HOUSEHOLD COSTS ASSOCIATED WITH HEALTH CARE SEEKING AT THREE TERTIARY CARE HOSPITALS IN LAO PDR

Walaiporn Patcharanarumol[1], Latsamy Siengsounthone[2], Manithong Vonglokham[2], Bart Jacobs[3] and Viroj Tangcharoensathien[1]

[1]International Health Policy Program, Ministry of Public Health, Nonthaburi, Thailand; [2]National Institute of Public Health, Ministry of Health, Vientiane, Lao PDR; [3]Luxembourg Development, Vientiane, Lao PDR

Abstract. The objective of this study was to estimate household costs (direct medical, direct non-medical and opportunity costs) associated with outpatient consultations and inpatient admissions at three tertiary hospitals in Lao PDR (national, university and regional hospitals). Revolving drug funds are the main sources of revenue for the facilities. We used outpatient exit interviews and interviews with discharged inpatients to obtain data. A total of 280 outpatients and 149 patients discharged from internal medicine wards were interviewed. The average cost for the outpatient services was USD16.0 per patient. Direct medical costs accounted for more than half the amount. Patient interviews revealed it was common for the hospital to require patients to come back the following day to obtain the results of ancillary services which will result in higher transportation and opportunity costs to the patient. The average cost for inpatient admission was USD292; this ranged from USD118 (regional hospital) to USD407 (national hospital). Direct medical costs accounted for 60% and 35% at those two facilities, respectively. Revolving drug funds as a provider payment method at tertiary hospitals were regressive. An uninsured patient faced higher outpatient costs than an insured patient. With the limited number of people currently insured in Lao PDR (8% of the total population in 2009), these results suggest the need to rapidly scale up effective risk protection schemes.

Keywords: household costs, inpatient, outpatient, tertiary hospital, Lao PDR

INTRODUCTION

The oil crises during the 1970s and subsequent imposition of structural adjustment in developing countries led to a curb in government spending. In 1987, an influential World Bank report of financing of health services, strongly advocated the introduction of user fees in developing countries (Akin *et al*, 1987). Public health care that was historically provided for free became suddenly subjected to user fees. Out-of-pocket expenditures that are incurred at the moment of health care utilization in the form of user fees are highly regressive (Gilson and McIntyre, 2005) and are a major cause of (further)

Correspondence: Walaiporn Patcharanarumol, International Health Policy Program, Ministry of Public Health, Nonthaburi 11000, Thailand. Tel +66 (0) 2590 2366; Fax + 66 (0) 2590 2385 E-mail: Walaiporn@ihpp.thaigov.net

impoverishment (McIntyre *et al*, 2006).

Access to effective health care was curtailed due to lack of consumables, including medicine. Consequently, the UNICEF/WHO Bamako Initiative endorsed in 1988, aimed to ensure a constant availability of essential medicines to enable affordable access to health care services (Uzochukwu *et al*, 2002). The approach forwarded by the Bamako Initiative became known as Revolving Drug Fund (RDF) schemes, whereby drugs are sold with a profit margin to enable further drug purchases by taking into account, among others, costs for transport, inflation and expired drugs (Chukwuani *et al*, 2006).

This concept was introduced in the Lao PDR where the shift from planned to market economy in the late 1980s necessitated the introduction of RDF mechanisms to raise revenue. In 1996, user fees were officially introduced with the application of Decree 52 and by 1997 the National Guidelines for RDF were formulated (Pholsena and Thomé, 2009). The latter allowed drugs to be sold at 25% above purchase prices and also specified the clinical pathway to be followed by patients (Ministry of Health, 1997). An initial report from the provider perspective from Vientiane Capital reported financial success with the RDF initiative at health centers (107% cost recovery) and district hospitals (108% cost-recovery) (Murakami *et al*, 2001). Stock-outs of medicines were only about 6%. However, patients complained about the associated lengthy and complex procedures for registration, medical procedures and payment (Paphassarang *et al*, 2002).

This study assesses the patient pathway for using medical services at tertiary hospitals in Lao PDR and associated household cost for outpatient consultations and inpatient admissions in order to inform policy makers and international audiences how to improve financial access to tertiary medical services, in particular, and public health services, in general, in a resource limited situation.

Background

Lao PDR has a population of 5.9 million people, is a landlocked low-income country in Southeast Asia with a per capita GDP of USD630 and an economy that grew at 7.1% on average during 2003-2007 (World Bank, 2008). The population density is 24 people per km^2 (Epprecht *et al*, 2008). It is a one-party state governed along Marxist-Leninist philosophy with neo-liberal economic reforms being introduced in 1986 (Stuart-Fox, 2005). The economy consists for about 50% of subsistence farming, while hydroelectricity, mining, tourism and garment manufacturing are of growing importance (World Bank, 2008).

Life expectancy at birth in 2005 was 64 years, under five mortality 98 per 1,000 live births and maternal mortality 405 per 100,000 live births (WHO, 2005). In 2005, 34.7% of the population lived below the poverty line (40% of the rural population, 19.8% urban) and 73% resided in rural areas (GRID, 2006). The average monthly per capita expenditure was Lao Kip 140,721 (USD13.4) in 2005 (Epprecht *et al*, 2008). The country has 17 provinces with 140 districts of which 47 are considered poor and requiring priority (Epprecht *et al*, 2008). The majority of the poor are ethnic minorities who live in remote mountainous areas (Epprecht *et al*, 2008).

Total health expenditure was USD36 per capita in 2009 of which 61% was paid by households, 16% by donors, 19% by the government of Lao PDR and the remainder by insurances (WHO, 2012). The most

recent Lao expenditure and consumption survey noted that user fees played an increasingly prominent role in financing public health services, that government health spending was not related to factors such as poverty or health needs and that it was biased towards central level while resources at district level are extremely limited (World Bank, IMF, ADB, EC, 2007). The meagre public subsidies available for health services favor the upper income quintiles, whereby the richest quintile got 27% and the poorest 13% of these resources (World Bank, IMF, ADB, EC, 2007).

Government health facilities currently include 4 central hospitals, 3 specialized hospitals, 5 regional hospitals, 13 provincial hospitals, 127 district hospitals and 750 health centers (Pholsena and Thomé, 2009). In 2002 there were about 2000 licensed private pharmacies and 260 clinics, mainly located in urban centers, as well as unlicensed drug retailers. Also in 2002, central hospitals received 17-25% of recurrent costs from the government (of which 76-94% was salaries for staff) and regional hospitals 25-52% (83-93% for salaries), the rest was derived from the revolving drug fund (Derché *et al*, 2004, unpublished document).

There are currently 4 schemes for health insurance covering about 8% of the total population in 2009 (Tangcharoensathien *et al*, 2011). First, the scheme for civil servants, which is part of a wider package of social welfare benefits for all civil servants since the revolution in 1975. It underwent reforms in 2006, whereby a limited fee-for-service reimbursement system for health care costs for insured (about 20% of incurred health care costs are reimbursed) was gradually being replaced by a capitation payment to providers. Second, Social Health Insurance under the Social Security Organisation (SSO), the Ministry of Labor and Social Welfare was introduced in 2002. It is a mandatory contribution scheme for all employees of private enterprises with at least ten salaried workers. However, due to the small number of formal private employees, the scheme has very limited population coverage. Third, community-based health insurance was launched by the Ministry of Health in 2002 for non-poor families on a voluntary basis. The fourth is a scheme to protect the poor with health equity funds-third party mechanisms that reimburse contracted health care providers for services rendered to eligible poor to enable them to access fee-free health care (Noirhomme *et al*, 2007). All insured people using any health insurance scheme can get free medicines from the revolving drug funds of the contracted healthcare facilities according to medicine availability.

MATERIALS AND METHODS

Three tertiary hospitals were purposively selected for this study: a 450-bed national referral hospital (Mahosot), a 175-bed university teaching hospital (Sethathirath) and a regional hospital outside the capital (Savannakhet) with 200 beds. Due to the limited number of insured people, these three tertiary hospitals have a combination of patients who are covered by health insurance and those who are not.

Costs associated with hospital consultations or admissions are from the household perspective and made up of: 1) direct medical costs – medicines (which are managed by the revolving drug funds of the health facilities), ancillary services and other fees; 2) direct non-medical costs – transport and food for patients and their caretakers; 3) indirect costs – the imputed opportunity costs from not being able to perform paid or other non-paid work by

the patients and their caretakers.

In order to estimate the financial burden of hospital admissions to households, two main assumptions were made: 1) household income equals daily patient income multiplied by 30 days a month, for 12 months a year by two adult income earners out of five members in a household. This was based on information from the Lao Statistical Report 2009 which found an average of 5.6 members per family for the country, two of whom were breadwinners; 2) there was one admission per household at the time of the survey.

In October 2008, researchers from the National Institute of Public Health and the International Health Policy Program visited the outpatient department and internal medicine ward of the national hospital to observe patient pathways and interview medical doctors and nurses on the wards for additional information with the objective of designing survey tools. Patients admitted to an internal medicine ward were selected because they were the most likely patients to participate in the study. They were also more likely to represent a typical case of hospitalization, unlike a severe case in the intensive care unit.

Two tools were used for the study. Tool 1, outpatient exit interviews**.** Exit interviews were conducted with 100 randomly selected outpatients (OP) or their caregivers per hospital. Variables assessed included distance of residence from the hospital, direct medical cost, direct non-medical cost, total time lost from their routine income generating activities during hospital consultation, their monthly income and insurance status. Cases were randomly selected in front of the pharmacy unit. For caregivers, information was gathered regarding the number of people accompanying the patient, their occupation, daily income, total days or hours absent from income generating activities due to looking after the patient. Tool 2, inpatient exit interview. Exit interviews were conducted among 50 inpatients (IP) at the internal medicine department of each hospital upon discharge. During the discharge process, each patient was interviewed by a trained nurse in the inpatient ward before leaving the hospital. Assessed variables were similar to those for the OP exit interviews but also included length of stay. This study part was conducted on inpatients who paid their own bills since insured patients do not know their medical costs because the bill is submitted directly to the insurance unit of the hospital.

Quantitative data were entered into an Excel sheet and analysed using the same program.

RESULTS

Systems analysis: patient pathway

The patient pathways for outpatient and ancillary services at the 3 study hospitals are shown in Fig 1.

Outpatients initially had to go to the reception for registration, followed by payment at the cashier, vital sign measurement, (waiting for) consultation with the physician, paying for drugs and/or ancillary tests, and finished by taking medicines from the pharmacy or by leaving the facility to return the following day if there was an appointment. For ancillary services, patients usually had to wait until the next day for the results of laboratory tests and other ancillary services. If the concerned ancillary service was relatively complicated to perform or there was a long queue, patients had to make an appointment and come back for results another day.

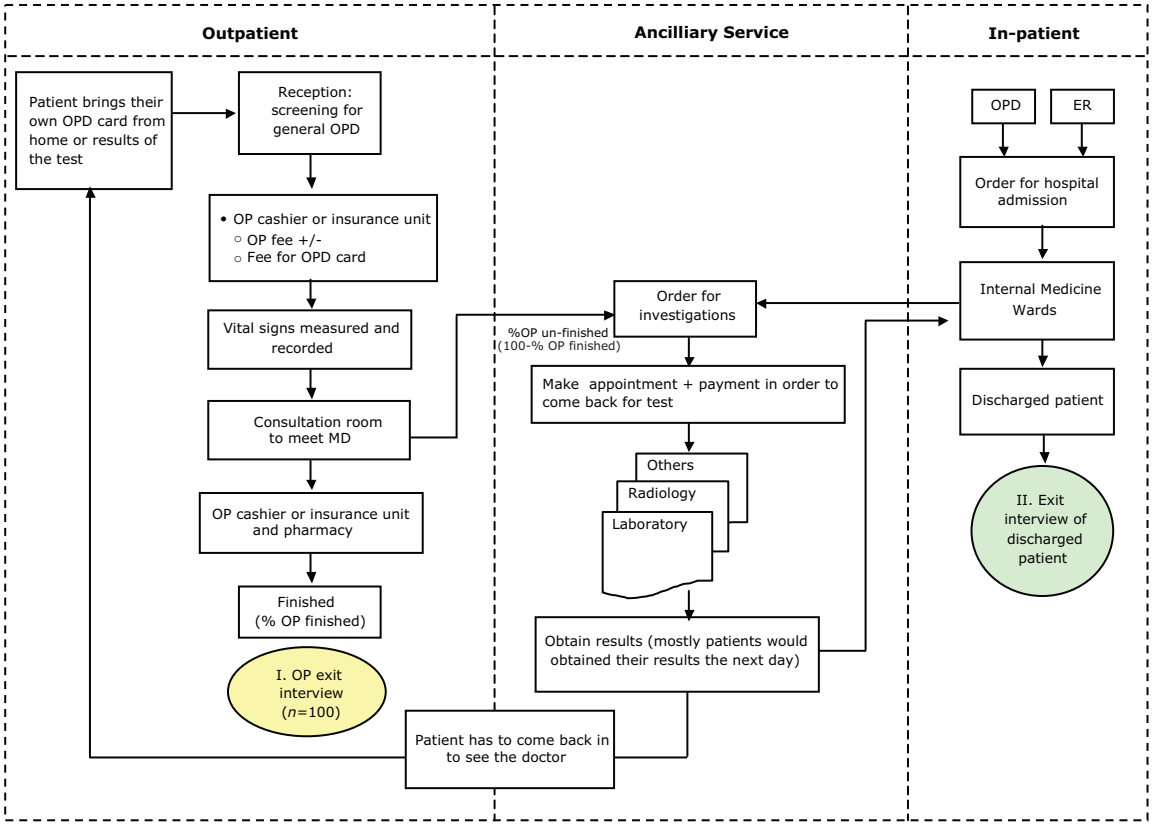

Fig 1–The patient pathways at the 3 study hospitals.

Patients covered by health insurance were required to report to the Health Insurance Unit to show their insurance ID card and for verification by staff of the Health Insurance Unit.

The patient pathway for admissions was similar to OP. Outpatients were requested by doctors to be hospitalized from the OP department and proceed to the respective ward for investigation and treatment. In spite of this simple pathway, investigations and treatments may be complicated, depending on the number required, the condition and its severity. Inpatients are required to pay on a daily basis, the respective amount varying according to the prescribed treatments and investigations.

Costs associated with outpatient consultations

Exit interviews were conducted among 280 outpatients at the three hospitals. Table 1 shows their characteristics and indirect costs incurred. The overall insurance coverage is 8% for the total population of Lao PDR, but many of the out patients in this study had insurance (100 insured patients out of a total of 280). The average age of the 280 cases was 31.6 years and the mean income was 23,314 Kip (USD2.7) per day (1 USD=8,500 Kip). The patient's spent an average of more than half a day (0.61 day), including travelling, in order to seek care at the hospital as an outpatient. On average, the indirect costs of lost earnings for this visit were 12,549

Table 1
Characteristics of cases and indirect costs of outpatient consultations (in Kip).

Hospital	Insurance	Cases	Mean age (yrs)	Mean daily income	Time lost (days)	Patient income lost	No. of care-takers	Total caretaker income lost	Mean indirect cost
National	OOP	65	33.1	17,941	0.98	13,765	1.05	23,187	36,953
	Ins	35	37.6	23,450	0.42	8,966	0.49	12,756	21,722
	All	100	34.7	19,869	0.78	12,086	0.85	19,536	31,622
						38%		62%	100%
University	OOP	52	24.1	21,506	0.75	22,406	0.92	31,060	53,467
	Ins	50	29.8	26,455	0.48	9,273	0.58	3,832	13,104
	All	102	26.9	23,932	0.62	15,968	0.75	17,713	33,681
						47%		53%	100%
Regional	OOP	63	33.2	22,354	0.39	7,359	1.16	18,762	26,121
	Ins	15	37.4	46,106	0.30	14,176	0.73	4,502	18,677
	All	78	34.0	26,922	0.37	8,670	1.08	16,020	24,690
						35%		65%	100%
3 Hospitals	OOP	180	30.5	20,516	0.71	14,019	1.05	23,913	37,933
	Ins	100	33.7	28,351	0.43	9,901	0.57	7,056	16,956
	All	280	31.6	23,314	0.61	12,549	0.88	17,893	30,441
						41%		59%	100%

Ins, insured; OOP, pays out-of-pocket

Kip and 17,893 Kip for patients and their caretakers, respectively. The average total indirect cost was 30,441 Kip for seeking outpatient services. Indirect costs for patients seeking care from the national and university hospitals were much higher than those at the regional hospital. The indirect cost incurred by patients not covered by health insurance was much higher (14,019 Kip) than those covered by health insurance (9,901 Kip).

Table 2 shows the direct medical and non-medical costs for outpatient consultations. Direct medical costs comprised 65% of the total while direct non-medical costs comprised 35% of the total costs. At all levels of care, direct medical costs, non-medical costs and the total costs to the patient not covered by insurance schemes were more expensive (at least two times higher) than for patients covered by health insurance.

The costs of medicines and ancillary costs in the insured group averaged 31,831 Kip and 6,300 Kip, respectively, and were fully absorbed by the health insurance schemes; these beneficiaries only paid for other fees (such as registration fees), transport and food. The significantly lower medical and ancillary costs among the insured group than the OOP group clearly indicates there is either supplier induced demand for the uninsured group or under-servicing for the insured group. This hypothesis may be further evaluated with a better study design. There are different financial incentives for the different provider payment methods for each

Table 2
Direct medical and non-medical costs for outpatient consultations (in Kip).

Hospital	Insurance	No. of cases	Medicines	Ancillary costs	Other fees	Medical costs	Transport costs	Food	Non-medical costs	Total costs
National	OOP	65	35,508	25,629	7,015	68,152	39,308	8,231	47,538	115,691
	Ins	35	30,594	0	2,429	33,023	10,343	1,771	12,114	45,137
	All	100	33,788	16,659	5,410	55,857	29,170	5,970	35,140	90,997
						61%			39%	100%
University	OOP	52	53,692	34,596	14,385	102,673	39,925	5,250	45,175	147,848
	Ins	50	32,686	9,400	3,700	45,786	16,784	460	17,244	63,030
	All	102	43,395	22,245	9,147	74,787	28,581	2,902	31,483	106,271
						70%			30%	100%
Regional	OOP	63	42,714	28,333	11,571	82,619	45,212	6,873	52,085	134,704
	Ins	15	31,867	10,667	1,600	44,133	16,760	6,933	23,693	67,827
	All	78	40,628	24,936	9,654	75,218	39,741	6,885	46,625	121,843
						62%			38%	100%
3 Hospitals	OOP	180	43,283	29,166	10,739	83,188	41,553	6,894	48,447	131,635
	Ins	100	31,831	6,300	2,940	41,071	14,526	1,890	16,416	57,487
	All	280	39,193	21,000	7,954	68,146	31,900	5,107	37,007	105,154
						65%			35%	100%

Ins, insured; OOP, pays out-of-pocket

health insurance scheme. For example, the health insurance schemes in Lao PDR mainly apply the capitation model while the uninsured group is charged as fee for service.

Significantly higher non-medical cost were observed among the uninsured group (48,447 Kip) than among insured patients (16,416 Kip), and were mostly attributable to transport costs. Insured patients, who are mostly formal workers, have better access to tertiary care hospitals than uninsured patients, who work in the informal sector and may live far from the hospital, requiring longer travel to access tertiary care.

The total costs to the household are shown in Table 3**.** Cost proportions and total costs varied slightly amongst the 3 study hospitals (USD14 to 17 per visit). An outpatient consultation consumed on average 19% of the patients reported monthly income, ranging from 18% at the regional hospital to 21% at the central level and from 9% for insured to 28% for uninsured. The insured patients did not have to pay for medicines and ancillary costs while uninsured patients had to pay the total amount themselves, which is catastrophic (when measured by more than 10% of their household income or consumption expenditure). The direct medical costs alone could lead to catastrophic health expenditure for uninsured patients (14% of patient monthly income).

Costs associated with hospitalization

Table 4 shows the characteristics of the 149 studied inpatients (56 at the National, 55 at the University, and 38 at the Regional Hospital). None of the studied inpatients had health insurance. All of them paid medical costs out of pocket.

Table 3
Costs of seeking outpatient services and respective financial burden to households.

Hospital	Type	No. of cases	Age	USD per OPD visit				Patient monthly income (USD per month)	% of HH income			
				Medical costs	Non-medical costs	Indirect costs	Total costs		Medical costs	Non-medical costs	Indirect costs	Total costs
National	OOP	65	33.1	8.0	5.6	4.3	18.0	63.3	13%	9%	7%	28%
	Ins	35	37.6	3.9	1.4	2.6	7.9	82.8	5%	2%	3%	10%
	All	100	34.7	6.6	4.1	3.7	14.4	70.1	9%	6%	5%	21%
University	OOP	52	24.1	12.1	5.3	6.3	23.7	75.9	16%	7%	8%	31%
	Ins	50	29.8	5.4	2.0	1.5	9.0	93.4	6%	2%	2%	10%
	All	102	26.9	8.8	3.7	4.0	16.5	84.5	10%	4%	5%	19%
Regional	OOP	63	33.2	9.7	6.1	3.1	18.9	78.9	12%	8%	4%	24%
	Ins	15	37.4	5.2	2.8	2.2	10.2	162.7	3%	2%	1%	6%
	All	78	34.0	8.8	5.5	2.9	17.2	95.0	9%	6%	3%	18%
3 Hospitals	OOP	180	30.5	9.8	5.7	4.5	19.9	72.4	14%	8%	6%	28%
	Ins	100	33.7	4.8	1.9	2.0	8.8	100.1	5%	2%	2%	9%
	All	280	31.6	8.0	4.4	3.6	16.0	82.3	10%	5%	4%	19%

HH, household; Ins, insured; OOP, uninsured

Table 4
Characteristics of inpatient cases and their indirect costs (in Kip).

Hospital	Gender	No. of cases	Mean age (years)	Mean daily patient income	Mean LOS (days)	Mean days lost before + during hospital stay	Mean total days lost	Patient income lost	Mean number of care-takers	Mean income lost per care-taker	Total care-taker income lost	Indirect cost
National	Male	23	48.0	90,527	6.13	7.91	14.04	1,434,288	1.65	357,540	547,979	1,982,267
	Female	33	46.6	76,942	6.58	5.76	12.33	982,643	1.52	261,315	352,410	1,335,053
	M+F	56	47.2	82,522	6.39	6.64	13.04	1,168,140	1.57	300,836	432,733	1,600,873
								73%			27%	100%
University	Male	23	41.5	32,352	4.35	13.43	17.78	588,501	1.35	160,119	228,307	816,808
	Female	32	43.3	19,092	6.25	8.63	14.88	299,316	1.22	550,026	574,333	873,650
	M+F	55	42.5	24,637	5.45	10.64	16.09	420,248	1.27	386,974	429,631	849,880
								49%			51%	100%
Regional	Male	13	33.5	1,821	3.69	7.69	11.38	29,179	1.54	38,410	66,936	96,115
	Female	25	20.2	3,760	4.32	7.20	11.52	58,520	1.76	92,987	143,840	202,360
	M+F	38	24.7	3,096	4.11	7.37	11.47	48,482	1.68	74,316	117,531	166,013
								29%			71%	100%
3 Hospitals	Male	59	42.3	48,303	4.90	10.02	14.92	794,974	1.51	210,262	317,368	1,112,343
	Female	90	38.1	36,045	5.83	7.18	13.01	482,982	1.48	317,210	373,380	856,362
	M+F	149	39.7	40,899	5.46	8.30	13.77	606,522	1.49	274,862	351,201	957,723
								63%			37%	100%

F, female; LOS, length of stay; M, male

Table 5
Direct medical and non-medical care costs for hospitalization in Kip.

Hospital	Gender	Medicines	Ancillary services	Other fees	Medical care costs	Transport	Food	Non-medical care costs	Med + non-med costs
National	Male	541,174	463,087	215,870	1,220,130	220,217	408,565	628,783	1,848,913
	Female	587,273	392,758	217,879	1,197,909	296,697	364,848	661,545	1,859,455
	M+F	568,339	421,643	217,054	1,207,036	265,286	382,804	648,089	1,855,125
		31%	23%	12%	65%	14%	21%	35%	100%
University	Male	435,478	278,391	139,565	853,435	304,609	189,304	493,913	1,347,348
	Female	702,775	375,031	180,328	1,258,134	215,156	394,313	609,469	1,867,603
	M+F	590,996	334,618	163,282	1,088,896	252,564	308,582	561,145	1,650,042
		36%	20%	10%	66%	15%	19%	34%	100%
Regional	Male	288,369	186,769	89,308	564,446	98,846	108,846	207,692	772,138
	Female	337,880	200,160	77,960	616,000	62,800	195,200	258,000	874,000
	M+F	320,942	195,579	81,842	598,363	75,132	165,658	240,789	839,153
		38%	23%	10%	71%	9%	20%	29%	100%
3 Hospitals	Male	444,268	330,203	158,237	932,708	226,373	257,051	483,424	1,416,132
	Female	559,064	332,956	165,661	1,057,681	202,733	328,200	530,933	1,588,614
	M+F	513,608	331,866	162,721	1,008,195	212,094	300,027	512,121	1,520,316
		34%	22%	11%	66%	14%	20%	34%	100%

Table 6
Costs of hospitalization as percent of annual household income.

Hospital	Gender	No. of cases	Age in years	USD per admission				Estimated annual household income (USD)	% of annual HH income			
				Medical costs	Non-medical costs	Indirect costs	Total costs		Medical costs	Non-medical costs	Indirect costs	Total costs
National	Male	23	48	144	74	233	451	11,502	1%	1%	2%	4%
	Female	33	46.6	141	78	157	376	9,776	1%	1%	2%	4%
	M+F	56	47.2	142	76	188	407	10,485	1%	1%	2%	4%
University	Male	23	41.5	100	58	96	255	4,111	2%	1%	2%	6%
	Female	32	43.3	148	72	103	323	2,426	6%	3%	4%	13%
	M+F	55	42.5	128	66	100	294	3,130	4%	2%	3%	9%
Regional	Male	13	33.5	66	24	11	102	231	29%	11%	5%	44%
	Female	25	20.2	72	30	24	127	478	15%	6%	5%	27%
	M+F	38	24.7	70	28	20	118	393	18%	7%	5%	30%
3 Hospitals	Male	59	42.3	110	57	131	297	6,137	2%	1%	2%	5%
	Female	90	38.1	124	62	101	288	4,580	3%	1%	2%	6%
	M+F	149	39.7	119	60	113	292	5,197	2%	1%	2%	6%

The mean age was 40 years. More women than men were interviewed (90 females, 59 males). The mean length of stay (LOS) was 4.1 days at the Regional Hospital compared to 6.4 days at the National and 5.5 days at the University Hospital. The average numbers of caretakers per inpatient was 1.5.

Patients admitted to the national hospital reported the highest daily income (82,522 Kip/day), followed by those at the university hospital (24,637) and the regional hospital (3,096). Male inpatients reported a higher income than women at the hospitals in the capital while the opposite was observed at the regional hospital. Opportunity costs associated with those admissions included income lost by patients and their caretakers which averaged 957,723 Kip (USD113), mostly attributed to patient income loss (63%), and caretaker income loss (37%). There was no consistent pattern across the three hospitals, the share of the caretakers was 71% at the regional hospital and 27% at the national hospital.

On average, the direct medical and non-medical costs were 1.5 million Kip (USD176) per admission, ranging from 839,000 (USD99) to 1.8 million (USD212) Kip at the regional and national hospital, respectively (Table 5). Of these direct costs, medical cost comprised 66% and non-medical costs comprised 34%, though some variations across hospitals were observed. Of the direct medical cost, medicines by the RDF were the major portion. There were no differences by gender. Non-medical expenditure on food was larger than transport.

Total cost as a percent of household annual income at the national and university hospitals were not as high as the regional hospital (30% of the annual household income, 44% for households having men admitted and 27% for households having women admitted) (Table 6). This high proportion of annual income is probably due to the low estimate of reported annual income per household (USD393). Among the three hospitals, the average cost for hospitalization was 6% of the total annual household income.

DISCUSSION

Patients normally spent more than half a day at the out-patient department to have a consultation lasting 6-8 minutes. Direct costs for transportation and opportunity costs will be higher for patients and their caretakers who are required to return to the hospital for test; the total cost cannot be accurately estimated in this group of patients.

The total household costs for an OPD consultation amounted to USD16 with little variation among hospitals. This is a relatively high figure with drugs accounting for 50% and non-medical direct costs for 27%. The large expenditure on medicines is due to the limited funding provided by the government to the health sector in general and for hospitals in particular. Consequently, our minimum estimation of an outpatient consultation at a Lao tertiary hospital consumed up to 19% of the patients' reported monthly household income. Uninsured patients paid costs averaging 28% of their reported income.

The survey of IPD patients captured all aspects of treatment, including that prior to hospitalization. Studied inpatient cases at the regional hospital were considerably younger (24.7 years) than those at the university and national hospitals (42-47 years). Consequently they reported a much lower daily income (USD0.36) than

cases at the university hospital (USD2.9) and national hospital (USD9.7). Such differences were not seen among OPD cases. This may suggest OPD services at the three tertiary hospitals serve a relatively homogenous population, but IPD patients varied by hospital. These differences may also explain the lower mean length of stay observed at the regional hospital (4.1 days) compared to the university (5.5) and national (6.4) hospitals. As patients pay their daily medical bill, less affluent ones may discharge themselves earlier.

The lower reported daily income among regional hospital patients may also explain why the direct medical costs amounted to 60% of the total household costs per admission. These figures were 35% and 44% for the university and national hospitals, respectively. Patients at the university and national hospitals had much larger proportions of indirect costs, 34% (USD100) and 46% (USD188), respectively, compared to regional hospital patients, 17% (USD19.5). The numbers of caretakers averaged 1.5 per inpatient and their share of the indirect costs ranged from 27% at the national hospital to 71% at the regional hospital. Admission to the regional hospital was clearly catastrophic, costing 30% of the estimated annual income. Hospitalization costs were lower than those reported for China, where hospitalization reportedly cost the equivalent of the average per capita annual income (Hu *et al*, 2008). Household costs at the tertiary hospitals located in the capital were markedly higher than those observed at a tertiary hospital in India where such costs amounted to USD135 for hospitalized children (Madsen *et al*, 2009). Only at the regional hospital were the household costs lower, but due to the smaller income, had a greater impact on livelihood.

Since patients in the outpatient department were in a hurry it was not possible to ask detailed questions about income (or expenditure), therefore, they were only queried about their monthly income when salaried or daily income when self employed; non-wage income from agriculture and live stock products could not be solicited or estimated in this study. Income is often underreported (Morris *et al*, 2000), and so may our respective estimates, so the impact of costs associated with an outpatient consultation may be exaggerated. The estimated annual income for inpatients in this study may be overestimated, thereby underestimating the financial impact of hospitalization costs, at least for the study hospitals in the capital. Interpretation of the results should be made with caution.

The limitations of this study prevent us from obtaining a full picture of household costs for outpatient consultations as we were unable to determine the costs related to ancillary services. We surveyed during the least busy weekdays whereby waiting times and indirect costs may be underestimated. Considerable proportions of patients at the national and university hospital were lost; these may have been cases who became impatient due to long waiting times.

We did not include the cost of care seeking prior to consulting the hospital. Most patients initiate care seeking in the private sector (Paphassarang *et al*, 2002; Patcharanarumol *et al*, 2009) or use traditional medicine (Sydara *et al*, 2005); therefore, our household costs may be an underestimation of the true costs incurred. Since we did not use a tracer condition or adjusted for mixed cases, some differences between patients may not be accounted for or captured during these estimates. The number of patients in our study was relatively robust; cases were randomly

selected from the same Internal Medicine Department. As this was a hospital-based study, we could not capture people requiring health care but who were unable to access it due to financial or other barriers, who may have opted to stay at home or seek traditional providers. For example, during a study from Savannakhet Province among 1,139 villagers who suffered a total of 103 episodes of illness, none sought care at the regional hospital (Patcharanarumol *et al*, 2009).

To understand the problem more precisely, it is necessary to consider other factors, such as the nature of the disease among the patients and patient characteristics, such as age, gender, employment status and relationship with the head of household. These factors can influence health care seeking behavior and cost incurred as well as coping mechanisms adopted by the household (Paphassarang *et al*, 2002; Sydara *et al*, 2005; Patcharanarumol *et al*, 2009). However, these factors were beyond the scope of this study. We found more female than male patients in both the outpatient departments and among hospitalized patients at the national, university and regional hospitals, with no evident cost differences by gender.

This patient pathway analysis provided useful information to improve services at the health facilities studied. For example, there is room for efficiency improvement at the hospitals, especially in obtaining faster results from ancillary services within 1 day. This will result in household savings.

Household costs associated with seeking care as outpatient at the studied hospitals are likely to create a financial hardship to the household. The current population coverage by pre-paid health insurance schemes is minimal. Findings from this study contribute to the understanding of costs associated with healthcare utilization and its impact on household livelihood.

In China, a similar provider payment method resulted in escalation of costs; the profit attached to drug sales resulted in provision of unnecessary treatments and use of excessive expensive medicines (Meng *et al*, 2005; Xingzhu and Mills 2005). More rigorous monitoring systems by the government are called upon to curb cost escalation but such issues are difficult to implement in low-income countries. Instead, it may be more opportune to introduce different provider payment methods that aim at addressing inefficiencies and cost-containment. This is currently being experimented within several places in China (Yip *et al*, 2010) where retrospective fee-for-services have been replaced by prospective case-based payments for inpatients or capitation of outpatient services, coupled with incentives to redirect efforts in preventive services instead of curative ones. Concurrent introduction of standardized cost-effective treatment protocols and performance based payments appear to be effective strategies for preventing excessive treatment and financial burden to patients.

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