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Appendices.

Appendix I

Inflation Rate and Minimum Wage Forecasting

- The Forecasting of Inflation Rate

In this study, all of the future costs will be adjusted by the inflation in order to get the future costs. The inflation rate in the future will be estimated from the past data of the general consumer price index that starts from 1965 to 1999 by using the exponential smoothing forecasting from E View Program for predicting the average inflation in the next 10 years. And assumed that the forecasting inflation rate in the next 10 years will be a representation of the total inflation rate in the future.

The exponential is a method for continually revising an estimate or forecast by accounting for more recent changes or for fluctuations in the data. Random error, an unexplained component or an unpredictable outside incident could cause these fluctuations. The exponential smoothing is an effective way of forecasting when we have only a few observations. There are five patterns of exponential smoothing methods.

- Single Exponential Smoothing (no trend and seasonal)
- Double Exponential Smoothing (with trend, no seasonal)
- Holt-Winters (no seasonal)
- Holt-Winters (with trend and additive seasonal variation)
- Holt-Winters (with trend and multiplicative seasonal variation)

There are several ways to measure the accuracy of the models. Firstly, all of the statistical test for regression must be met for the trend component. These include the tests for autocorrelation, goodness of fit and slopes. Secondly, a graph of the actual values along with the predicted values is an excellent means of showing how well the model fits the data. Lastly is to compute Theil's U Statistics. The closer of Theil's U Statistics is to 0, the better the model and any Theil's U Statistics equal to or less than 0.55 indicates a good fit (Gaynor P.E.,1994).

After trying for forecasting from every method by using the E-View Program, we can summarize the residuals or errors of the forecasting from each method in the table 1.1

Table A1.1: The Residuals or Errors of Each Forecasting Model.

	Single	Double	Holt-Winter no seasonal	Holt-Winter additive seasonal	Holt-Winter multiplicative
MAE	3.5342	2.1589	1.6531	2.0690	2.6871
MAPE	0.0737	0.0565	0.0330	0.0516	0.0639
MSE	22.0391	8.2835	5.3082	6.4577	12.4426
RMSE	4.6946	2.8781	2.3040	2.5412	3.5274
Theil's U-Statistics	0.0340	0.0205	0.0164	0.0181	0.0253

From the results, the Holt-Winter (no seasonal), which the error terms, such as MAE, MAPE and RMSE, are less than other models, the statistics for the trend are significant, and the Theil's U Statistics of the Holt-Winter (no seasonal) is the least.

From the results of the prediction values in the next 10 years (E View result 1.3 in next page), therefore, the inflation rate for the future costs will use the average inflation in the next 10 years that is 3% per year.

- The Forecasting of the Minimum Wage

In this study, the forecasting for the minimum wage per day is necessary because it is a part of the calculation of cost saving from decreasing patient and parental productivity. The future minimum wages will base on the past data from the Ministry of Labor and Welfare, which is from 1973 to 1999. The way to choose the minimum wage forecaster is the same with the predicted inflation method by using Exponential Smoothing method from E View program. As the result, we can summarized the residuals of each Exponential Smoothing method into table 1.2.

Table A1.2: The Residuals or Errors of Each Forecasting Model.

	Single	Double	Holt-Winter no seasonal	Holt-Winter additive seasonal	Holt-Winter multiplicative
MAE	27.7862	3.4777	4.4639	3.0104	4.7657
MAPE	0.1678	0.0644	0.0631	0.0587	0.0682
MSE	12042.81	15.5214	47.6944	11.7827	37.7881
RMSE	109.7398	3.9397	6.9061	3.4326	6.1470
Theil's U-Statistics	0.4475	0.0208	0.0368	0.0181	0.0325

From the table, the best model for the minimum wage forecaster should be the Holt-Winters (with trend and additive seasonal variation) model. However, the future minimum wage from this model is not reasonable (from the E View result). Therefore, the minimum wage forecaster will be the Holt-Winters (with trend and multiplicative seasonal variation) because the predicted values are more reasonable than the prior is. Consequently, the future estimation of minimum wage in this study will follow the predicted values from the Holt-Winters (with trend and multiplicative seasonal variation) model, which is shown in E View result 1.4.

Table A1.3: The Forecasting of General Consumer Price Index Result by the Holt-Winter (No Seasonal)

Date: 03/31/00 Time: 09:46
Sample: 1965 1999
Included observations: 35
Method: Holt-Winters No Seasonal
Original Series: Y
Forecast Series: YSM

Parameters:	Alpha	1.0000
	Beta	0.5300
Sum of Squared Residuals		185.7892
Root Mean Squared Error		2.303966
End of Period Levels:	Mean	128.2000
	Trend	3.916870

Table A1.3: The Forecasting of General Consumer Price Index Result by the Holt-Winter (No Seasonal). Continue.

Year	General Consumer Price Index	Forecasting General Consumer Price Index.
1965	19	19
1966	19.7	21.67647059
1967	20.6	21.32902518
1968	21	21.84267282
1969	21.5	21.79609204
1970	21.5	22.13917584
1971	21.6	21.80043981
1972	22.6	21.79421523
1973	26.1	23.22124691
1974	32.5	28.2468637
1975	34.2	36.90084518
1976	35.6	37.16951202
1977	38.3	37.73773735
1978	41.4	40.73571266
1979	45.5	44.18775672
1980	54.4	48.98318989
1981	61.3	60.75386903
1982	64.5	67.94329523
1983	67	69.3184951
1984	67.5	70.58979123
1985	69.2	69.4523332
1986	70.5	71.01860733
1987	72.2	72.04376748
1988	75	73.82656408
1989	79	77.24843525
1990	83.7	82.17669012
1991	88.5	87.68397962
1992	92.1	92.91643574
1993	95.2	96.0837595
1994	100	98.71540452

Table A1.3: The Forecasting of General Consumer Price Index Result by the Holt-Winter (No Seasonal). Continue.

Year	General Consumer Price Index	Forecasting General Consumer Price Index.
1995	105.8	104.1961855
1996	112	110.846139
1997	118.2	117.6576363
1998	127.8	124.145066
1999	128.2	135.6820257
2000		132.1168701
2001		136.0337401
2002		139.9506102
2003		143.8674802
2004		147.7843503
2005		151.7012204
2006		155.6180904
2007		159.5349605
2008		163.4518306
2009		167.3687006
2010		171.2855707

Source: Trade and Economic Index Division, Department of Internal Trade, Ministry of Commerce.

Figure A1.1: Graph of the General Consumer Price Index Forecasting.

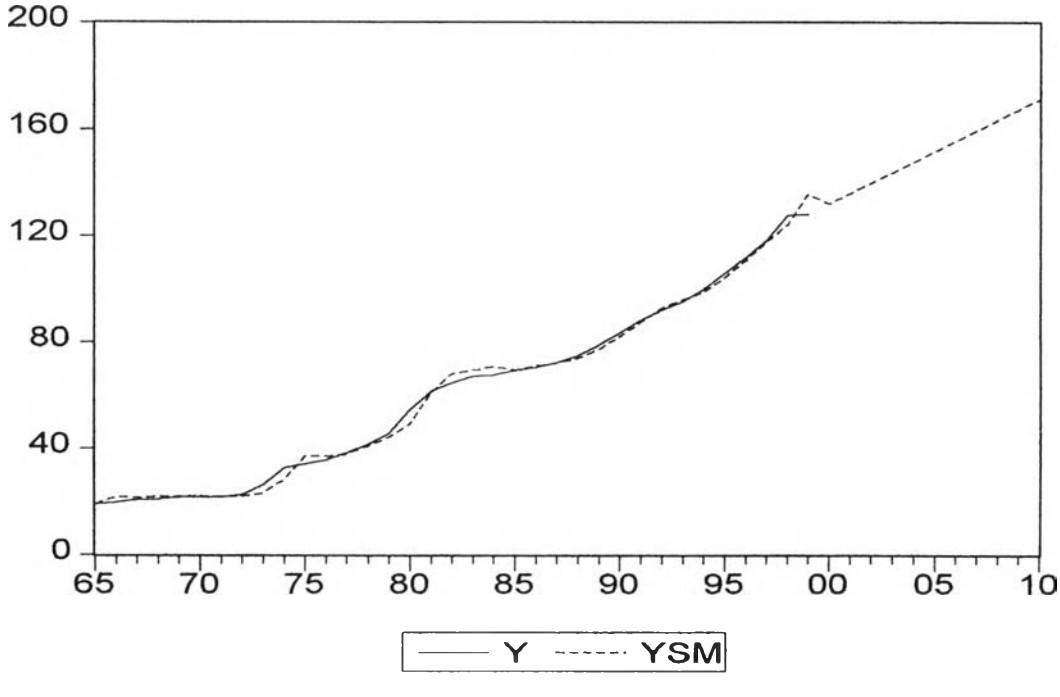


Table A1.4: The Forecasting of Minimum Wage Results by the Holt-Winter (With Trend and Multiplicative Seasonal Variation) Model

Date: 04/04/00 Time: 08:38
Sample: 1973 1999
Included observations: 27
Method: Holt-Winters Multiplicative Seasonal
Original Series: Y
Forecast Series: YSM

Parameters:	Alpha		1.0000
	Beta		0.0000
	Gamma		0.0000
Sum of Squared Residuals			1020.726
Root Mean Squared Error			6.148550
End of Period Levels:	Mean		158.7363
	Trend		6.110000
	Seasonals:	1995	1.024539
		1996	0.977345
		1997	0.961049
		1998	1.016506
		1999	1.020560

Year	Minimum Wage per day	Forecasting Minimum Wage per day
1973	12	9.941433
1974	20	18.28348
1975	25	26.33791
1976	25	29.81996
1977	28	30.45518
1978	35	35.8266
1979	45	41.37521
1980	54	51.43538
1981	61	57.48409
1982	64	65.85494
1983	66	73.90398
1984	66	72.49885
1985	70	72.51726
1986	70	72.74706
1987	73	74.70488
1988	73	83.42332

Table A1.4: The Forecasting of Minimum Wage Results by the Holt-Winter (With Trend and Multiplicative Seasonal Variation) Model.(Cont.)

Year	Minimum Wage per day	Forecasting Minimum Wage per day
1990	90	84.56405
1991	100	91.82577
1992	115	104.2047
1993	125	127.8469
1994	132	131.7342
1995	145	138.7746
1996	157	144.2922
1997	162	160.2543
1998	162	177.5591
1999	162	168.8817
2000		168.8915
2001		167.0832
2002		170.1694
2003		186.1999
2004		193.1781
2005		200.1912
2006		196.9411
2007		199.5294
2008		217.2542
2009		224.3562
2010		231.4909
2011		226.799
2012		228.8895
2013		248.3084
2014		255.5344
2015		262.7906
2016		256.6569
2017		258.2495
2018		279.3627
2019		286.7125
2020		294.0903

Table A1.4: The Forecasting of Minimum Wage Results by the Holt-Winter (With Trend and Multiplicative Seasonal Variation) Model. (Cont.)

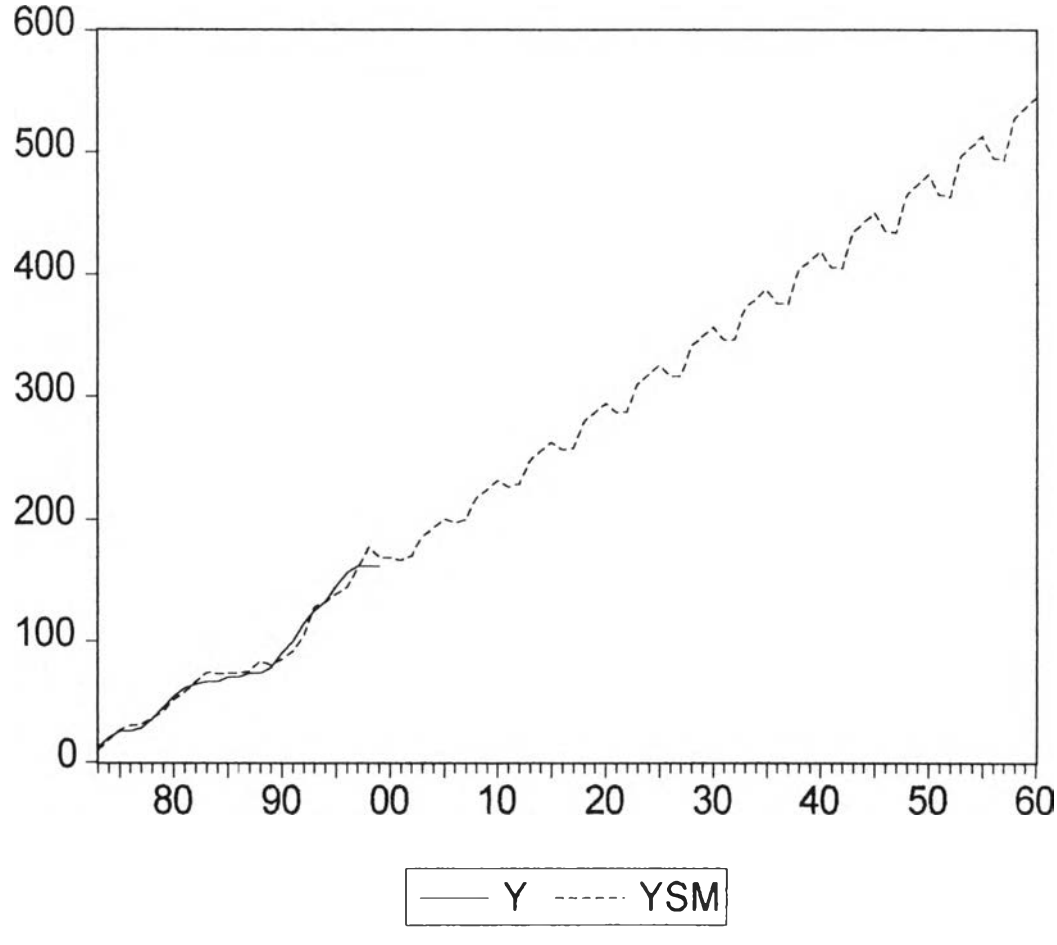
Year	Minimum Wage per day	Forecasting Minimum Wage per day
2021		286.5147
2022		287.6096
2023		310.417
2024		317.8906
2025		325.39
2026		316.3726
2027		316.9696
2028		341.4712
2029		349.0687
2030		356.6896
2031		346.2305
2032		346.3297
2033		372.5255
2034		380.2469
2035		387.9893
2036		376.0884
2037		375.6897
2038		403.5798
2039		411.425
2040		419.289
2041		405.9462
2042		405.0498
2043		434.634
2044		442.6031
2045		450.5887
2046		435.8041
2047		434.4098
2048		465.6883
2049		473.7812
2050		481.8884

Table A1.4: The Forecasting of Minimum Wage Results by the Holt-Winter (With Trend and Multiplicative Seasonal Variation) Model. (Cont.)

Year	Minimum Wage per day	Forecasting Minimum Wage per day
2051		465.662
2052		463.7699
2053		496.7426
2054		504.9594
2055		513.188
2056		495.5199
2057		493.1299
2058		527.7969
2059		536.1375
2060		544.4877

Source: Office of Wage Committee, Ministry of Labour and Social Welfare.

Figure A1.2: Graph of Minimum Wage Per Day Forecasting by the Holt-Winter (With Trend and Multiplicative Seasonal Variation) Model.



Appendix II

Incidence Rate Calculation

Incidence rate calculation of Congenital Hypothyroidism calculation from July 1991 to December 1999 will be compared with the gold standard.

Table A2.1: The Sensitivity and Specificity of TSH and T_4 Test.

Test	Sensitivity	Specificity
TSH and T_4	100%	100%

Source Unpublished study at Chulalongkorn Hospital at 1996.

From the record form at Nursery Department at Chulalongkorn hospital, the screened TSH program has started from 1991 until now. The total number of screened cases has been shown in table 2.3 that are 52,377 cases. From all of these, the suspected cases, who need a confirmatory process are 124 cases, however, there were 35 cases that could not contact them. So, there are only 89 patients who responded the recall back to confirm laboratory. From the responded cases, the doctor has found that 18 cases are congenital hypothyroidism patients. The calculation of the incidence rate of congenital hypothyroidism is as follow. Moreover, in 1996, there was one unpublished study about the sensitivity and specification of TSH and T_4 that are 100% in both. Therefore, in this study will follow this sensitivity and specification. As a result, there are no missed diagnosis cases.

Table A2.2: The Number of Screened Cases and Detected Cases.

Screening with TSH

	C.H.	No C.H.	
TSH + TSH>20mU/L	18	71	89
TSH – TSH<20mU/L	0	52288	52288
	18	52359	52377

The incidence rate of congenital hypothyroidism at Chulalongkorn Hospital

$$= A_1 / A_1 + B_1 + C_1 + D_1$$

$$= 18 / 52377$$

$$= 0.000344$$

Therefore, the incidence of congenital hypothyroidism at Chulalongkorn Hospital is around 1 per 2907 live births.

The prior data about the suspected group of patients, so we can calculate the recall rate of TSH test by dividing the number of suspected cases by the total screened cases.

Thus, the recall rate of TSH = 124 / 52377

= 0.002367

= 0.24 %

And the responded recall rate at Chulalongkorn Hospital is calculated by dividing the responded cases by the total recall cases. The non-responded recall patients from July, 1991 to December.1999 are 35 cases.

Therefore, the responded rate of TSH screening at Chulalongkorn Hospital

= 89 / 124

= 0.7177

= 71.77 %

Appendix III

Cost Calculation from Provider Perspective

Record Form of Capital Cost.

Equipment	*Unit*	*Price (Baht)*	*Received Year*	*Expected life (Year)*	*Remarks*
Gramma counter	2	1,000,000 1,250,000	1987 1999	10 10	Normally only one machine used. Another for sparing

A3.1.1 Calculation for Capital Costs

Gramma Counter is equipment that used for analyzing TSH and T_4. From the expert opinion, the expected useful life is 10 years. Thus, there is only one machine that was bought in 1999 will be calculated for the annual cost for equipment. The annual cost of the equipment will be calculated by dividing the cost of the machine in the year 1999 by annualizing factor. The annualizing factor is defined based on the real interest rate and the total life of the asset. The values are provided in the annualizing factor table.

Therefore, the annual cost for Gramma Counter equipment in the year 1999

= 1,250,000 / 7.722

= 161,875.162

~ 161875 Baht per year 1999.

The proportion of TSH and T_4 using by this machine can be calculated by dividing the TSH and T_4 using by the total of using this machine. From the expert interviewing, normally in a month, this equipment uses around 1,900 times. For the TSH test, it uses around 800 times per month and T_4 test around 20 times in a month. So, the proportion of using can be easily calculated by dividing 800 by 1,900 for TSH test and dividing 20 by 1,900 for T_4 test.

Therefore, e_1, which is the proportion of time frequency used for TSH test, is 0.421 and e_2. which is the proportion of time frequency used for T_4 test, is 0.010.

Table A3.1: Capital Costs for TSH Screening Program.

Procedure	*Equipment*	*Annual Cost*	*Proportion of using*	*Total cost (Baht / Year)*
TSH Test	Gramma Counter	161875	0.421	~68,149
T_4	Gramma Counter	161875	0.010	~1,619

A3.1.2 Calculation for Operating Cost

The operating cost will be divided into two parts, labor cost and material cost. The labor costs are recorded by an interviewing of the health personnel that response for that job. The proportion of time spent in the blood collecting procedure can be calculated by dividing the time spent in TSH blood collecting by the total working time. In the nursery department, the blood collecting trainees have done two jobs. One is collecting the blood from heel prick of all of newborns for TSH test and another is collecting blood for bilirubin test. Approximately, the time spent for TSH blood collecting is 40% of their jobs and in a day there are two blood-collecting trainees on duty.

For the blood transfer process, there is one messenger from the nuclear radiology department. He collects the specimens from the neonatal department once to twice a week. So, the proportion of time spent for blood transfer is around 10% of the total time for his job.

For the TSH blood analysis procedure, there is one technician, who responses for this job. She works on this job half day for two times per week. Therefore, the proportion of her time spent for TSH analysis is around 20% of the total of her job.

For the T_4 blood analysis, the same technician with TSH blood analysis works on this job and the time spent for this duty is around half day a week. So the proportion of the time spent is around 10% of the total time, which is calculated from in a week, the technician works for 10 periods, so the proportion of time spent is 1 in 10 of week.

The Record Form of Labor Cost Calculation.

Duty of personnel	Annual Salary	Other fringe benefits	Total annual income	Proportion of time spent	Total labor cost per year.
Blood collecting	66,000	6,600	72,600	40%	29,040
Blood collecting	84,000	1,500	85,500	40%	34,200
Blood tranfer	96,000	-	96,000	10%	9,600
TSH blood analysis	72,000	500	72,500	20%	14,400
T_4 blood analysis	72,000	500	72,500	10%	7,200
				The total labor cost. (Baht per Year)	94,440

For the cost calculation of the follow up and treatment process can be calculated be adjusted the OPD unit cost, which was done in 1991 by Kamol-Ratanakul et al.. The unit cost of pediatric out patient in 1991 is 333.69 baht per visit. Therefore, the pediatric out patient unit cost will be adjusted by the health care and personnel service consumer price index.

Table A3.2: Health Care and Personnel Service Consumer Price Index.

Year	*CPI 1994 = 100*
1991	85.9
1992	89.5
1993	94.3
1994	100.0
1995	103.0
1996	105.0
1997	108.7
1998	118.0
1999	121.6

Source: Trade and Economic Index division, Department of Internal Trade, Ministry of Commerce.

The unit cost of pediatric out patient after adjusting to the present value is 472.3714 baht per visit. From the parents of patient interviewing and expert opinion, the follow up times in newborns to 2 years are every month, from 2 years to 6 years are every three month and after 6 years are every six month.

Table A3.3: The Cost Calculation for the Follow Up and Treatment. (Refer from Table A3.7)

Age	**Cost of OPD / person**	**Net present value in 1999**
Newborn – 2 years	11,507	11,229
2 – 6 years	8,386	7,068
> 6 years	226,927	31,774

Average net present cost of follow up and treatment process in provider perspective

= 11,229 + 7,068 + 31,774

= 50,700 Baht per person

The material cost is calculated from the price of each material that Chulaongkorn hospital buy from the company. For the blood collection, the materials for doing this process is sterile needle number 23. For the blood analysis, the reagent is ordered from the private company, which is imported from aboard.

Table A3.4: Calculation for Total Material Costs.

Items of material	Unit cost	No. of material used in a year.	Total material costs (Baht per Year)
Needle	0.58	10500	6090
TSH kit	50	10321	516,050
T_4 Reagent	50	25	1,250
		Total material cost (Baht per Year)	523,390

Table A3.5: Cost Calculation for Each Test.

Test	Capital costs	Material costs	Labor costs	Total costs	Average costs per unit of test
TSH	68,149	522,140	87,240	677,529	66
T_4	1,619	1,250	7,200	10,069	403

Table A3.6: Screened Cost Calculation for Provider Perspective.

Items	Baht / Year	Baht /Case	Baht / correctly diagnostic case	Baht / positive correctly case
Capital costs	69768	6.76	6.77	34,884
Labor costs	94440	9.15	9.17	47,220
Material costs	523390	50.71	50.82	261,695
Total costs	687598	66.62	66.77	343,799

Note: Total screened cases in 1999 = 10,321 cases, 25 recalled cases and 2 positive correctly detected cases in 1999.

All costs are calculated in Fiscal year 1999.

The average cost of the correctly case of the TSH screening program including treatment. = 66.62 + 50,700

= 50,766.62

= 50767 Baht / person

The average cost of the positive correctly case of the TSH screening program including treatment. = 343,799 + 50,700

= 394,499 Baht / positive corrected case

Table A.3.7 : The Outpatient Department Cost Calculation.

Age	*Frequencies of follow up*	*Cost of OPD1*	*Present value in 1999*[2]
1	12	5,668	5,668
2	12	5,839	5,561
3	4	2,005	1,818
4	4	2,065	1,784
5	4	2,127	1,750
6	4	2,190	1,716
7	2	1,128	842
8	2	1,162	826
9	2	1,197	810
10	2	1,233	795
11	2	1,270	779
12	2	1,308	765
13	2	1,347	750
14	2	1,387	736
15	2	1,429	722
16	2	1,472	708
17	2	1,516	695
18	2	1,562	681
19	2	1,608	668
20	2	1,657	656
21	2	1,706	643
22	2	1,758	631
23	2	1,810	619
24	2	1,865	607
25	2	1,920	595
26	2	1,978	584
27	2	2,037	573
28	2	2,099	562
29	2	2,162	551
30	2	2,226	541
31	2	2,293	531
32	2	2,362	520
33	2	2,433	511
34	2	2,506	501
35	2	2,581	491

Table A.3.7 : The Outpatient Department Cost Calculation. (Cont.)

Age	*Frequencies of follow up*	*Cost of OPD1*	*Present value in 1999*[2]
36	2	2,658	482
37	2	2,738	473
38	2	2,820	464
39	2	2,905	455
40	2	2,992	446
41	2	3,082	438
42	2	3,174	429
43	2	3,269	421
44	2	3,368	413
45	2	3,469	405
46	2	3,573	398
47	2	3,680	390
48	2	3,790	383
49	2	3,904	375
50	2	4,021	368
51	2	4,142	361
52	2	4,266	354
53	2	4,394	348
54	2	4,526	341
55	2	4,662	334
56	2	4,801	328
57	2	4,945	322
58	2	5,094	316
59	2	5,247	310
60	2	5,404	304
61	2	5,566	298
62	2	5,733	292
63	2	5,905	287
64	2	6,082	281
65	2	6,265	276
66	2	6,453	271
67	2	6,646	266
68	2	6,846	260
69	2	7,051	255
70	2	7,262	251
71	2	7,480	246
72	2	7,705	241
		Total treatment costs	50,700

Note [1] =(Present value costs of OPD * (1+ inflation)^{t}) * frequencies of follow up

[2]= Future costs at year t * (1+ discounting) ^{t}

Appendix IV

Cost Calculation from Patient Perspective

The cost of patient perspective means the out of pocket for each item that the Chulalongkorn hospital charges to patients. Assumed that all of patients can not reimburse their spending. For the congenital hypothyroidism screen, the parents of newborns will pay for TSH test. The price of TSH test for ordinary case is 50 Baht per test and the price for special case is 100 Baht per test. The proportion of the special case is around 20% of the total cases, which figure comes from the recording at neonatal department. If the result of neonatal TSH, which finishes in around 7 days after the test, is greater than 20 mU/L but less than 40 mU/L, these patients will be called back in order to confirm with TSH again. The charge of the TSH confirming is 50 Baht per test. If the result of neonatal TSH is greater than 40 mU/L, the patients will be called back to confirm with TSH, T_4 and FT_4 , which the total charge is 300 Baht.

In the congenital hypothyroidism cases, they need thyroid hormone supplement for their life. From the parent of patients interviewing and expert opinion, the frequency of follow up after birth to the age of 2 is every month. After that the follow up will be every three to four month until the children go to school at age 6. After the children are 6 years, the doctors allow extending the follow up to every six-month. Thus, in this calculation for the treatment process, the average follow up times, the direct and indirect costs will calculated from the empirical data of the real cases that found at Chulalongkorn hospital.

All of the Congenital Hypothyroidism patients and their family were invited to interview for the cost of patient perspective calculation. There are 13 cases from 18 Congenital Hypothyroidism cases, who were detected from Chulalongkorn Hospital, responded the interviewing process. The general characteristics of the patient perspective are summarized into

1. The average parental income per month is 15,193 Baht and the average relative income, who companies to the hospital, is 7,500 Baht per month. In a day, the

working hour is 8 hours and 5 days a week. And the working time is 4 weeks a month.

Therefore, the average parental income = 15193 / ((8*5)*4)
= 95 Baht per hour.
The average relative income = 7500 / ((8*5)*4)
= 47 Baht per hour.

2. The average drug costs per visit is 64 Baht and the average laboratory cost is 272 Baht per lab time.
3. The average transportation costs is 137 Baht per visit.
4. The average duration of follow up process is 3.27 hour per visit.

All of these data will use in the patient perspective cost calculation.

Table A4.1: Cost Calculation for Patient Perspective.

Procedure	**Number of patient**	**Charge / unit**	**Total out of pocket per year.**
TSH test			
Ordinary case	8256	50	412,800
Special case	2065	100	206,500
Confirming test			
Direct cost			
• If TSH > 20 and < 40 mU/L	20	50	1,000
• If TSH >40 mU/L	5	300	1,500
Indirect cost			
• Transportation costs for parents	25	137	3425
		Total out of pocket (Baht / Year)	625,225

Total screened cases in 1999 = 10,321 cases, 25 recalled cases and 2 positive correctly detected cases in 1999.

From the above data, we can calculate the following

- Screened costs per correctly case for patient perspective.

  = 412,80 0 + 206,500 + 1,000 + 2,500 + 3,425 / 10321

  = 625,225 / 10321

  = 60.578 = ~61 Baht / patient.

- Screened costs per correctly diagnostic correctly case for patient perspective.

  = 412,80 0 + 206,500 + 1,000 + 2,500 + 3,425 / 10,298

  = 625,225 / 10,298

  = 60.71 = 61 Baht / correctly diagnostic case

- Screened costs per positive correctly case for patient perspective.

  = 412,80 0 + 206,500 + 1,000 + 2,500 + 3,425 / 2

  = 625,225 / 2

  = 312,612.50 = 312,613 Baht / patient

- Treatment and follow up process

Table A4.2: Cost Calculation for Thyroid Hormone Treatment. (Refer to Table A4.3)

Age	Total direct cost	Total indirect cost	Total cost	Net present value in 1999[1]
Newborn – 2 years	6,001	11,311	17,312	16,487
2 – 6 years	5,983	8,242	14,225	11,988
> 6 years- 72 years	227,228	223,145	450,373	63,060

[1] = Future cost at year t / $(1+r)^t$

Total treatment cost for the whole life = 16,487 + 11,988 + 63,060

= 91,536 Baht per patient

Table A4.3 : The Present Value of Treatment Costs Calculation

Age	*Total direct costs*[1]	*Total indirect costs*[2]	*Total costs*	*Present value in 1999*[3]
1	2956	5572	8,528	8,122
2	3,045	5,739	8,784	8,366
3	1,430	1,970	3,400	3,084
4	1,473	2,029	3,502	3,025
5	1,517	2,090	3,607	2,968
6	1,563	2,153	3,715	2,911
7	1,130	1,109	2,239	1,671
8	1,163	1,143	2,306	1,639
9	1,198	1,177	2,375	1,608
10	1,234	1,212	2,446	1,577
11	1,271	1,248	2,520	1,547
12	1,309	1,286	2,595	1,517
13	1,349	1,325	2,673	1,489
14	1,389	1,364	2,754	1,460
15	1,431	1,405	2,836	1,432
16	1,474	1,447	2,921	1,405
17	1,518	1,491	3,009	1,378
18	1,564	1,535	3,099	1,352
19	1,611	1,582	3,192	1,326
20	1,659	1,629	3,288	1,301
21	1,709	1,678	3,386	1,276
22	1,760	1,728	3,488	1,252
23	1,813	1,780	3,593	1,228
24	1,867	1,833	3,700	1,205
25	1,923	1,888	3,811	1,182
26	1,981	1,945	3,926	1,159
27	2,040	2,003	4,044	1,137
28	2,101	2,064	4,165	1,116
29	2,164	2,125	4,290	1,094
30	2,229	2,189	4,419	1,073
31	2,296	2,255	4,551	1,053
32	2,365	2,323	4,688	1,033
33	2,436	2,392	4,828	1,013
34	2,509	2,464	4,973	994
35	2,584	2,538	5,122	975
36	2,662	2,614	5,276	956
37	2,742	2,693	5,434	938
38	2,824	2,773	5,597	920
39	2,909	2,856	5,765	903
40	2,996	2,942	5,938	886
41	3,086	3,030	6,116	869
42	3,178	3,121	6,300	852
43	3,274	3,215	6,489	836
44	3,372	3,311	6,683	820
45	3,473	3,411	6,884	804
46	3,577	3,513	7,090	789

Table A4.3 : The Present Value of Treatment Costs Calculation. (Cont.)

Age	*Total direct costs*[1]	*Total indirect costs*[2]	*Total costs*	*Present value in 1999*[3]
47	3,685	3,618	7,303	774
48	3,795	3,727	7,522	759
49	3,909	3,839	7,748	745
50	4,026	3,954	7,980	731
51	4,147	4,073	8,220	717
52	4,272	4,195	8,466	703
53	4,400	4,321	8,720	690
54	4,532	4,450	8,982	677
55	4,668	4,584	9,251	664
56	4,808	4,721	9,529	651
57	4,952	4,863	9,815	639
58	5,101	5,009	10,109	627
59	5,254	5,159	10,413	615
60	5,411	5,314	10,725	603
61	5,573	5,473	11,047	591
62	5,741	5,637	11,378	580
63	5,913	5,807	11,720	569
64	6,090	5,981	12,071	558
65	6,273	6,160	12,433	548
66	6,461	6,345	12,806	537
67	6,655	6,535	13,190	527
68	6,855	6,731	13,586	517
69	7,060	6,933	13,994	507
70	7,272	7,141	14,414	497
71	7,490	7,356	14,846	488
72	7,715	7,576	15,291	479
			Total treatment costs	91,536

Note [1] = Net present value of direct costs * (1 + Inflation rate) ^{t}

[2] = Net present value of indirect costs * (1 + Inflation rate)^{t}

[3] = Total costs at year t / (1+ discounting rate)^{t}

Appendix V

Estimation of Benefits

Assumption

- If there is no screened program, the all of cases that detected will be a mental retardation.
- The estimation of benefit look at macro point, which there are 1,000,000 live births because the actual data of Chulalongkorn Hospital is very small and the survival rate of newborn is 100%.
- The incidence rate is the actual incidence rate at Chulalongkorn Hospital.
- The mental retarded cases would be 344 cases, if there is no screening program.
- The number of the mental retarded patients in each severity group is

Severe retarded	=	55%	= 189 cases
Moderate retarded	=	10%	= 34 cases
Mildly retarded	=	15%	= 52 cases
Suboptimal Intelligence		20%	= 69 cases

- Average Life expectancy at birth of Thai people in 1996-1999 is 71.75 years.

A5.1.1 Cost Saving from Losing Patient Productivity Calculation

Assumption

- The working time period of normal people starts at 15 years to 60 years.
- The working time period of mental retarded people will star at 21 years until the retirement age.
- In the cases that their life expectancy less than 60 years, the working time period will finish at the end of life expectancy.

The cost saving from losing patient productivity

= Opportunity earning of normal people– Opportunity earning of mental retarded people.

Table A5.1: The Cost Saving from Losing Patient Productivity (Refer to Table A5.3).

Classification of patient.	**Number of patient.**	**Proportion of employed finding**	**Number of patient can find employment**	**Total net present value in1999 of income.**
Normal people	344	100%	344	285,973,048
Severe retarded	189	5%	9	3,716,613
Moderate retarded	34	30%	10	6,525,130
Mildly retarded	52	60%	31	20,227,903
Suboptimal intelligence	69	100%	69	45,023,397
	Total net present value in1999 of income that loosed because of no screened program.			210,480,005

Average losing patient productivity per unit = 210,480,005 / 344

= 611,860.48 Baht per person.

A5.1.2 Cost Saving from Losing Parental Productivity due to Taking Care Mental Retarded Child Calculation

Assumption

- In mildly, moderate and severe retarded children, the half of their mother earning is foregone by taking care of their children until the children are because these children require special attention.
- The children are assumed that they living at home and need special attention until age 25 years
- Mother earning is based on the minimum wage.

Cost saving from losing parental productivity

= 50% of the maternal earning due to taking care from newborns to 25 years in severe, moderate and mildly retarded group.

From table A5.4, the total mother earning that forgone due to taking cares one mental retarded child is 401,284 Baht per person.

Therefore, the average cost of losing parental productivity

= (401,284 * 275) / 344

= 320,793.90 Baht per case.

A5.1.3 Cost Saving Calculation from Special Education

From the interviewing an expert opinion at Phanyavuthikorn school, which provides a special education for mental retarded children from the kinder garden until primary school and job training class, generally, the study period or training time of mental retarded children is around 15 years. Therefore, the mental retarded child will finish training course at the age around 21. Normally, the tuition fee is free but the parent of the mental retarded children have to pay for food and study materials. At Phanyavuthikorn School, the parents of the mental retarded child will pay 3,500 baht for the first semester and then 3,000 baht for each semester until graduated the primary class, which takes time 6 years. After that, the mental retarded children will take a job training class that tuition fee is 3,800 baht per semester until they can be depended on themselves.

The compulsory education for normal children is 9 years. The fees of public primary school that is 6 years are free and for the next three years in the secondary school, the tuition fees are 750 baht per semester.

Assumption.

- Only the mildly, moderate and severe retarded children go to the special school.
- The suboptimal intelligence cases go to study at a same school with normal children.
- The special education cost is the extra education from the normal children that will calculate only the job training class in order to help themselves.

Table A5.2: The Cost Calculation of Special Education for Mental Retarded Children (Refer to Table A5.5 And A5.6).

Items	Total net present value at 1999 of special education costs (Baht / case)
Normal children	3,573
Mental retarded children	56,496
Total extra special education costs from normal children	52,923

Therefore, The cost saving from special education = 52,923 Baht / case.
The average costs of extra education = (52,923 * 275) / 344
= 42,307.63 Baht per case

A5.1.4 Cost saving calculation from general support for mental retarded children
In Thailand, there are several foundations for mental retarded people. The biggest one is the Mental Retarded Foundation under Queen Sirikit providing, which is established in 1962 by Queen Sirikit. The objectives of this foundation are encourage the training course for mental retarded people and study and research about the mental retardation including protecting and rehabilitation. This foundation consists of many parts such as Phanyavuthikorn School; Phapakarnphanya mental retarded-trained center and Phanyakarn job trained center. Furthermore, this foundation has branches center to cover others parts of Thailand, for instance, in the northern part at Cheing Mai, in the northeastern part at Udon and in the southern part at Songkha.

In 1998, the account-balanced incomes of this mental retarded foundation are 18,650,882.77 baht. This study calculates all of costs in year 1999 so this number will be adjusted by the general CPI index in order to be the value in year 1999.

Year	*General CPI 1994 = 100*
1998	127.8
1999	128.2

Source: Trade and Economic Index division, Department of Internal Trade, Ministry of Commerce.

After adjusting the account-balanced income are 18,709,258 baht per year.

Assumption of the general support calculation

- Only 2% of the funding for mental retarded children are allocated to mental retarded children, who come from Congenital Hypothyroidism.
- The general support money will be allocated to mental retarded children all of their life expectancy at birth.
- This cost will support the mental retarded children until age 21.

The cost saving from general support = 2 % of the income of the foundation.

Therefore, the general supports for mental retarded children from C.H.

= (18,709,258 * 2) / 100

= 374,185 baht per year.

The average general support per one mental retarded child

= 374,185 / 344

= 1,088 baht per year.

The average general support per one mental retarded child until age 21(referred from table A5.7)

= 18,979 Baht per case.

From the above, we can calculate

- Average cost saving from taking care mental retarded child

$TC_{mpt.}$ = $TC_{mpt.so.}$ + $TC_{mpt.treat}$

= 611,860.48 + 320,793.90 +42,307.63 + 18,979

= 993,941.01 Baht per case

Table A5.3 : Income Per Year Calculation

Age	*Minimum Wage*	*Income per year*[1]	*Present value in 1999*[2]
15	256	64000	32,324
16	263	65750	31,627
17	257	64250	29,434
18	258	64500	28,141
19	279	69750	28,983
20	286	71500	28,295
21	294	73500	27,701
22	286	71500	25,664
23	287	71750	24,528
24	310	77500	25,232

Table A5.3 : Income Per Year Calculation. (Cont.)

Age	*Minimum Wage*	*Income per year*[1]	*Present value in 1999*[2]
25	318	79500	24,650
26	325	81250	23,993
27	316	79000	22,218
28	316	79000	21,160
29	341	85250	21,747
30	349	87250	21,197
31	357	89250	20,650
32	346	86500	19,061
33	346	86500	18,153
34	372	93000	18,588
35	380	95000	18,084
36	387	96750	17,540
37	376	94000	16,230
38	376	94000	15,457
39	403	100750	15,778
40	411	102750	15,325
41	419	104750	39,479
42	406	101500	13,731
43	405	101250	13,045
44	435	108750	13,344
45	443	110750	12,942
46	450	112500	12,521
47	436	109000	11,554
48	434	108500	10,953
49	466	116500	11,201
50	474	118500	10,850
51	482	120500	10,508
52	465	116250	9,655
53	463	115750	9,155
54	496	124000	9,341
55	505	126250	9,510
56	513	128250	9,201
57	495	123750	8,455
58	493	123250	8,020
59	528	132000	8,181
60	536	134000	7,909

Note [1] = Minimum wage * 250

[2] = Future income at year t-1 / $(1+r)^t$

Table A5.4The Calculation of Cost Saving from Losing Mother Earning due to Taking Care on Mental Retarded Child.

Children age	*Minimum wage per day*	*Income per year* [1]	*Present value of income* [2]	*Money that forgone for taking care* [3]
1	162	40500	40500	20,250
2	169	42250	40238	20,119
3	167	41750	37868	18,934
4	170	42500	36713	18,357
5	186	46500	38256	19,128
6	193	48250	37805	18,903
7	200	50000	37311	18,655
8	197	49250	35001	17,501
9	200	50000	33842	16,921
10	217	54250	34970	17,485
11	224	56000	34379	17,190
12	231	57750	33765	16,883
13	227	56750	31601	15,800
14	229	57250	30361	15,180
15	248	62000	31314	15,657
16	255	63750	30665	15,332
17	263	65750	30121	15,060
18	257	64250	28032	14,016
19	258	64500	26801	13,401
20	279	69750	27602	13,801
21	287	71750	27042	13,521
22	294	73500	26382	13,191
23	287	71750	24528	12,264
24	288	72000	23441	11,721
25	310	77500	24030	12,015

Note [1] = Minimum wage per day * 250

[2] = Future value at year t / (1 + r)^{t}

[3] = 50% of net present value of income

Table A5.5: The Special Education Cost Calculation

Age	*Tuition fees*	*Present value at year 1999 of tuition fees*
12	10520	6151
13	10836	6034
14	11161	5919
15	11496	5806
17	12196	5587
18	12562	5481
19	12938	5376
20	13327	5274
21	13726	5173
	Total special education cost	56496

Table A5.6 : The Tuition Fee Calculation for Normal Children.

Age	*Tuition fees*[1]	*Net present value at year 1999 of tuition fees*[2]
12	2076	1214
13	2139	1191
14	2203	1168
Total education cost for normal child		3573

Table A5.7: The General Supported Cost Calculation for Mental Retarded Children

Year	*Age of children*	*Average cost of general support per year*[1]	*Net present value in 1999*[2]
1999	1	1088	1088
2000	2	1,121	1,067
2001	3	1,154	1,047
2002	4	1,189	1,027
2003	5	1,225	1,007
2004	6	1,261	988
2005	7	1,299	969
2006	8	1,338	951
2007	9	1,378	933
2008	10	1,420	915
2009	11	1,462	898
2010	12	1,506	881
2011	13	1,551	864
2012	14	1,598	847
2013	15	1,646	831
2014	16	1,695	815
2015	17	1,746	800
2016	18	1,798	785
2017	19	1,852	770
2018	20	1,908	755
2019	21	1,965	741
		Total general supported costs per person	18,979

Note [1] = Present value of general support per year * (1+Inflation rate)^t

[2] = Future costs at year t / (1+r)^t

Appendix VI

Net Present Value of Benefit-Cost Ratio Calculation and Sensitivity Analysis

The benefit cost ratio will calculate base on the Chulalongkorn Hospital and the national policy scenario. The total costs of the screened program will be calculated base on all of the cost items that incur to the societal. To compare with the all of cost saving items that would be burden to patient and family perspective and societal perspective, if they did not have a screened program.

The formula for computing the benefit cost ratio is following.

- Net present value of benefit cost ratio.

$$B/C = \frac{\Sigma^{n}_{t=n} B_t}{(1+r)^t} \Big/ \frac{\Sigma^{n}_{t=n} C_t}{(1+r)^t}$$

Where B_t = Monetary value of benefits incurred at time t

C_t = Monetary value of costs incurred at time t

r = Discount rate

Since the screening program is not complete from the non-response group patient, the total societal costs will add with the costs of taking care and welfare for the mental retarded cases in non-response group.

Table A 6.1: The Conclusion of the Cost and Benefit Calculation in Provider Perspective

COST CALCULATION.	
Screened cost of TSH test	66 * (1)
Confirmed cost with T_4	403 * (5)
Treatment cost from provider side	50700 * (8)
Total cost of losing patient productivity	611860.48 * (6)
Total cost of losing mother earning	320,793.90 * (6)
Total costs of special education	42307.63 * (6)
Total general supported costs	18979 * (6)
Total costs for the screened program	Summation of above items (11)

Table A6.1: The Conclusion of The Cost and Benefit Calculation.(Cont.)

BENEFIT CALCULATION.	
Cost saving from losing patient productivity	611860.48 * (10)
Cost saving from losing maternal earning	320,793.90 * (10)
Cost saving from special education	42307.63 * (10)
Cost saving from general supporting.	18979 * (10)
Total benefit from the screened program	Summation of above items (12)
PRESENT VALUE B/C RATIO	(12) / (11)

Figure A6.1: The Summarize Chart of the Total Cases in National Policy.

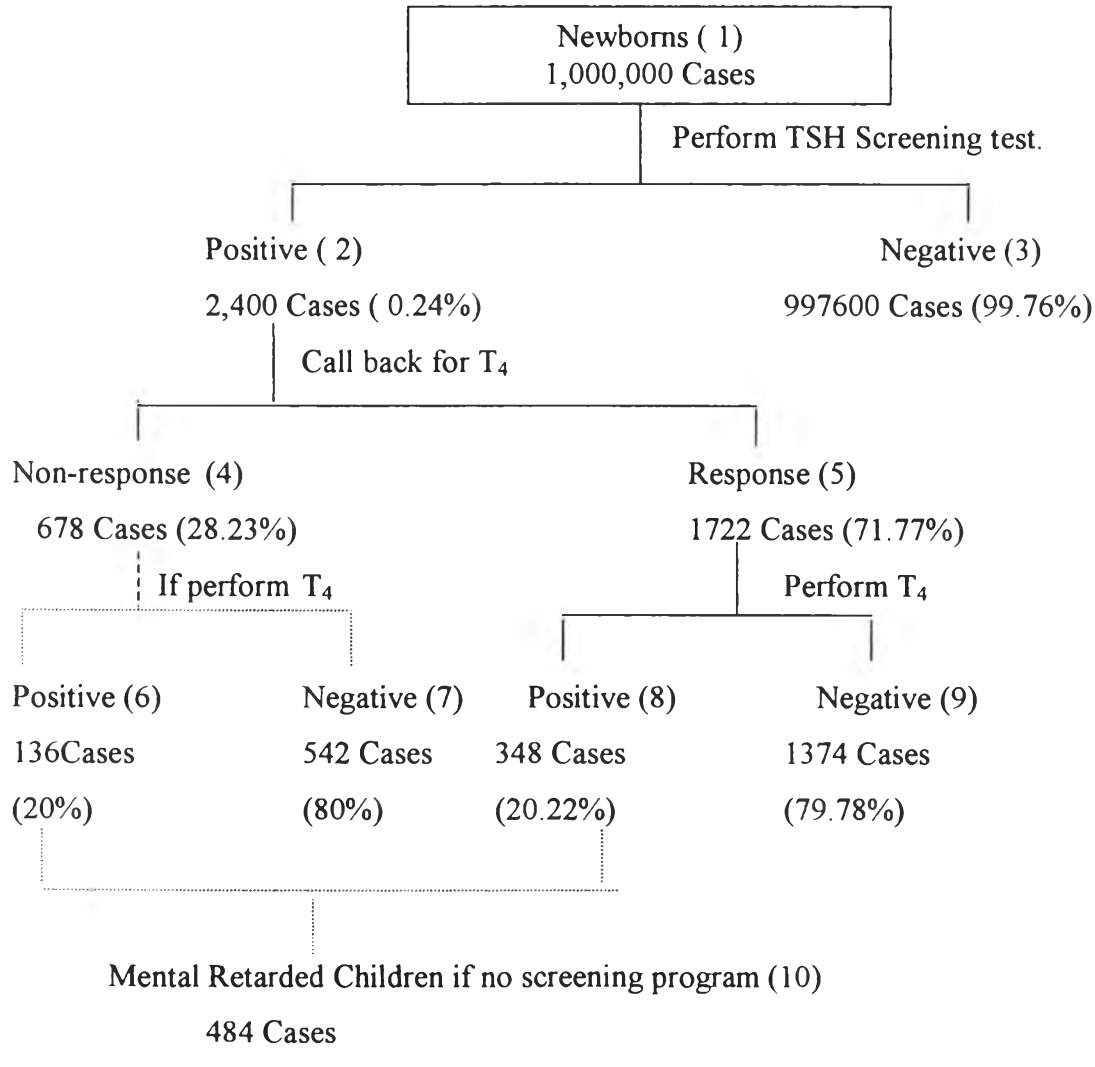


Table A6.2: The Present Value of Benefit-Cost Ratio Calculation at Chulalongkorn Hospital. (Provider Perspective)

Items	
Total screened cases	52377
Response cases	89
Non-response cases	35
Total C.H. cases that can detect and treat	18
Total mental retarded children from non-response group	7
COST CALCULATION.	
• Screened cost of TSH test	3,456,882.00
• Confirmed cost with T_4	35,867.00
• Treatment cost from provider side	912,600.00
• Total cost of losing patient productivity	4,283,023.36
• Total cost of losing mother earning	2,245,557.30
• Total costs of special education	296,153.41
• Total general supported costs	132,853.00
Total costs for the screened program	11,362,936.07
BENEFIT CALCULATION.	
• Cost saving from losing patient productivity	15,296,512.00
• Cost saving from losing maternal earning	8,019,847.50
• Cost saving from special education	1,057,690.75
• Cost saving from general supporting.	474,475.00
• Total benefit from the screened program	24,848,525.25
PRESENT VALUE B/C RATIO	**2.19**

For proposed process of national policy differs from the proposed process of the Chulalongkorn Hospital. So, the main changing in the calculation will be as the follow.

1. The test kit price for TSH is 25 Baht per test.
2. The specimen transportation cost is 15 Baht per test.
3. The unit cost of OPD after adjusting the value into year 1999 is 155.72 Baht per visit.
4. The difference in the follow up process.

Table A6.3: The Present Value of Benefit-Cost Ratio Calculation of National Policy Scenario.(Provider Perspective)

Items	
Total screened cases	1,000,000
Response cases	1,722
Non-response cases	678
Total C.H. cases that can detect and treat	348
Total mental retarded children from non-response group	136
COST CALCULATION.	
• Screened cost of TSH test	25,000,000.00
• Confirmed cost with T_4	693,966.00
• Transportation costs	15,000,000.00
• Treatment cost from provider side	2,451,660.00
• Total cost of losing patient productivity	83,213,025.28
• Total cost of losing mother earning	43,627,970.40
• Total costs of special education	5,753,837.68
• Total general supported costs	2,581,144.00
Total costs for the screened program	178,321,603.36
BENEFIT CALCULATION.	
• Cost saving from losing patient productivity	296,140,472.32
• Cost saving from losing maternal earning	155,264,247.60
• Cost saving from special education	20,476,892.92
• Cost saving from general supporting.	9,185,836.00
Total benefit from the screened program	481,067,448.84
PRESENT VALUE B/C RATIO	**2.70**

Table A6.4: The Summation of Cost Calculation in Different Perspective.

Perspective	Procedure	Total costs.	Average cost per case.
Provider	• TSH Process	677,529	66
	• Confirmatory process (T_4)	10,069	403
	• OPD for treatment	101,400	50,700
Average provider cost per case			**51,169**
Patient	• TSH Screen	619,300	60
	• Confirmatory process (T_4)	5,925	237
	• Treatment and follow up	183,072	91,536
Average patient costs			**91,833**
Total costs	• Screening with TSH	677,529	66
	• Confirming process (provider side)	10,069	403
	• Follow up process (provider side)	101,400	50,700
	• Traveling costs from patient		
	1. Confirmatory	3425	137
	2. Follow up	28,903.42	14,451.71[2]
	• Time costs from patient side.	98,456[3]	49,228[3]
Total societal costs.			**114,985.71**

Table A6.5: The Present Value of Benefit-Cost Ratio Calculation of Patient Perspective

Items	*Base Case.*	*National Policy.*
Total screened cases	52377	1,000,000
Response cases	89	1,722
Non-response cases	35	678
Total C.H. cases that can detect and treat	18	348
Total mental retarded children from non-response group	7	136
COST CALCULATION.		
• Screened cost of TSH test	3,142,620.00	25,000,000.00
• Confirmed cost with T_4	21,093.00	408,114.00
• Transportation costs for specimens	-	-
• Treatment cost	1,647,648.00	31,854,528.00
• Total cost of losing patient productivity	4,283,023.36	83,213,025.28
• Total cost of losing mother earning	2,245,557.30	43,627,970.40
• Total costs of special education	296,153.41	5,753,837.68
• Total general supported costs	132,853.00	2,581,144.00
Total costs for the screened program	11,768,948.07	192,438,619.36
BENEFIT CALCULATION.		
• Cost saving from losing patient productivity	15,296,512.00	296,140,472.32
• Cost saving from losing maternal earning	8,019,847.50	155,264,247.60
• Cost saving from special education	1,057,690.75	20,476,892.92
• Cost saving from general supporting.	474,475.00	9,185,836.00
Total benefit from the screened program	24,848,525.25	481,067,448.84
PRESENT VALUE B/C RATIO	**2.11**	**2.50**

Table A6.6: The Present Value of Benefit-Cost Ratio Calculation of Societal Perspective.

Items	*Base Case.*	*National Policy.*
Total screened cases	52377	1,000,000
Response cases	89	1,722
Non-response cases	35	678
Total C.H. cases that can detect and treat	18	348
Total mental retarded children from non-response group	7	136
COST CALCULATION.		
• Screened cost of TSH test	3,456,882.00	25,000,000.00
• Confirmed cost with T_4	48,060.00	929,880.00
• Transportation costs for specimens	-	15,000,000.00
• Treatment cost	2,058,834.78	39,804,139.08
• Total cost of losing patient productivity	4,283,023.36	83,213,025.28
• Total cost of losing mother earning	2,245,557.30	43,627,970.40
• Total costs of special education	296,153.41	5,753,837.68
• Total general supported costs	132,853.00	2,581,144.00
Total costs for the screened program	12,521,363.85	215,909,996.44
BENEFIT CALCULATION.		
• Cost saving from losing patient productivity	15,296,512.00	296,140,472.32
• Cost saving from losing maternal earning	8,019,847.50	155,264,247.60
• Cost saving from special education	1,057,690.75	20,476,892.92
• Cost saving from general supporting.	474,475.00	9,185,836.00
Total benefit from the screened program	24,848,525.25	481,067,448.84
PRESENT VALUE B/C RATIO	**1.98**	**2.23**

Table A 6.7 : The Sensitivity Analysis After Changing Discount Rate. (No Discount Rate)

Items	*Base case*	*National policy*
Total screened cases	52377	1,000,000
Response cases	89	1,722
Non-response cases	35	678
Total C.H. cases that can detect and treat	18	348
Total mental retarded children from non-response group	7	136
COST CALCULATION.		
• Screened cost of TSH test	3,456,882.00	25,000,000.00
• Confirmed cost with T_4	35,867.00	693,966.00
• Transportation costs for specimens	-	15,000,000.00
• Treatment cost from provider side	4,442,778.00	13,702,152.00
• Total cost of losing patient productivity	21,814,730.00	423,829,040.00
• Total cost of losing mother earning	4,055,650.20	78,795,489.60
• Total costs of special education	638,965.67	12,414,190.16
• Total general supported costs	218,400.00	4,243,200.00
Total costs for the screened program	34,663,272.87	573,678,037.76
BENEFIT CALCULATION.		
• Cost saving from losing patient productivity	77,909,750.00	1,508,332,760.00
• Cost saving from losing maternal earning	14,484,465.00	280,419,242.40
• Cost saving from special education	2,282,020.25	44,179,912.04
• Cost saving from general supporting.	780,000.00	15,100,800.00
Total benefit from the screened program	95,456,235.25	1,848,032,714.44
PRESENT VALUE B/C RATIO	**2.75**	**3.22**

Table A 6.8 : The Sensitivity Analysis After Changing Discount Rate. (Discount Rate 10%)

Items	*Base case*	*National Policy*
Total screened cases	52377	1000000
Response cases	89	1722
Non-response cases	35	678
Total C.H. cases that can detect and treat	18	348
Total mental retarded children from non-response group	7	136
COST CALCULATION.		
• Screened cost of TSH test	3,456,882.00	25000000
• Confirmed cost with T_4	35,867.00	693966
• Transportation cost for specimens	-	15000000
• Treatment cost from provider side	483,696.00	1,149,444.00
• Total cost of losing patient productivity	1,215,535.30	23,616,114.40
• Total cost of losing mother earning	1,427,870.50	27,741,484.00
• Total costs of special education	144,783.52	2,812,936.96
• Total general supported costs	132,853.00	2,581,144.00
Total costs for the screened program	6,897,487.32	98,595,089.36
BENEFIT CALCULATION.		
• Cost saving from losing patient productivity	4,341,197.50	84,045,583.60
• Cost saving from losing maternal earning	5,099,537.50	98,727,046.00
• Cost saving from special education	517,084.00	10,010,746.24
• Cost saving from general supporting.	474,475.00	9,185,836.00
Total benefit from the screened program	10,432,294.00	201,969,211.84
PRESENT VALUE B/C RATIO	**1.51**	**2.05**

Table A 6.9 : The Sensitivity Analysis After Changing Responsive-Recall Rate to 100%.

Item	*Base Case.*	*National Policy.*
Total screened cases	52377	1,000,000
Response cases	124	2,400
Non-response cases	0	0
Total C.H. cases that can detect and treat	25	484
Total mental retarded children from non-response group	0	0
COST CALCULATION.		
• Screened cost of TSH test	3,456,882.00	25,000,000.00
• Confirmed cost with T_4	49,972.00	967,200.00
• Transportation costs for specimens	-	15,000,000.00
• Treatment cost from provider side	1,267,500.00	3,409,780.00
• Total cost of losing patient productivity	-	-
• Total cost of losing mother earning	-	-
• Total costs of special education	-	-
• Total general supported costs	-	-
Total costs for the screened program	4,774,354.00	44,376,980.00
BENEFIT CALCULATION.		
• Cost saving from losing patient productivity	15,296,512.00	296,140,472.32
• Cost saving from losing maternal earning	8,019,847.50	155,264,247.60
• Cost saving from special education	1,057,690.75	20,476,892.92
• Cost saving from general supporting.	474,475.00	9,185,836.00
Total benefit from the screened program	24,848,525.25	481,067,448.84
PRESENT VALUE B/C RATIO	**5.20**	**10.84**

Table A 6.10 : The Sensitivity Analysis After Changing Compliance Rate of Patient to 75%.

Item	*Base Case.*	*National Policy.*
Total screened cases	52377	1,000,000
Response cases	89	1,722
Non-response cases	35	678
Total C.H. cases that can detect and treat	18	348
Drop out cases	5	87
Total mental retarded children from non-response group	7	136
Total mental retarded children	12	223
COST CALCULATION.		
• Screened cost of TSH test	3,456,882.00	25,000,000.00
• Confirmed cost with T_4	35,867.00	693,966.00
• Transportation costs for specimens	-	15,000,000.00
• Treatment cost from provider side	684,450.00	13,232,700.00
• Total cost of losing patient productivity	7,036,395.52	136,444,887.04
• Total cost of losing mother earning	2,245,557.30	43,627,970.40
• Total costs of special education	296,153.41	5,753,837.68
• Total general supported costs	132,853.00	2,581,144.00
Total costs for the screened program	13,888,158.23	242,334,505.12
BENEFIT CALCULATION.		
• Cost saving from losing patient productivity	15,296,512.00	296,140,472.32
• Cost saving from losing maternal earning	8,019,847.50	155,264,247.60
• Cost saving from special education	1,057,690.75	20,476,892.92
• Cost saving from general supporting.	474,475.00	9,185,836.00
Total benefit from the screened program	24,848,525.25	481,067,448.84
PRESENT VALUE B/C RATIO	**1.79**	**1.99**

Table A 6.11 : The Sensitivity Analysis After Changing Proportion of Whole Life Treatment to 80%.

Items	*Base Case.*	*National Policy.*
Total screened cases	52377	1,000,000
Response cases	89	1,722
Non-response cases	35	678
Total C.H. cases that can detect and treat	18	348
Total Congenital Hypothyroidism cases who need whole life treatment	14	278
Total mental retarded children from non-response group	7	136
COST CALCULATION.		
• Screened cost of TSH test	3,456,882.00	25,000,000.00
• Confirmed cost with T_4	35,867.00	693,966.00
• Transportation costs for specimens	-	15,000,000.00
• Treatment cost from provider side	789,433.20	15,262,375.20
• Total cost of losing patient productivity	4,283,023.36	83,213,025.28
• Total cost of losing mother earning	2,245,557.30	43,627,970.40
• Total costs of special education	296,153.41	5,753,837.68
• Total general supported costs	132,853.00	2,581,144.00
Total costs for the screened program	11,239,769.27	191,132,318.56
BENEFIT CALCULATION.		
• Cost saving from losing patient productivity	15,296,512.00	296,140,472.32
• Cost saving from losing maternal earning	8,019,847.50	155,264,247.60
• Cost saving from special education	1,057,690.75	20,476,892.92
• Cost saving from general supporting.	474,475.00	9,185,836.00
Total benefit from the screened program	24,848,525.25	481,067,448.84
PRESENT VALUE B/C RATIO	**2.21**	**2.52**

Table A 6.12 : The Benefit Cost Ratio of National Policy in Differences of Incidence Rate.

Items	*Low*	*High*
Incidence rate	1 per 8,500	1 per 687
Total screened cases	1,000,000	1,000,000
Response cases	1,722	1,722
Non-response cases	678	678
Total C.H. cases that can detect and treat	118	1456
Total mental retarded children from non-response group	47	573
COST CALCULATION.		
• Screened cost of TSH test	25,000,000.00	25,000,000.00
• Confirmed cost with T_4	693,966.00	693,966.00
• Transportation costs	15,000,000.00	15,000,000.00
• Treatment cost from provider side	831,310.00	10,257,520.00
• Total cost of losing patient productivity	28,757,442.56	350,596,055.04
• Total cost of losing mother earning	15,077,313.30	183,814,904.70
• Total costs of special education	1,988,458.61	24,242,271.99
• Total general supported costs	892,013.00	10,874,967.00
Total costs for the screened program	88,240,503.47	620,479,684.73
BENEFIT CALCULATION.		
• Cost saving from losing patient productivity	100,956,979.20	1,241,464,913.92
• Cost saving from losing maternal earning	52,930,993.50	650,890,823.10
• Cost saving from special education	6,980,758.95	85,842,181.27
• Cost saving from general supporting.	3,131,535.00	38,508,391.00
Total benefit from the screened program	164,000,266.65	2,016,706,309.29
PRESENT VALUE B/C RATIO	**1.86**	**3.25**

CURRICULUM VITAE

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