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Unit costs of the social security services at King Chulalongkorn Memorial Hospital

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- Objective** : *To study the costs of providing services to socially insured patients at King Chulalongkorn Memorial Hospital in the fiscal year 1998 (1 October 1997 – 30 September 1998)*
- Location** : *King Chulalongkorn Memorial Hospital*
- Design** : *Descriptive study by retrospective-prospective data collection*
- Method** : *Analysis was performed to establish the costs of the main services provided for social security patients by compiling the direct costs, (comprising wages, material costs and investment costs) in work units which deal with services for socially insured patients. The work units were divided into 3 groups, namely: Non Revenue-Producing Cost Centers (NRPCC), Revenue-Producing Cost Centers (RPCC), and Patient Services (PS). Indirect costs were allocated to patient service units by a simultaneous equation method. Sensitivity analysis was used in calculating investment costs. Costs of RPCC in terms of drugs, medical supplies, laboratory and radiological examinations, were calculated as separate items from the medical care costs. For patients who sought services outside the social security clinic, costs were calculated by using unit costs from the studies done in the outpatient units in 1991 adjusted to applicable values by using the consumer index.*

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Results of study : *Total costs in providing services to socially insured patients at King Chulalongkorn Memorial Hospital in the fiscal year 1998 were 65,128,332.66 baht. These comprised 34,783,086.05 baht in the Out-Patient Unit, which equaled 641.80 baht per visit and 389.80 baht per registered beneficiary per year, and 30,345,226.61 baht in the In-patient Unit, which equaled 2,678.07 baht per hospital day and 340.07 baht per each beneficiary per year. The average total cost per beneficiary per year of the hospital was 729.87 baht. The cost in the year 1999 was, therefore estimated to be 1030.76 baht.*

Conclusions : *The study on costs shows the financial status of King Chulalongkorn Hospital's social security service program needs close attention. Proper cost containment measures should be put in place such that quality of care to social security patients can be maintained while the services are financially sustainable.*

Key words : *Cost analysis, Socially security scheme.*

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จุฑามาศ โมหี, จิรุตม์ ศรีรัตนบัลล์, มานพ เงินวิวัฒน์กุล. ต้นทุนต่อหน่วยของบริการผู้ป่วยประกันสังคม โรงพยาบาลจุฬาลงกรณ์. จุฬาลงกรณ์เวชสาร 2544 ก.พ; 45(2): 129 - 42

- วัตถุประสงค์** : เพื่อศึกษาต้นทุนการให้บริการผู้ป่วยประกันสังคมของโรงพยาบาลจุฬาลงกรณ์ ในปีงบประมาณ 2541 (1 ตุลาคม 2540 - 30 กันยายน 2541)
- สถานที่ศึกษา** : โรงพยาบาลจุฬาลงกรณ์
- รูปแบบการวิจัย** : การศึกษาเชิงพรรณนา โดยเก็บรวบรวมข้อมูลย้อนหลังและไปข้างหน้า
- วิธีการ** : วิเคราะห์ต้นทุนของหน่วยบริการหลักของผู้ป่วยประกันสังคมโดยการรวบรวมต้นทุนทางตรงซึ่งประกอบด้วยต้นทุนค่าแรง ค่าวัสดุ ค่าลงทุน ของกลุ่มหน่วยงานที่เกี่ยวข้องกับการให้บริการผู้ป่วยประกันสังคม แบ่งกลุ่มหน่วยงานออกเป็น 3 กลุ่มหน่วยงาน ได้แก่ กลุ่มหน่วยงานที่ไม่ก่อให้เกิดรายได้ (Non Revenue - Producing Cost Centre : NRPPC) กลุ่มหน่วยงานที่ก่อให้เกิดรายได้ (Revenue-Producing Cost Centre : RPCC) และกลุ่มหน่วยงานบริการผู้ป่วย (Patient Service : PS) จัดสรรต้นทุนทางอ้อมไปให้หน่วยบริการผู้ป่วยโดยวิธีสมการพีชคณิต (Simultaneous equation method) สำหรับต้นทุนค่าลงทุนได้ใช้วิธีวิเคราะห์ความอ่อนไหว (Sensitivity analysis) ต้นทุนจากกลุ่มหน่วยงานที่ก่อให้เกิดรายได้ส่วนที่เป็นต้นทุนค่ายา ค่าเวชภัณฑ์ ค่าตรวจทางห้องปฏิบัติการ และค่าตรวจทางรังสีวินิจฉัย ได้มีการคำนวณแยกต่างหากเป็นต้นทุนทางการแพทย์ ส่วนผู้ป่วยประกันสังคมที่รับบริการนอกคลินิกประกันสังคมแผนกผู้ป่วยนอกจะวิเคราะห์ต้นทุนโดยใช้ต้นทุนต่อหน่วยจากการศึกษาในแผนกผู้ป่วยนอก ตึก ภปร. ในปีงบประมาณ 2534 มาปรับเป็นค่าปัจจุบันโดยใช้ดัชนีมวลรวมผู้บริโภคมาคำนวณ
- ผลการศึกษา** : ต้นทุนรวมทั้งหมดในการให้บริการผู้ป่วยประกันสังคมของโรงพยาบาลจุฬาลงกรณ์ ในปีงบประมาณ 2541 มีมูลค่าเท่ากับ 65,128,332.66 บาท โดยแผนกผู้ป่วยนอกมีต้นทุนรวมเท่ากับ 34,783,086.05 บาท และต้นทุนต่อครั้งเท่ากับ 641.80 บาท ต้นทุนต่อผู้ประกันตนต่อปีเท่ากับ 389.80 บาท แผนกผู้ป่วยในมีต้นทุนรวมเท่ากับ 30,345,226.61 บาท และต้นทุนต่อวันนอนเท่ากับ 2,678.07 บาท ต้นทุนต่อผู้ประกันตนต่อปีเท่ากับ 340.07 บาท ต้นทุนต่อผู้ประกันตนต่อปีของผู้ป่วยประกันสังคมทั้งหมดของโรงพยาบาลเท่ากับ 729.87 บาท ต้นทุนในปี 2542 โดยประมาณจะอยู่ 1030.76 บาท

- สรุป** : การศึกษาต้นทุนครั้งนี้แสดงให้เห็นสถานะทางการเงินของโครงการประกันสังคมของโรงพยาบาลจุฬาลงกรณ์ ซึ่งเป็นประโยชน์เพื่อประกอบการตัดสินใจของผู้บริหารในการวางแผนและควบคุมค่าใช้จ่ายในการจัดระบบการให้บริการผู้ป่วยประกันสังคมอย่างมีประสิทธิภาพ รวมทั้งกำหนดแนวทางในการลดต้นทุน
- คำสำคัญ** : การวิเคราะห์ต้นทุน, ผู้ป่วยประกันสังคม

Capitation payment in the social security system has caused problems in service quality provided for the insured as well as dispersion of the insured with unequal risks.⁽¹⁾ At the same time, free choice of the insured in selecting medical institutions,⁽²⁾ and payment by a third party have led to a moral problem whereby the insured tend to demand over-treatment.^(3,4) Such a situation has made several hospitals adopt stricter measures to control costs, including preventing the insured from frequent use of services without appointment to follow up on treatment results, or by postponing treatment of certain high-cost diseases until the patients' membership period with the hospital becomes overdue, thereby transferring the burden of treatment to other hospitals in the ensuing year.⁽¹⁾

King Chulalongkorn Memorial Hospital, with treatment capabilities in providing treatment from primary to tertiary-care levels and rapidly increasing service use, is prone to having to deal with such a burden of treating patients under the social security scheme. It is therefore important that the hospital monitors cost control in providing services so as to ensure efficient and equitable service. To do so, it is also important to know the real costs of services.

Methods

This is a descriptive study based on analysis of data in records of costs in the fiscal year 1998 from the perspective of service providers. Cost data were acquired from all units concerned in order to calculate the cost per one insured patient per year. The analysis was done in 5 parts:

1. Analysis of costs of providing service to socially insured patients in the main services, including

the Social security clinic of the outpatient unit (The 13th Floor clinic of the "Bor-Por-Ror" outpatient building, BPR 13) and the inpatient unit at the Sawadlom Building, 2nd and 3rd floors. Work units involved in providing services to social security patients were divided into 3 groups, namely Non Revenue-Producing Cost Centers (NRPCC), Revenue-Producing Cost Centers (RPCC), and Patient Services (PS). Direct costs from each of these groups were compiled, consisting of labor costs, material costs and investment.^(5,6) Costs of investment were processed through a sensitivity analysis, while indirect cost allocation for patient servicing units was processed through the simultaneous equation method.^(7,8) Costs of the revenue-producing unit such as those related to medicine, medical supplies, laboratory and radiological examination were separately analyzed as medical care costs.

2. Analysis of the costs of providing services to social security patients outside the main services, including specialty clinics in the outpatient unit (in the Bor-Por-Ror Building), emergency Unit, general medical examination room, and other outpatient sectors outside the Bor-Por-Ror Building. The analysis used data, which Aree Sahasanan had already studied during the fiscal year 1991, on financial investment on routine services cost (RSC) and on medical care costs, minus capital spent on medicine, laboratory and radiological examinations in the specialty clinics.⁽⁹⁾ These data were adjusted for inflation to the applicable value in the fiscal year 1998, using the consumer price index multiplied by the frequency of service use, which yielded total costs in each unit. For the in-patient unit, the analysis used the data from routine services costs (RSC) and medical costs, minus costs in medicine,

medical supplies, laboratory and radiological examinations, per day of socially insured patients from the 2nd and 3rd floor of the "Sawadlom" inpatient Building. These were multiplied by stay days of socially insured patients in each unit, yielding total costs of treating socially insured patients in each unit.

3. Analysis of the medical care costs in drugs, medical supplies, laboratory and radio-analysis examination costs of all socially insured patients in inpatient and outpatient units. The medical care costs in medicine and medical supplies were calculated by deducting the real gains, laboratory and radio-analysis costs, and using the cost structure already devised in the study on laboratory and radio-analysis costs of the Out-Patient Building of Chulalongkorn Hospital in the fiscal year 1991 by Pintusorn Hempisuth,⁽¹⁰⁾ adjusted to the money value of the fiscal year 1998. This enabled calculation of the costs of examination per one socially insured patient through a cost-charge ratio method.

4. Analysis of the cost per unit of the outpatient and inpatient units by calculating average cost per visit and cost per each registered social security beneficiary per year in the case of the outpatient unit, and cost per hospital day and cost per each social security beneficiary in the case of the inpatient unit. With these data, the total costs per registered beneficiary per year were obtained.

5. Use of the sensitivity analysis, as the limitation on data obtained required estimation of costs in certain parts. Therefore, an analysis was performed on change of costs per unit by adjusting numbers which could affect costs per unit for recalculation.^(11,12,13)

Results

1. Costs of service for social security patients

in the outpatient unit totaled 34,783,086.05 baht, consisting of 2 types of costs. First, basic service costs and miscellaneous medical care costs, (excluding costs in drugs, medical supplies, laboratory and radiological examinations,) of the main services (the social security clinic), specialty clinics in the Bor-Por-Ror Building and the outpatient units outside the Bor-Por-Ror Building, the emergency unit, and the general medicine unit. It was found that the specialty clinics in the Bor-Por-Ror Building had the highest cost (13.79%) as the service there was the most used. Second, medical care costs in drugs, medical supplies, laboratory and radiological examinations of social security outpatients of all sectors in the outpatient department. These were proportionally the highest – 70.58% — of the total outpatient costs. (See Table 1). Comparing the total costs and per-unit costs, the basic service costs, which were static, were less than the medical care costs, which were variable, in the ratio of 1:2.77.

2. Costs of service for socially insured patients in the In-Patient Unit totaled 30,345,226.61 baht, consisting of 3 groups of costs. First, Basic service costs and miscellaneous medical care costs, (excluding costs in drug, medical supplies, laboratory and radiological examinations) of the main services (Sawadlom Building, 2nd and 3rd floors), other buildings and the intensive care units. It was found that the costs of the main services (Sawadlom Building, 2nd and 3rd floors) were highest (49.67%) as the services there were most frequently used. Second, medical costs in drugs, medical supplies, laboratory and radiological examinations on the social security inpatients in all sectors. These amounted to 38.19% of the total costs. Third, costs of surgical operations

performed to social security patients staying outside the surgical and orthopedics departments. These accounted for 30% of all operation costs for socially insured patients and were 6.01% of the total costs in the In-Patient Unit. The rest of the patients stayed in the departments and their costs were included in the first group. (See Table 2) Comparing the total costs and per unit costs, the basic service costs, which were static, were less than the medical care costs, which were variable, in the ratio of 1:1.70.

3. The unit cost of outpatient services was, on average, 641.80 baht per visit. With the outpatient utilization rate of 0.61 visit per person per year in the year 1998, the outpatient cost per each registered social security beneficiary per year was 389.80 baht. This accounted for 53.41% of the total cost. The unit cost of inpatient services was, on average, 2,678 baht per hospital day. Given the inpatient utilization rate of 0.13 day per person per year, the inpatient cost per each registered social security beneficiary per year

was 340.07 baht, or 46.59% of the total cost. Therefore, the average cost per person per year for the social security service of the hospital in 1998 was calculated as 729.87 baht. (See Table 3) If the hospital's recent utilization statistics of 0.88 outpatient visits and 0.174 hospital day per person per year in the year 1999 were applied, assuming that the unit costs of the services remained unchanged, the cost per registered beneficiary per year would be 1,030.76 baht.

4. The sensitivity analysis revealed that the difference in costs per each socially insured patient was no more than 38.2 baht per patient per year – accounting for 5.10% (between the lowest and highest assumptions). When comparing the basic assumptions of this study with the lowest assumption, it was found that the difference was 2.70% and, when compared with the highest assumption, 0.17-2.53%. This outcome showed that the result of the sensitivity analysis did not yield any significant differences. (See Table 4)

Table 1. Full cost and Services for Socially Insured Patients in the Out-Patient Unit.

Types of Costs	Total Cost (baht)	%	Use of Service (visits)	%
1. Basic services and miscellaneous medical care costs*				
- Main Services (Social Insurance Clinic)	4,340,354.69	12.48	18,669	34.45
- Disease-Specific Clinic (Bor-Por-Ror Building)	4,796,048.42	13.79	28,744	53.04
- Out-Patient Unit (Outside Bor-Por-Ror Building), Accident and Emergency Unit, General Medicine Unit	1,096,973.00	3.15	6,783	12.51
2. Medical care costs**				
- All sectors of the Out-Patient Unit	24,549,709.94	70.58		
Total	34,783,086.05	100	54,196	100

* Medical care costs minus medicine, medical supplies, laboratory and radiological examinations

**Medical care costs in medicine, medical supplies, laboratory and radiological examinations

Table 2. Full cost and Service for Socially Insured Patients in the In-Patient Unit.

Types of Costs	Total Costs (baht)	%	Use of Service (hospital days)	%
1. Basic services and miscellaneous medical care costs*	15,077,057.10	49.67	10,086	89.01
- Main Services (Sawadlom Building, 2 nd and 3 rd floors)	1,547,169.75	5.10	1,035	9.13
- Other Buildings (except Sawadlom Building)	313,918.05	1.03	210	1.86
- Intensive Care Unit				
2. Medical care costs**	11,584,429.26	38.19		
- All sectors in the In-Patient Unit				
3. Operation costs***	1,822,652.00	6.01		
Total	30,345,226.61	100	11,331	100

* Medical care costs minus medicine, medical supplies, laboratory and radiological examinations

** Medical care costs in medicine, medical supplies, laboratory and radiological examinations

*** Operation costs for social security patients staying outside the surgical and the orthopedic departments accounts for 30% of all socially insured patient using operation services.

Table 3. Total Costs and Costs per Each Socially Insured Patient Per Year in Comparison with Capitation of Medical Care Costs

Unit	Out-Patient Unit	In-Patient Unit	Total
Total Cost (baht)	34,783,106.05	30,345,226.61	65,128,332.66
Routine Service Cost	26.50%	37.09%	-
Medical Care Cost	73.50%	62.91%	-
- Drugs	70.98%	27.09%	
- Others	29.02%	72.91%	
Unit cost of services	641.80 / visit	2,678.07 / hospital day	-
Utilization per person per year	0.61 visit	0.13 hospital day	-
Total cost (baht) / registered beneficiary / year	389.80	340.07	729.87

Table 4. Results of Sensitivity Analysis.

Assumptions On Costs	Significant Assumptions with Estimation	Cost/Patient/Year Out-Patient	Cost/Patient/Year In-Patient	Total Cost/Patient/Year	Deviation from base case
Costs based on basic assumptions	<ol style="list-style-type: none"> Specify costs of investment - Out-Patient Unit at 23.22% - In-Patient Unit at 17.35% Specify basic service and medical care costs (minus medicine, medical supplies, laboratory and radio-analysis examination costs) of other building except Sawadllo Building and of the Intensive Care Unit, at the same level as costs of Sawadllo Building 	389.80	340.07	729.87	
Costs based on ilowest assumption	<ol style="list-style-type: none"> Specify costs of investment in the Out-Patient and In-Patient Units at 11.20% Specify basic service and medical care costs (minus medicine, medical supplies, laboratory and radio-analysis examination costs) of other building except Sawadllo Building and of the Intensive Care Unit, at the same level as costs of Sawadllo Building 	383.21	326.92	710.13	-19.74
Costs based on highest assumption	<ol style="list-style-type: none"> Specify costs of investment - Out-Patient Unit at 23.22% - In-Patient Unit at 23.22% Increase costs of office supplies to 3.52% of the total material costs in units outside Bor-Por-Ror Building Specify basic service and medical care costs (minus medicine, medical supplies, laboratory and radio-analysis examination costs) of the Intensive Care Unit, at 6.25 times of the costs of Sawadllo Building 	389.80	354.58	744.38	+14.51
		389.85	341.26	731.11	+1.24
		389.80	358.53	748.33	+18.46

Discussions

In analyzing the costs of providing services to social security patients, this study found that the total costs and costs per each social security patient per year in the Out-Patient Unit were higher than those in the in-Patient Unit by the ratio of 1.15:1. When considering the service costs according to their elements medical care costs, which were variable, were higher than basic service costs, which were static, in both out-patient and in-patient units in the ratio of 2.77:1 and 1.70:1, respectively. Relative to the unit costs of other public hospitals of the Ministry of Public Health (MOPH), the figure of the King Chulalongkorn Memorial Hospital looked much higher. (See Table 5) The differences can be attributed a number of factors. First, since the King Chulalongkorn Memorial Hospital possesses tertiary care capabilities with modern medical technology for efficient treatment, the practice pattern may be more material and capital intensive—use of expensive drugs, medical supplies, and lots of laboratory and radiological investigations to identify causes of diseases. Other factors might include higher severity of the illnesses suffered by patients of the hospital, a tendency among the social security patients to demand over-treatment, and a tendency among doctors to treat patients without regard to costs. Unfortunately, the unit-cost study of other university hospitals in the country is not publicly available for comparison.

Regarding the financial status of the hospital's social security program, the costs were still lower than medical service charges paid to the hospital by the Social Security Office which paid 1,000 per person per year for the first 50,000 registered beneficiaries and 900 baht afterwards. The surplus should be

satisfactory in the balance sheet in 1998. However, when considering the costs based on their composition which shows that the variable medical care costs were proportionally higher than the rather static basic service costs, the breakeven was at a low level.⁽¹⁴⁾ The hospital is also very likely to be at high risk of having a financial loss if the volume of service utilization keeps increasing.

In this regard, cost containment becomes critical. In seeking to reduce costs, it is necessary to analyze composition of costs and factors affecting these costs, such as rate of service use, characteristics and acuteness of illness, characteristics of service users and hospital management and internal control. The organization of the social security system requires continuous costs analysis and analysis of trends in service use. Such analyses will provide administrators with the information needed for estimation of changes in costs for future management as well as enable them to plan effective cost control measures by giving due consideration to those elements of the costs which are proportionally high. Nevertheless, cost reduction should not jeopardize quality of care. Any cost containment effort should be focused on inefficiencies in treatment, service and administrative processes.

The results of this study could also be used in evaluating the effectiveness of services for social security patients in all units concerned, thereby assisting the decision-making process on management, including allocation of funds to the personnel and departments involved, as shown in Table 6.

Certain technical and data limitations of this study should be noted. Due to the nature of the retrospective study, some information to quantify costs could not be obtained. Capital costs were most

Table 5. Some unit-cost studies in public hospitals of the Ministry of Public Health (MOPH), Thailand.

Investigator	Year	Hospitals	Allocation of indirect costs	Unit cost in baht (Nominal value)	Cost structure Labor: Material: Capital
Health planning division ⁽¹⁵⁾	1980	District hospitals	Step-down	OPD = 53 / visit IPD = 182 / day	24-58 : 27-53 : 12.8-22.8
Health planning division ⁽¹⁶⁾	1980	Provincial hospitals 1. 121-240 beds 2. 241-360 beds 3. > 360 beds	Double distribution method	1. IPD = 193 /day 2. IPD = 198 /day 3. IPD = 194 /day	39 : 45 : 12 42 : 45 : 33 35 : 53 : 12
V. Tangcharoen-sathien, et al. ⁽¹⁷⁾	2531	1. Trakarnperpol Hospital (30 beds) 2. Srisakate Hospital (340 beds)	Double distribution method	1. OPD = 72 /visit IPD = 806 / case 2. OPD = 85 /visit IPD = 1,255 /case	N/A
S. Vibulpolprasert, et al. ⁽¹⁸⁾	2532	1. Community hospitals (8 hosp.) 2. Tertiary-care hospitals (8 hosp.)	Simultaneous equation method	1. OPD = 68 / visit IPD = 507 / day 2. OPD = 122 / visit IPD = 387 /day	5 : 4 : 1
Health Planning Division ⁽¹⁹⁾	2534	General and tertiary-care hospitals 1. < 201 beds from financial 2. 201-400 beds 3. 401-600 beds 4. > 600 beds	Studied operating costs only and performance report in 89 hospitals	1. OPD = 136 / visit IPD = 632 / day 2. OPD = 131 / visit IPD = 445 / day 3. OPD = 167 / visit IPD = 507 / day 4. OPD = 137 / visit IPD = 496 / day	Proportion of the Labor costs were the highest at 47.86 – 52.08 percent of the total cost
Satsanguan and Leopairote ⁽²⁰⁾	2535	1. Nan General Hospital 2. Pua Community Hospital 3. Tabor Community Hospital	Simultaneous equation method	1. OPD = 93.32 / visit IPD = 417.77 / day 2. OPD = 77.80 / visit IPD = 353.86 / day 3. OPD = 84.00 / visit IPD = 400.37 / day	46.9 : 41.8 : 11.2 40.7 : 34.1 : 25.2 37.0 : 47.5 : 15.6
T. Bunpaisarncharoen, et al. ⁽²¹⁾	2540	1. Pranakornsri-ayudhaya Hospital (369 beds) 2. Sena Hospital (160 beds)	Simultaneous equation method	1. OPD = 283 / visit IPD = 3,261-16,241/case 2. OPD = 219 / visit IPD = 4,209-6,008 /case	Operating costs 58 : 42 46 : 43 : 11

Table 6. Percentage of Costs of Each Group of Work Units Allocated for Socially Insured Patients Units According to Amount of Services Provided.

NRPCC	%	RPCC	%	PS	%
General Administration	0.15	Internal Medicine	37.25	Social security Clinic	4.01
หน่วยคุ้มครอง	0.03	Physical Medicine & Rehabilitation	0.01	Socially Insured In-Patient Unit	14.71
Supply Unit	0.02	Medical Supplies	5.85	Sawadlom Building (2 nd and 3 rd Floor)	
Maintenance Unit	0.09	Operation	9.25	Other Patient Service Units	7.08
Maintenance Unit (of the Bor-Por-Ror building)	0.20	Blood Bank	0.54		
Transport Unit	0.06	Autopsy	10.09		
Security Unit	0.01	Radiology	4.36		
Finance and Accounting	0.33				
Secretarial unit	0.17				
Telephone	0.02				
Public Relations	0.06				
Academic Unit	0.06				
Nurse	0.36				
Laundry	1.05				
Central Affairs	0.39				
Patient transport unit	0.30				
Health study	0.12				
Computer	0.23				
Outpatient record unit	0.92				
Registrar and Statistics	0.48				
Forensic Medicine	0.47				
Patient Admission	0.29				
Nutrition and dietary services	0.84				
Out-Patient Administration	0.20				

affected due to the lack of such data in old buildings. Personnel benefits could not be completely collected owing to the inability to obtain data from the Bureau of Finance of the Thai Red Cross, resulting in some

underestimation of labor costs. Allocation of physician costs to the social security services was assumed on the basis of the proportion of the number of the patients, relative to the total number of the hospital

patients. This might not reflect the real workload. Furthermore, the assumption made to re-value the costs of laboratory and radiological examinations from previous studies might contribute to some errors in cost estimation. Nevertheless, the sensitivity analyses of the major assumptions in the study demonstrated only slight changes in the resulting numbers.

Conclusions

This study of costs shows the financial status of King Chulalongkorn Hospital's social security service program needs close attention. Proper cost containment measures should be put in place so that quality of care to social security patients can be maintained while the services are financially sustainable.

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