C) to PS (Dept. W, X and Y). This method is the easiest of the four methods to use. However, because it does not recognize that NRPCC and RPCC serve each other, this method's usefulness is limited.

Exhibit 2 : Cost finding using direct method

step 1

			Allocation criteria adjusted		
		TDC	Dept. A	Dept. B	Dept. C
Dept.	A	฿ 4,000			
	B	฿ 5,000			
	C	฿ 6,000			
	W	฿ 10,000	.25/.50=.5000	.40/.70=.5714	.30/.60=.5000
	X	฿ 6,000	.15/.50=.3000	.10/.70=.1429	.20/.60=.3333
	Y	฿ 8,000	.10/.50=.2000	.20/.70=.2857	.10/.60=.1667
		฿ 39,000	1.0000	1.0000	1.0000

step2

	Dept. A	Dept. B	Dept. C
Dept. W	0.5000*4,000=2,000	0.5714*5,000=2,857	0.5000*6,000=3,000
X	0.3000*4,000=1,200	0.1429*5,000= 714	0.3333*6,000=2,000
Y	0.2000*4,000= 800	0.2857*5,000=1,429	0.1667*6,000=1,000
	4,000	5,000	6,000

step 3

		IDC from			
	TDC	Dept. A	Dept. B	Dept. C	Full Cost
Dept. W	฿ 10,000	฿ 2,000	฿ 2,857	฿ 3,000	฿ 17,857
X	฿ 6,000	฿ 1,200	฿ 714	฿ 2,000	฿ 9,914
Y	฿ 8,000	฿ 800	฿ 1,429	฿ 1,000	฿ 11,229
					฿ 39,000

In Exhibit 3, cost finding method 2, the step down method, is used to allocate costs of NRPCC and RPCC to PS. This method is an improvement over method 1 in that costs of some NRPCC and RPCC are allocated to other departments. Since NRPCC and RPCC are closed once their costs are allocated, the correct sequence of closing the NRPCC and RPCC is essential.

Exhibit 3 : Cost finding using step down method

step 1

	Dept. A	Dept. B	Dept. C
Dept. A	-	-	-
B	0.3000	-	-
C	0.2000	.15/.85=.1765	-
W	0.2500	.40/.85=.4706	.30/.60=.5000
X	0.1500	.10/.85=.1176	.20/.60=.3333
Y	0.1000	.20/.85=.2353	.10/.60=.1667
	1.0000	1.0000	1.0000

step 2

	Dept. A	Dept. B	Dept. C
Dept. A	฿4,000	-	-
B	0.3000*4,000=1,200	5,000+1,200=6,200	-
C	0.2000*4,000= 800	0.1765*6,200=1,094	6,000+800+1,094=7,894
W	0.2500*4,000=1,000	0.4706*6,200=2,918	0.5000*7,894=3,947
X	0.1500*4,000= 600	0.1176*6,200= 729	0.3333*7,894=2,631
Y	0.1000*4,000= 400	0.2353*6,200=1,459	0.1667*7,894=1,316
	4,000	6,200	7,894

step 3

	TDC	IDC from Dept. A	IDC from Dept. B	IDC from Dept. C	Full Cost
Dept. W	10,000	1,000	2,918	3,947	17,865
X	6,000	600	729	2,631	9,960
Y	8,000	400	1,459	1,316	11,175
					฿ 39,000

Method 3 is sometimes called the double apportionment or double distribution method. In the first allocation there is recognition that NRPCC and RPCC provide services to other department. In Exhibit 4, when costs of Dept. A are allocated, B, C, W, X and Y will all receive costs based on the services received from A. After the first allocation, Dept. A has costs of 2,862.5 baht which represents 930 baht from B and 1,932.5 baht from C. The second allocation is performed using method 2.

Exhibit 4 : Cost finding using double distribution method

	First allocation			Reallocation		
	Dept. A	Dept. B	Dept. C	Dept. A	Dept. B	Dept. C
Dept. A	-	0.15	0.25	-	-	-
B	0.30	-	0.15	0.30	-	-
C	0.20	0.15	-	0.20	.15/.85=.1765	-
W	0.25	0.40	0.30	0.25	.40/.85=.4706	.30/.60=.5000
X	0.15	0.10	0.20	0.15	.10/.85=.1176	.20/.60=.3333
Y	0.10	0.20	0.10	0.10	.20/.85=.2353	.10/.60=.1667
	1.00	1.00	1.00	1.00	1.0000	1.0000

First allocation		Dept. A	Dept. B	Dept. C
	TDC	4,000	5,000+1,200=6,200	6,000+800+930=7,730
Dept. A	฿ 4,000	-	0.15*6,200= 930	0.25*7,730=1,932.5
B	฿ 5,000	0.30*4,000=1,200	-	0.15*7,730=1,159.5
C	฿ 6,000	0.20*4,000= 800	0.15*6,200=930	-
W		0.25*4,000=1,000	0.40*6,200=2,480	0.30*7,730=2,319
X		0.15*4,000= 600	0.10*6,200= 620	0.20*7,730=1,546
Y		0.10*4,000= 400	0.20*6,200=1,240	0.10*7,730= 773
		4,000	6,200	7,730

Exhibit 4 (cont.)

Reallocation	Dept. A	Dept. B	Dept. C
	930+1,932.5=2,862.5	1,159.5+859=2018.5	572.5+356.2=928.7
Dept. A	-	-	-
B	0.30*2,862.5=859	-	-
C	0.20*2,862.5=572.5	0.1765*2,018.5=356.2	-
W	0.25*2,862.5=716	0.4706*2,018.5=950	0.5000*928.7=464.4
X	0.15*2,862.5=429	0.1776*2,018.5=237.3	0.3333*928.7=309.5
Y	0.10*2,862.5=286	0.2353*2,018.5=475	0.1667*928.7=154.8
	2,862.5	2,018.5	928.7

	A	B	C	W	X	Y	Total
TDC	4,000	5,000	6,000	10,000	6,000	8,000	39,000
Allocate A	(4,000)	1,200	800	1,000	600	400	
	0	6,200	6,800	11,000	6,600	8,400	39,000
Allocate B	930	(6,200)	930	2,480	620	1,240	
	930	0	7,730	13,480	7,220	9,640	39,000
Allocate C	1,932.5	1,159.5	(7,730)	2,319	1,546	773	
	2,862.5	1,159.5	0	15,799	8,766	10,413	39,000
Reallocate A	(2,862.5)	859	572.5	716	429	286	
	0	2,018.5	572.5	16,515	9,195	10,699	39,000
Reallocate B		(2,018.5)	356.2	950	237.3	475	
		0	928.7	17,465	9,432	11,174	39,000
Reallocate C			(928.7)	464.4	309.5	154.8	
			0	17,929.4	9,741.8	11,328.8	39,000

Method 4 is an algebraic method that uses simultaneous equations to allocate the costs of NRPCC and RPCC to other departments. Exhibit 5 demonstrates the use of this method by manual calculation and Exhibit 6 demonstrates the computer use of this method with Matrix from the data in Exhibit 1.

Exhibit 5 : Cost finding using simultaneous equation method

LET : A = 4,000 + 0.15B + 0.25C

B = 5,000 + 0.30B + 0.15C

C = 6,000 + 0.20B + 0.15C

Rearrange the equations :

1.0A - 0.15B - 0.25C = 4,000	Equation 1
- 0.30A + 1.0B - 0.15C = 5,000	Equation 2
- 0.20A - 0.15B + 1.0C = 6,000	Equation 3

Multiply Equation 1 by 0.30 and add to Equation 2 :

0.30A - 0.045B - 0.075C = 1,200	Equation 1
- 0.30A + 1.0B - 0.15C = 5,000	Equation 2
0.955B - 0.225C = 6,200	Equation 4

Multiply Equation 3 by -1.5 and add to Equation 2 :

0.30A + 0.225B - 1.5C = - 9,000	Equation 3
- 0.30A + 1.0B - 0.15C = 5,000	Equation 2
1.225B - 1.65C = - 4,000	Equation 5

From a new system of equations :

0.955B - 0.225C = 6,200	Equation 4
1.225B - 1.65C = - 4,000	Equation 5

Multiply Equation 4 by -1.65 and mutiply Equation 5 by 0.225 :

-1.57575B + 0.37125C = - 10,230	Equation 4
0.275625B - 0.37125C = - 900	Equation 5

Exhibit 5 (cont.)

Add Equation 4 and 5, and solve for B :

$$-1.300125B = -11,130$$

$$B = 8,560.72$$

Substitute value for B in Equation 5, solve for C :

$$1.225\ (8,560.72) - 1.65C = -4,000$$

$$-1.65C = -4,000 - 10,486.88$$

$$= -14,486.88$$

$$C \doteq 8,779.93$$

Subsitute in Equation 1, solve for A :

$$A - 0.15\ (\ 8,560.72\ ) - 0.25\ (\ 8,779.93\ ) = 4,000$$

$$A - 1,284.11 - 2,194.98 = 4,000$$

$$A = 7,479.09$$

Values rounded to : A = 7,479 B = 8,561 C = 8,780

The above values are the total cost of Dept. A, B and C. To develop the full cost of Dept. W, X and Y , the costs of NRPCC and RPCC should be allocated to PS based on the data in Exhibit 1 as follows :

$$W = 10,000 + 0.25A + 0.40B + 0.30C$$

$$= 10,000 + 0.25\ (7,479) + 0.40\ (8,561) + 0.30\ (8,780)$$

$$= 10,000 + 1,869.75 + 3,424.4 + 2,634$$

$$= 17,928$$

$$X = 6,000 + 0.15A + 0.10B + 0.20C$$

$$= 6,000 + 0.15\ (7,479) + 0.10\ (8,561) + 0.20\ (8,780)$$

$$= 6,000 + 1,121.85 + 856.1 + 1,756$$

$$= 9,734$$

$$Y = 8,000 + 0.10A + 0.20B + 0.10C$$

$$= 8,000 + 0.10\ (7,479) + 0.20\ (8,561) + 0.10\ (8,780)$$

$$= 8,000 + 747.9 + 1,712.2 + 878$$

$$= 11,338$$

Exhibit 6 : Cost finding using simultaneous equation method

(computed by Matrix with computer program)

From Equation 1, 2, 3 in Exhibit 5

$$1.0A - 0.15B - 0.25C = 4{,}000 \qquad \text{Equation 1}$$

$$-0.30A + 1.0B - 0.15C = 5{,}000 \qquad \text{Equation 2}$$

$$-0.20A - 0.15B + 1.0C = 6{,}000 \qquad \text{Equation 3}$$

Matrix : $[X][A] = [B]$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} \begin{pmatrix} 1 & -0.15 & -0.25 \\ -0.30 & 1 & -0.15 \\ -0.20 & -0.15 & 1 \end{pmatrix} = \begin{pmatrix} 4{,}000 \\ 5{,}000 \\ 6{,}000 \end{pmatrix}$$

Matrix $[X] = [A^{-1}][B]$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} = \begin{pmatrix} 1.1278 & 0.2163 & 0.3144 \\ 0.3807 & 1.0960 & 0.2596 \\ 0.2827 & 0.2077 & 1.1018 \end{pmatrix} * \begin{pmatrix} 4{,}000 \\ 5{,}000 \\ 6{,}000 \end{pmatrix}$$

Multiply $[A^{-1}]$ with $[B]$

$$\begin{pmatrix} A \\ B \\ C \end{pmatrix} = \begin{pmatrix} 7{,}479 \\ 8{,}561 \\ 8{,}780 \end{pmatrix}$$

Values rounded to : A = 7,479

B = 8,561

C = 8,780

The values of full cost of Dept. A, B and C are same value in Exhibit 5 and full cost of Dept. W, X and Y can be determined as in Exhibit 5.

APPENDIX II

DATA COLLECTION SHEETS

Data collection sheet of labor cost

code	department	salary	wage	welfare	overtime	traveling expense	bonus	total LC

Data collection sheet of material cost

code	department	office supply	medical supply	maintenance & utility	house keeping	drug	other	Total MC

Data collection sheet of capital cost

code	department	depreciation of equipment	depreciation of building	maintenance of building	Total CC

Data collection sheet of total direct cost

code	department	labor cost	material cost	capital cost	total direct cost

APPENDIX III

DATA OF THIS STUDY

Total direct cost of NRPCC (unit : baht)

Code	Department	LC	MC	CC	TDC
A01	General affairs	7,976,821	16,634,409	3,413,105	28,024,335
A02	Nurse administration	5,401,514	1,738,586	61,043	7,201,143
A03	Finance and accounting	2,792,804	231,653	42,228	3,066,685
A04	Supply	2,553,073	487,116	42,393	3,082,582
A05	Maintenance	2,837,826	1,079,295	55,607	3,972,728
A06	Laundry	1,895,713	2,675,774	319,651	4,891,138
A07	Academic	2,623,009	1,339,620	141,980	4,104,608
A08	Med. Illustration	662,750	230,938	131,994	1,025,683
A09	Med. records and statistics	3,664,797	532,033	227,962	4,424,792
A10	Central supply	2,751,625	3,732,694	117,349	6,601,668
A11	Respiratory center	846,308	251,921	423,417	1,521,647
A12	Health insurance office	1,477,585	527,737	216,821	2,222,143
	Total of NRPCC	35,483,825	29,461,776	5,193,550	70,139,151

Total direct cost of RPCC (unit : baht)

Code	Department	LC	MC	CC	TDC
B01	Clinical pathology	2,390,979	876,553	314,093	3,581,626
B02	Clinical laboratory	6,765,930	11,743,511	3,344,589	21,854,029
B03	Radiology	5,018,730	2,185,023	4,293,952	11,497,705
B04	Rehabilitation	2,868,509	659,795	159,233	3,687,537
B05	Pharmacy	8,954,078	87,407,819	761,147	97,123,045
B06	Operating room	16,270,093	18,659,368	6,088,840	41,018,300
B07	Nutrition	4,318,539	7,368,929	326,579	12,014,047
B08	Delivery room	3,685,381	727,014	164,538	4,576,932
B09	Anaesthesiology	5,971,927	731,205	2,124,603	8,827,735
	Total of RPCC	56,244,166	130,359,217	17,577,574	204,180,956

Total direct cost of PS and NPS (unit : baht)

	Code	Department	LC	MC	CC	TDC
PS	C01	OPD-medical service	2,730,541	122,185	16,075	2,868,801
	C02	OPD-surgical service	1,951,915	112,845	16,075	2,080,834
	C03	OPD-orthopedic service	1,467,342	48,682	16,075	1,532,098
	C04	OPD-obs. and gyn. service	2,585,180	201,499	54,205	2,840,885
	C05	OPD-ophthalmological service	986,534	49,970	511,759	1,548,263
	C06	OPD-ENT service	982,410	61,184	131,454	1,175,048
	C07	OPD-pediatric service	2,063,838	86,881	16,075	2,166,793
	C08	OPD-GP service	2,017,483	217,287	30,475	2,265,244
	C09	OPD-dental service	4,139,465	1,437,199	398,193	5,974,856
	C10	Emergency and forensic service	8,749,491	1,001,998	135,966	9,887,455
	C11	IPD-female medical ward	6,201,136	1,174,470	200,551	7,576,157
	C12	IPD-male medical ward	5,511,092	1,206,534	209,767	6,927,392
	C13	IPD-female surgical ward	3,884,517	837,414	281,532	5,003,463
	C14	IPD-male surgical ward	3,935,465	861,102	221,611	5,018,178
	C15	IPD-traumatic ward no.1	3,615,641	1,286,207	256,139	5,157,987
	C16	IPD-traumatic ward no.2	3,659,921	1,282,470	319,643	5,262,034
	C17	IPD-uro-surgical ward	4,473,058	798,252	167,690	5,439,000
	C18	IPD-EENT ward	3,392,973	654,416	192,769	4,240,158
	C19	IPD-obstetric ward	2,022,503	463,990	135,977	2,622,470
	C20	IPD-gynecological ward	2,891,684	457,681	197,058	3,546,423
	C21	IPD-male orthopedic ward no.1	3,619,077	775,586	72,177	4,466,841
	C22	IPD-male orthopedic ward no.2	2,945,309	774,328	39,288	3,758,926
	C23	IPD-female orthopedic ward	3,068,724	760,287	61,678	3,890,689
	C24	IPD-pediatric ward no.1	3,791,212	1,632,858	471,997	5,896,067
	C25	IPD-pediatric ward no.2	3,594,397	1,524,103	229,795	5,348,295
	C26	IPD-pediatric ward no.3	1,615,231	986,227	68,558	2,670,016
	C27	Private section ward	5,707,139	950,337	401,421	7,058,897
	C28	Medical ICU	3,411,474	1,343,548	512,634	5,267,656
	C29	Traumatic ICU	2,782,084	1,213,420	251,931	4,247,435
	C30	Surgical ICU	3,764,228	1,763,007	480,680	6,007,916
		Total of PS	101,561,063	24,085,967	6,099,247	131,746,278
NPS	D01	Health education and PR	695,762	393,707	71,982	1,161,451
	D02	Social medicine	2,892,743	905,843	60,000	3,858,586
		Total of NPS	3,588,505	1,299,551	131,982	5,020,038

Proportion of allocation criteria

Allocate to	Allocate from																				
	A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12	B01	B02	B03	B04	B05	B06	B07	B08	B09
A01	0	0	0.0119	0.0129	0.3411	0	0.0544	0.0585	0	0	0	0	0	0	0	0	0	0	0	0	0
A02	0.0357	0	0.1095	0.1189	0.0827	0.0008	0.0342	0.0903	0	0	0	0	0	0	0	0	0	0	0	0	0
A03	0.0131	0	0	0.0004	0.0008	0	0.0126	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A04	0.0182	0	0.0795	0	0.0485	0.0002	0.0174	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A05	0.0218	0	0	0	0	0	0.0209	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A06	0.0182	0	0	0	0.0130	0	0.0174	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A07	0.0131	0	0.0264	0.0286	0.0538	0	0	0.1235	0	0	0	0	0	0	0	0	0	0	0	0	0
A08	0.0058	0	0	0	0.0039	0	0.0056	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A09	0.0291	0	0	0	0.0035	0	0.0279	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A10	0.0211	0.0327	0	0	0.0156	0	0.0202	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A11	0.0066	0.0101	0	0	0.0186	0.0002	0.0063	0	0	0.0069	0	0	0	0	0	0	0	0	0	0	0
A12	0.0109	0	0.0005	0.0005	0.0000	0	0.0105	0.0118	0	0	0	0	0	0	0	0	0	0	0	0	0
B01	0.0124	0	0.0015	0.0016	0.0031	0	0.0119	0.0149	0	0	0	0	0	0	0	0	0	0	0	0	0
B02	0.0335	0	0.1009	0.1096	0.0081	0.0012	0.0321	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B03	0.0255	0	0.0181	0.0196	0.0312	0.0060	0.0244	0.0201	0	0	0	0	0	0.0004	0	0	0.0062	0	0	0	0
B04	0.0167	0	0.0061	0.0067	0.0027	0.0039	0.0160	0.0134	0	0.0029	0	0	0	0.0005	0.0031	0	0	0	0	0	0
B05	0.0531	0	0.3897	0.4232	0.0818	0	0.0509	0.0118	0	0	0	0	0	0.0001	0	0	0	0	0	0	0
B06	0.0648	0.1002	0.1397	0.1517	0.0512	0.0008	0.0621	0.1243	0	0	0	0	0	0.0004	0.0004	0	0	0	0	0	0
B07	0.0298	0	0.0608	0.0660	0.0305	0	0.0286	0.0036	0	0	0	0	0	0	0	0	0	0	0	0	0
B08	0.0189	0.0293	0	0	0.0011	0.0227	0.0181	0	0.0148	0.0216	0.0000	0.0148	0	0.0407	0.0001	0	0	0	0	0	0.0359
B09	0.0189	0.0293	0.0131	0.0142	0.0103	0	0.0181	0.0027	0	0	0	0	0	0	0	0	0	0	0	0	0
C01	0.0058	0.0090	0.0000	0.0000	0.0030	0.0009	0.0056	0.0027	0.0946	0	0	0.0946	0.1001	0.0450	0.0336	0.0051	0.0970	0	0	0	0
C02	0.0058	0.0090	0.0000	0.0000	0.0030	0.0009	0.0056	0.0027	0.0836	0	0	0.0836	0.1020	0.0248	0.1074	0.0083	0.0188	0.0122	0	0	0.0010
C03	0.0058	0.0090	0.0000	0.0000	0.0030	0.0009	0.0056	0.0027	0.0271	0	0	0.0271	0.0994	0.0024	0.0419	0.2490	0.0030	0	0	0	0.0006
C04	0.0073	0.0113	0	0	0.0002	0.0041	0.0070	0	0.0884	0.0043	0	0.0884	0.1012	0.0134	0.0180	0.0002	0.0030	0	0	0	0
C05	0.0029	0.0045	0.0054	0.0058	0.0061	0	0.0028	0.0064	0.0425	0	0	0.0425	0.0994	0.0015	0.0015	0	0.0093	0	0	0	0
C06	0.0036	0.0056	0.0026	0.0029	0.0000	0.0014	0.0035	0.0026	0.0246	0	0	0.0246	0.0998	0.0056	0.0040	0.0003	0.0043	0	0	0	0.0000

to be continue

Proportion of allocation criteria (cont.)

	Allocate from																				
Allocate to	A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12	B01	B02	B03	B04	B05	B06	B07	B08	B09
C07	0.0058	0.0090	0.0000	0.0000	0.0030	0.0009	0.0056	0.0027	0.0647	0	0	0.0647	0.0995	0.0096	0.0072	0.0457	0.0083	0	0	0	0
C08	0.0073	0.0113	0.0000	0.0000	0.0030	0.0009	0.0070	0.0027	0.1934	0	0	0.1934	0.0994	0.0575	0.0858	0.0271	0.0549	0	0	0	0
C09	0.0189	0.0293	0.0116	0.0126	0.0115	0.0067	0.0181	0.1396	0.0363	0	0	0.0363	0.0997	0.0014	0.0001	0	0.0009	0.0083	0	0	0
C10	0.0466	0.0721	0.0016	0.0018	0.0165	0.0259	0.0446	0.0301	0.1388	0.0287	0.0078	0.1388	0.0995	0.0271	0.0525	0.0002	0.0070	0	0	0	0
C11	0.0291	0.0450	0.0025	0.0027	0.0154	0.0808	0.0279	0.0448	0.0150	0.0866	0.0498	0.0150	0	0.1295	0.0682	0.0001	0.1472	0	0.0808	0	0.0084
C12	0.0284	0.0439	0.0025	0.0027	0.0184	0.0835	0.0272	0.0448	0.0230	0.0438	0.0775	0.0230	0	0.1464	0.1328	0	0.1195	0	0.1239	0	0.0005
C13	0.0204	0.0315	0	0	0.0030	0.0597	0.0195	0	0.0125	0.0537	0.0121	0.0125	0	0.0486	0.0267	0.0533	0.0569	0.1046	0.0675	0	0.1458
C14	0.0211	0.0327	0	0	0.0031	0.0599	0.0202	0	0.0129	0.0130	0.0083	0.0129	0	0.0494	0.0429	0.0167	0.0635	0.1046	0.0695	0	0.1277
C15	0.0240	0.0372	0	0	0.0029	0.0450	0.0230	0	0.0096	0.1233	0.1047	0.0096	0	0.0414	0.1071	0.0002	0.0313	0.0371	0.0517	0	0.0490
C16	0.0218	0.0338	0	0	0.0037	0.0496	0.0209	0	0.0103	0.0820	0.0658	0.0103	0	0.0568	0.0939	0	0.0238	0.0501	0.0555	0	0.1154
C17	0.0262	0.0405	0	0	0.0042	0.0627	0.0251	0	0.0107	0.0314	0.0014	0.0107	0	0.0557	0.0275	0.0708	0.0416	0.2934	0.0578	0	0.0953
C18	0.0175	0.0270	0	0	0.0095	0.0385	0.0167	0	0.0113	0	0.0036	0.0113	0	0.0107	0.0050	0	0.0288	0.1219	0.0608	0	0.0614
C19	0.0102	0.0158	0.0008	0.0008	0.0157	0.0498	0.0098	0.0209	0.0141	0.0229	0	0.0141	0	0.0117	0.0008	0	0.0069	0.0793	0.0761	1.0000	0.0084
C20	0.0153	0.0236	0.0008	0.0008	0.0040	0.0348	0.0146	0.0209	0.0105	0.0190	0.0000	0.0105	0	0.0240	0.0053	0	0.0204	0	0.0566	0	0.0698
C21	0.0197	0.0304	0.0016	0.0017	0.0040	0.0394	0.0188	0.0038	0.0077	0.0070	0.0062	0.0077	0	0.0137	0.0195	0.1159	0.0249	0.0554	0.0415	0	0.0426
C22	0.0160	0.0248	0.0016	0.0017	0.0004	0.0452	0.0153	0.0038	0.0063	0.0122	0.0066	0.0063	0	0.0121	0.0208	0.1163	0.0202	0.0554	0.0339	0	0.0299
C23	0.0175	0.0270	0.0016	0.0017	0.0021	0.0417	0.0167	0.0038	0.0077	0.0073	0.0004	0.0077	0	0.0125	0.0163	0.1159	0.0139	0.0554	0.0415	0	0.0386
C24	0.0226	0.0349	0.0013	0.0014	0.0127	0.0451	0.0216	0.0273	0.0104	0.0821	0.1377	0.0104	0	0.0555	0.0155	0.0492	0.0114	0.0132	0.0559	0	0.0162
C25	0.0182	0.0282	0.0013	0.0014	0.0033	0.0359	0.0174	0.0273	0.0127	0.0665	0.0772	0.0127	0	0.0455	0.0229	0.0829	0.0350	0.0088	0.0685	0	0.0386
C26	0.0073	0.0113	0.0013	0.0014	0.0024	0.0302	0.0070	0.0273	0.0043	0	0.0031	0.0043	0	0.0073	0.0116	0.0428	0.0273	0	0.0230	0	0.0033
C27	0.0313	0.0484	0	0	0.0057	0.0474	0.0300	0	0.0066	0.0199	0.0140	0.0066	0	0.0119	0.0088	0	0.0326	0	0.0357	0	0.0371
C28	0.0204	0.0315	0	0	0.0050	0.0261	0.0195	0	0.0016	0.0447	0.1182	0.0016	0	0.0137	0.0051	0	0.0285	0	0	0	0.0016
C29	0.0175	0.0270	0	0	0.0011	0.0219	0.0167	0	0.0014	0.1152	0.1589	0.0014	0	0.0098	0.0082	0	0.0343	0	0	0	0.0149
C30	0.0218	0.0338	0	0	0.0105	0.0244	0.0209	0	0.0023	0.1050	0.1465	0.0023	0	0.0133	0.0056	0	0.0195	0	0	0	0.0579
D01	0.0036	0	0.0034	0.0037	0.0216	0	0.0035	0.0818	0	0	0	0	0	0	0	0	0	0	0	0	0
D02	0.0131	0	0.0027	0.0029	0.0008	0	0.0126	0.0260	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

matrix

1	0.0000	-0.0119	-0.0129	-0.3411	0.0000	-0.0544	-0.0585	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0357	1	-0.1095	-0.1189	-0.0827	-0.0008	-0.0342	-0.0903	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0131	0.0000	1	-0.0004	-0.0008	0.0000	-0.0126	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0182	0.0000	-0.0795	1	-0.0485	-0.0002	-0.0174	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0218	0.0000	0.0000	0.0000	1	0.0000	-0.0209	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0182	0.0000	0.0000	0.0000	-0.0130	1	-0.0174	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0131	0.0000	-0.0264	-0.0286	-0.0538	0.0000	1	-0.1235	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0058	0.0000	0.0000	0.0000	-0.0039	0.0000	-0.0056	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0291	0.0000	0.0000	0.0000	-0.0035	0.0000	-0.0279	0.0000	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0211	-0.0327	0.0000	0.0000	-0.0156	0.0000	-0.0202	0.0000	0.0000	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0066	-0.0101	0.0000	0.0000	-0.0186	-0.0002	-0.0063	0.0000	0.0000	-0.0069	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0109	0.0000	-0.0005	-0.0005	0.0000	0.0000	-0.0105	-0.0118	0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0124	0.0000	-0.0015	-0.0016	-0.0031	0.0000	-0.0119	-0.0149	0.0000	0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0335	0.0000	-0.1009	-0.1096	-0.0081	-0.0012	-0.0321	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0255	0.0000	-0.0181	-0.0196	-0.0312	-0.0060	-0.0244	-0.0201	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0004	1	0.0000	-0.0062	0.0000	0.0000	0.0000	0.0000
-0.0167	0.0000	-0.0061	-0.0067	-0.0027	-0.0039	-0.0160	-0.0134	0.0000	-0.0029	0.0000	0.0000	0.0000	-0.0005	-0.0031	1	0.0000	0.0000	0.0000	0.0000	0.0000
-0.0531	0.0000	-0.3897	-0.4232	-0.0818	0.0000	-0.0509	-0.0118	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0001	0.0000	0.0000	1	0.0000	0.0000	0.0000	0.0000
-0.0648	-0.1002	-0.1397	-0.1517	-0.0512	-0.0008	-0.0621	-0.1243	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0004	-0.0004	0.0000	0.0000	1	0.0000	0.0000	0.0000
-0.0298	0.0000	-0.0608	-0.0660	-0.0305	0.0000	-0.0286	-0.0036	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1	0.0000	0.0000
-0.0189	-0.0293	0.0000	0.0000	-0.0011	-0.0227	-0.0181	0.0000	-0.0148	-0.0216	0.0000	-0.0148	0.0000	-0.0407	-0.0001	0.0000	0.0000	0.0000	0.0000	1	-0.0359
-0.0189	-0.0293	-0.0131	-0.0142	-0.0103	0.0000	-0.0181	-0.0027	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1

inverse matrix

1.0093	0.0000	0.0148	0.0148	0.3486	0.0000	0.0630	0.0669	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0429	1.0000	0.1207	0.1207	0.1060	0.0009	0.0429	0.0981	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0135	0.0000	1.0006	0.0009	0.0062	0.0000	0.0135	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0208	0.0000	0.0804	1.0009	0.0568	0.0002	0.0208	0.0038	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0224	0.0000	0.0009	0.0009	1.0089	0.0000	0.0224	0.0041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0189	0.0000	0.0008	0.0008	0.0205	1.0000	0.0189	0.0034	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0161	0.0000	0.0290	0.0290	0.0614	0.0000	1.0037	0.1249	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0061	0.0000	0.0003	0.0003	0.0063	0.0000	0.0061	1.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0299	0.0000	0.0012	0.0012	0.0154	0.0000	0.0299	0.0054	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0234	0.0327	0.0049	0.0049	0.0278	0.0000	0.0234	0.0072	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0077	0.0104	0.0016	0.0016	0.0228	0.0002	0.0077	0.0023	0.0000	0.0069	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0113	0.0000	0.0010	0.0010	0.0046	0.0000	0.0113	0.0138	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0129	0.0000	0.0021	0.0021	0.0083	0.0000	0.0129	0.0172	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0381	0.0000	0.1112	0.1112	0.0286	0.0012	0.0381	0.0069	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0281	0.0000	0.0234	0.0234	0.0441	0.0060	0.0281	0.0253	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	1.0000	0.0000	0.0062	0.0000	0.0000	0.0000	0.0000
0.0178	0.0001	0.0075	0.0075	0.0103	0.0039	0.0178	0.0167	0.0000	0.0029	0.0000	0.0000	0.0000	0.0005	0.0031	1.0000	0.0000	0.0000	0.0000	0.0000
0.0704	0.0000	0.4263	0.4263	0.1307	0.0001	0.0704	0.0246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000
0.0776	0.1002	0.1670	0.1670	0.0989	0.0009	0.0776	0.1475	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
0.0335	0.0000	0.0674	0.0674	0.0470	0.0000	0.0335	0.0097	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
0.0245	0.0310	0.0097	0.0097	0.0152	0.0227	0.0245	0.0075	0.0148	0.0216	0.0000	0.0148	0.0000	0.0407	0.0001	0.0000	0.0000	0.0000	0.0000	1.0000	0.0359
0.0214	0.0293	0.0186	0.0186	0.0221	0.0000	0.0214	0.0092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000

Full cost of NRPCC and RPCC (unit : baht)

Code	Department	Full Cost
A01	General affairs	30,088,006.93
A02	Nurse administration	9,847,483.80
A03	Finance and accounting	3,530,519.65
A04	Supply	4,230,684.99
A05	Maintenance	4,736,823.98
A06	Laundry	5,589,366.36
A07	Academic	5,121,894.81
A08	Med. Illustration	1,247,920.36
A09	Med. records and statistics	5,460,266.13
A10	Central supply	7,735,555.30
A11	Respiratory center	1,993,187.57
A12	Health insurance office	2,623,004.25
B01	Clinical pathology	4,059,861.08
B02	Clinical laboratory	23,890,569.83
B03	Radiology	13,387,278.11
B04	Rehabilitation	4,449,027.48
B05	Pharmacy	102,552,614.40
B06	Operating room	45,823,051.39
B07	Nutrition	13,700,942.93
B08	Delivery room	7,276,860.72
B09	Anaesthesiology	9,936,872.76

Full Cost of Patient Service Areas and Non Patient Service Areas

Code	Department	RSC	MCC	FC
C01	OPD-medical service	3,948,955	11,898,016	15,846,971
C02	OPD-surgical service	3,072,178	4,977,700	8,049,877
C03	OPD-orthopedic service	2,066,114	2,438,605	4,504,719
C04	OPD-obs. and gyn. service	3,977,793	1,279,608	5,257,401
C05	OPD-ophthalmological service	2,118,889	1,409,737	3,528,626
C06	OPD-ENT service	1,589,500	1,034,616	2,624,117
C07	OPD-pediatric service	3,005,350	1,779,318	4,784,668
C08	OPD-GP service	4,216,580	8,673,672	12,890,252
C09	OPD-dental service	7,579,366	914,985	8,494,352
C10	Emergency and forensic service	13,860,458	2,469,493	16,329,951
C11	IPD-female medical ward	10,530,087	20,289,831	30,819,918
C12	IPD-male medical ward	9,662,213	19,228,828	28,891,040
C13	IPD-female surgical ward	6,915,612	14,756,257	21,671,869
C14	IPD-male surgical ward	6,649,530	15,357,118	22,006,648
C15	IPD-traumatic ward no.1	7,869,493	8,533,307	16,402,801
C16	IPD-traumatic ward no.2	7,501,783	9,262,922	16,764,704
C17	IPD-urosurgical ward	7,458,068	21,459,756	28,917,824
C18	IPD-EENT ward	5,476,349	10,306,836	15,783,185
C19	IPD-obstetric ward	3,810,607	13,038,642	16,849,249
C20	IPD-gynecological ward	4,791,995	4,210,331	9,002,325
C21	IPD-male orthopedic ward no.1	5,839,518	7,192,632	13,032,151
C22	IPD-male orthopedic ward no.2	4,994,591	6,461,363	11,455,953
C23	IPD-female orthopedic ward	5,148,587	5,954,516	11,103,103
C24	IPD-pediatric ward no.1 (0-8 mo.)	8,379,458	4,456,009	12,835,467
C25	IPD-pediatric ward no.2 (8 mo.-14 yr.)	7,294,338	7,074,443	14,368,781
C26	IPD-pediatric ward no.3 (chronic disease	3,301,414	3,671,491	6,972,906
C27	Private section ward	9,158,798	4,597,823	13,756,621
C28	Medical ICU	7,054,988	3,329,152	10,384,141
C29	Traumatic ICU	6,471,580	4,008,937	10,480,516
C30	Surgical ICU	8,413,683	2,966,727	11,380,410
D01	Health education and PR	1,520,848	0	1,520,848
D02	Social medicine	4,375,029	0	4,375,029
	Total			411,086,423

RSC : Routine Service Cost = IDC from NRPCC + TDC of PS

MCC : Medical Care Cost = IDC from RPCC

Unit cost of out-patient service areas

Code	Department	No. pt. Visit (visit)	RSC/Visit (baht/visit)	MCC/Visit (baht/visit)	FC/Visit (baht/visit)
C01	OPD-medical service	41,550	95	286	381
C02	OPD-surgical service	36,726	84	136	219
C03	OPD-orthopedic service	11,885	174	205	379
C04	OPD-obs. and gyn. service	38,794	103	33	136
C05	OPD-ophthalmological service	18,675	113	75	189
C06	OPD-ENT service	10,808	147	96	243
C07	OPD-pediatric service	28,427	106	63	168
C08	OPD-GP service	84,899	50	102	152
C09	OPD-dental service	15,947	475	57	533
C10	Emergency and forensic service	60,960	227	41	268
	Total of out-patient service	348,671	130	106	236

Unit cost of in-patient service areas

Code	Department	occupancy rate (%)	No. pt. (case)	Hospital day	UC/Case (baht)	RSC/Day (baht)	MCC/Day (baht)	UC/Day (baht)
C11	IPD-female medical ward	87	3,294	15,170	9,356	694	1,337	2,032
C12	IPD-male medical ward	139	5,052	26,401	5,719	366	728	1,094
C13	IPD-female surgical ward	149	2,753	19,528	7,872	354	756	1,110
C14	IPD-male surgical ward	123	2,833	16,136	7,768	412	952	1,364
C15	IPD-traumatic ward no.1	90	2,107	11,535	7,785	682	740	1,422
C16	IPD-traumatic ward no.2	73	2,264	9,988	7,405	751	927	1,678
C17	IPD-urosurgical ward	158	2,359	27,731	12,259	269	774	1,043
C18	IPD-EENT ward	81	2,481	10,380	6,362	528	993	1,521
C19	IPD-obstetric ward	86	3,102	6,928	5,432	550	1,882	2,432
C20	IPD-gynecological ward	98	2,307	12,484	3,902	384	337	721
C21	IPD-male ortho. ward no.1	112	1,694	14,357	7,693	407	501	908
C22	IPD-male ortho. ward no.2	121	1,381	13,235	8,295	377	488	866
C23	IPD-female ortho. ward	134	1,691	14,701	6,566	350	405	755
C24	IPD-ped. (0-8 mo.)	99	2,279	15,873	5,632	528	281	809
C25	IPD-ped. (8 mo.-14 yr.)	105	2,794	15,283	5,143	477	463	940
C26	IPD-ped. (chronic disease)	87	940	9,571	7,418	345	384	729
C27	Private section ward	65	1,456	12,958	9,448	707	355	1,062
C28	Medical ICU	100	347	2,915	29,925	2,420	1,142	3,562
C29	Traumatic ICU	84	318	2,451	32,958	2,640	1,636	4,276
C30	Surgical ICU	83	500	2,411	22,761	3,490	1,230	4,720
	Total of in-patient service	112	41,952	260,036	7,696	526	716	1,242
B06	Operating room		18,754		2,443			
B08	Delivery room		3,245		2,242			

CURRICULUM VITAE

Mrs.Walaiporn Patcharanarumol was born in Bangkok on July 15,1969 . She received her Bachelor degree of Pharmaceutical science from Khon Kaen University in 1992. She has studied in Master of sciences in Health Development (Health Program Management) , Faculty of Medicine , Chulalongkorn University since 1996. At present , she is working as a pharmacist at Khon Kaen Hospital.