CATASTROPHIC PAYMENTS FOR HEALTH CARE IN ASIA

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SUMMARY

Out-of-pocket (OOP) payments are the principal means of financing health care throughout much of Asia. We estimate the magnitude and distribution of OOP payments for health care in fourteen countries and territories accounting for 81% of the Asian population. We focus on payments that are catastrophic, in the sense of severely disrupting household living standards, and approximate such payments by those absorbing a large fraction of household resources. Bangladesh, China, India, Nepal and Vietnam rely most heavily on OOP financing and have the highest incidence of catastrophic payments. Sri Lanka, Thailand and Malaysia stand out as low to middle income countries that have constrained both the OOP share of health financing and the catastrophic impact of direct payments. In most low/middle-income countries, the better-off are more likely to spend a large fraction of total household resources on health care. This may reflect the inability of the poorest of the poor to divert resources from other basic needs and possibly the protection of the poor from user charges offered in some countries. But in China, Kyrgyz and Vietnam, where there are no exemptions of the poor from charges, they are as, or even more, likely to incur catastrophic payments. Copyright © 2007 John Wiley & Sons, Ltd.

INTRODUCTION

Out-of-pocket payments are the principal means of financing health care throughout much of Asia (O'Donnell *et al.*, 2005). This has consequences for the utilisation of health care and subsequently

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health. There are also potentially important consequences for household living standards. Welfare is reduced by the uncertainty of medical expenditures. Households may be able to borrow to cover unexpected medical bills but at the risk of being trapped in long-term debt. As a result, opportunities to escape poverty through investments in human capital may be lost. Where there is a lack of access to credit, a characteristic of less-developed economies particularly binding for the financing of investments in health, medical expenses must be covered from the current household budget and from wealth. Some households might be able to finance medical expenses from savings, by selling assets or by cutting back on expendable items of consumption. More severely economically constrained households may be forced to cut back on necessities and consequently be pushed into poverty. Illness then presents a difficult choice between diverting a large fraction of household resources to cover the costs of treatment and forgoing treatment at the expense of health.

The threat that out-of-pocket (OOP) payments pose to household living standards is increasingly recognised as a major consideration in the financing of health care (Commission on Macroeconomics and Health, 2001; OECD and WHO, 2003; World Bank, 2004; World Health Organisation, 2005). The extent to which such concern is justified depends upon the unpredictability of OOP payments, their magnitude relative to household resources and their distribution in relation to that of income. We describe the magnitude and distribution of OOP payments for health care in fourteen countries and territories that account for 81% of the total population of Asia (49% of the world population). Our focus is on expenditures that are catastrophic, in the sense that they severely disrupt household living standards. Following others (Berki, 1986; Wyszewianski, 1986; Wagstaff and Van Doorslaer, 2003; Xu *et al.*, 2003; Russell, 2004), we approximate such *catastrophic payments* by those in excess of a substantial fraction of the household budget. Spending a large fraction of household resources on health care can threaten living standards either in the short term, as current consumption of other goods and services must be sacrificed, or in the long term, as assets are divested, savings depleted or debt accumulated. One conception of fairness in health finance is that households should be protected against such catastrophic medical expenses (World Health Organisation, 2000).

Most previous estimates of the impact of OOP payments on living standards in developing countries have relied on data from small-scale health surveys that are not nationally representative, often being restricted to rural areas (Sauerbron *et al.*, 1995; Ensor and Pham, 1996; Sauerbron *et al.*, 1996; Pannarunothai and Mills, 1997; Wilkes *et al.*, 1998; Fabricant *et al.*, 1999; Ranson, 2002; Segall *et al.*, 2002; Skarbinski *et al.*, 2002; Russell, 2004; van Damme, 2004). We analyse data from nationally representative household expenditure surveys that record both OOP payments for health care and total household expenditure in detail and so offer accurate estimates of the magnitude of OOP payments relative to the household budget. We extend the existing evidence on catastrophic payments derived from nationally representative expenditure data (Pradhan and Prescott, 2002; Wagstaff and Van Doorslaer, 2003; Xu *et al.*, 2003) by adding estimates for China and India, and many other Asian countries.

The structure of the paper is as follows. Next, we provide background information on the financing contribution and composition of OOP payments and on public health care charging policy in each of the fourteen study territories. Then we summarise the magnitude and distribution of OOP payments relative to household budgets. Further, the extent to which OOP payments for health care are catastrophic is examined. Finally, we summarise and interpret the main findings, and acknowledge some limitations.

OUT-OF-POCKET FINANCING OF HEALTH CARE IN ASIA

The fourteen territories included in the analysis span the whole range of economic development from low to high income (Table I). In each case, OOP payments fund at least 30%, and often much more, of

Table I. National Income and out-of-pocket (OOP) payments health financing contribution and composition

	World Bank income group	GDP per capita, 2000 (US$ PPP exchange rates)	OOP as % of total expenditure on health	Year	Percentage of total OOP payments on				
					Public sector care	Inpatient care	Ambulatory care	Medicines	Traditional/home/other
Bangladesh[a]	Low income	1479	64.8	2000	0.50	8.90	6.46	70.32	14.32
China	Lower middle	3928	60.4	2000	N/A	11.60	73.80	6.30	8.30
Hong Kong	High	25796	31.2	1999/2000	6.36	16.98	38.99	7.56	36.47
India[b]	Low	2415	82.2	2002	25.61	9.26	11.15	74.72	4.87
Indonesia	Lower middle	3028	57.7	2001	23.19	12.50	52.95	34.55	0.00
Korea, Rep.	High	16172	49.9	2000	N/A	39.83	22.02	32.53	5.63
Kyrgyz Rep.[c]	Low	1560	51.7	2000/2001	44.52	12.21	27.94	55.85	4.00
Malaysia[e]	Upper middle	8926	40.2	1998/1999	7.17	24.82	45.41	24.66	5.11
Nepal[d]	Low	1328	75.0	1994/1995	N/A	N/A	N/A	N/A	N/A
Philippines	Lower middle	4028	44.9	1999	N/A	N/A	N/A	N/A	N/A
Sri Lanka	Lower middle	3626	49.6	1996/1997	0.86	10.00	31.00	47.00	12.00
Taiwan	High	14283	30.2	2000	N/A	10.89	27.71	23.14	38.26
Thailand	Lower middle	6280	32.7	2000	34.93	26.15	56.17	17.68	0.00
Vietnam[a,f]	Low	2012	80.5	1998	37.25	8.40	2.58	87.98	1.04
						32.35	21.07	36.99	9.59

Notes: Year 2000 GDP per capita in US$ at purchasing power parity (PPP) exchange rates are from World Development Indicators (World Bank), except Taiwan from World Economic Outlook (IMF). Out-of-pocket (OOP) payments as % of total expenditure on health (TEH) from National Health Accounts estimates unless stated otherwise below. Year, in parentheses, is closest available to the survey year used in the analysis. Shares of OOP spending by sector and type of care are computed from the survey data. N/A – not available since survey gives aggregate OOP spending on all care only.
[a]In top row, shares of OOP spent on inpatient and ambulatory care do not include payments for medicines prescribed on receipt of care, which are included in medicines column. In bottom row, payments for prescribed medicines included with the respective inpatient/ambulatory care and 'medicines' column includes self-medication only.
[b]OOP as % of TEH is estimate from World Health Report 2002, WHO. Public care % from 1995 to 96 Health Survey. Remainder from 1999 to 2000 National Sample Survey. % for medicines may be overestimated due to difficulty of distinguishing doctor charges from medicines in data.
[c]Share of OOP on public care from Kyrgyz Treasury data. Share of medicines includes payments for medicines prescribed through ambulatory care only.
[d]OOP as % of THE is from World Health Report 2002, WHO.
[e]OOP as % of TEH from (Hotchkiss et al., 1998).
[f]OOP as % of TEH from (World Bank, 2001). World Health Report 2002, gives a figure of 65.6%.

total expenditure on health (Table I). Poorer countries rely more heavily on direct payments. The OOP contribution reaches three-quarters or more of total expenditure on health (THE) in Nepal, India and Vietnam. OOP financing has been reduced in Hong Kong, Malaysia and Thailand by greater reliance on taxation and in Taiwan and South Korea through the development of universal social insurance. In Korea, heavy use of co-payments means that one half of TEH is still financed directly out-of-pocket.

Our analysis is based on OOP payments reported in household expenditure or socio-economic surveys. Details of the surveys are given in Table AI of Appendix A. OOP payments include fees, insurance co-payments, user charges for public care and purchases of medicines, appliances, diagnostic tests, etc (see Table III). Expenditures on both Western and traditional care are included. The shares of total OOP payments that are for public sector care and the percentages of the total on inpatient, ambulatory, medicines and other types of care are given in Table I. In some cases it is not possible to make this disaggregation since the survey asks only for total OOP payments for health care.

In Bangladesh and Sri Lanka, only a tiny fraction of OOP payments are for care delivered in the public sector. In Sri Lanka, care in the public sector is free, with the rather peculiar exception of family planning (Table II). In Bangladesh, most primary care is free and there is only a nominal registration charge for inpatient and outpatient care in secondary facilities. There are charges for inpatient care at major public hospitals but the poor and civil servants are exempt (Table II). In principle, medicines are free within facilities but in practice most medicines must be purchased from drug outlets. This, in addition to the widespread use of unqualified providers of modern and traditional medicine, accounts for the low share of total OOP payments that is for public sector care in Bangladesh (Data International Ltd., 2004). Public sector charges constitute a very modest share of total OOP payments in Hong Kong, where charges are made for inpatient and outpatient care but at a very moderate level and with exemptions for the poor, civil servants and health service staff (Table II). Malaysia is similar but with less exemptions for the poor. By contrast, payments for care received in the public sector account for around a quarter of total OOP payments in India and Indonesia and more than a third in Thailand and Vietnam and more than two-fifths in Kyrgyz (Table I).[1] There are user charges for virtually all public sector medical care and medicines in Indonesia. This is also the case in Thailand but since the 2001 universal coverage reform there has been a flat charge equivalent to around 70 US cents per day. Charges are levied for all public sector care in Vietnam, with the exception of outpatient care at health centres (Table II). In India, primary care delivered at some or all facilities is free, at least in principle. The same is true in Kyrgyz and the Philippines and there is a 60% subsidy for care at health posts and primary care centres in Nepal. There are no charges for vaccinations, immunisations and family planning services in Bangladesh, China, India, Malaysia, Nepal, Taiwan and Thailand. Consultations with hospital specialists are free only in India and Kyrgyz.

Exemptions of the poor from public sector user charges and co-payments in Bangladesh, Hong Kong, Indonesia, Malaysia, Nepal, the Philippines, Taiwan, Thailand and Vietnam may reduce the impoverishing effect of such charges. But this depends upon the implementation of fee waivers. There are known problems with implementation in Bangladesh, Nepal, and the Philippines, often because shortage of medicines means that they must be paid for. In Indonesia and Thailand, charges are levied on most medical services but effective health card systems help to shield the poor (Khoman, 1997; Saadah *et al.*, 2001). In India, subsidisation of the poor works indirectly, through price discrimination. The poor can opt for lower quality but cheaper inpatient care on separate wards. This arrangement also operates in Indonesia. Informally, the poor or those considered unable to pay are likely to be exempted from charges in parts of India, Sri Lanka and Thailand. Kyrgyz and Thailand exempt both children and the elderly from charges. The elderly are exempt in the Philippines and pay a reduced co-payment in Korea.

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[1] Payments for medicines prescribed at public sector facilities are included.

Table II. User charges for public sector care and co-payments for care covered by Social Health Insurance

	Charged services	Free services	Income/poverty related fee waivers	Non-poor groups exempt from charges
Bangladesh	Secondary services (nominal registration fee for inpatient/outpatient); Inpatient care in major hospitals	Most primary care (/local services); medicines within facility; immunisation; some reproductive health-care	Poor exempt or pay lower charge	Civil servants (selected services)
China	Inpatient (incl. medicines); Outpatient (incl. medicines)	Vaccination; immunisation; family planning	None	Old Red Army soldiers and Retirees
Hong Kong SAR	Inpatient (incl. medicines); outpatient (incl. medicines); dental	accident and emergency (until December 2002)	Welfare recipients exempt	Civil servants and dependents (reduced rate for IP); hospital staff and dependents
India	Inpatient bed charge; outpatient registration charge; certain medicines; tests/X-rays; dental	Hospital consultation and certain medicines. Primary care/health centre/polyclinic consultation and medicines. Family planning. Vaccinations and immunisations.	None formally. Indirect relation to income through price differentiation in inpatient care. Informally, 'poor' can be exempted partially or fully from charges	Civil servants
Indonesia	All medical care and medicines	None	Poor exempt from all charges. Indirect relation of inpatient charges to income through price discrimination	Charges determined at local government level. Some better-off local govts. provide free health centre care
Korea Rep.	All medical care and medicines. Co-payments under SHI are 20% (to limit) for inpatient and 30–55% for outpatient depending on institution. In addition, some services are not covered by SHI and paid for OOP. Sum of co-payment and OOP estimated at 40–50% for outpatient and 60–70% for inpatient care.	None	None. SHI premium is proportional to income but co-payments and charges not related to income	Elderly (>65 yrs.) pay half deductible for outpatient care from clinics
Kyrgyz Rep.	Consultations with specialist primary care (e.g., physiotherapy; psychotherapy). Dental care. Complex diagnostics. Family planning	GP consultation and prescribed medicines. Hospital care – IP, OP and medicines (payment for medicines may be requested). Certain diagnostics and X-ray. Vaccination and immunisation.	None	Children up to 18; pensioners; war veterans and dependents; disabled; pregnant women; those with state awards; military
Nepal	All medical care and medicines. Nominal charge for outpatient varying with facility	Emergency services; selected vaccines, immunisation and reproductive health services. 60% subsidy for medicines at Health Posts and Primary Care centres	Poor either exempt or pay reduced charge but not fully implemented	None
Malaysia	Hospital inpatient and outpatient. Primary care. Dental care. Diagnostics and X-rays	Family planning and vaccinations/immunisations. Outpatient ante and post natal care. Treatment of infectious diseases on 3rd class wards. Dental care for pregnant women and pre-school children	Hospital directors have discretion to waive fees for destitute. Upper limit on charges for 3rd class ward patients	Infants less than 1 year (outpatient). State rulers, Governors and families. Civil servants (incl. retired) and dependents. Local authority employees and dependents

Table II. *Continued*

	Charged services	Free services	Income/poverty related fee waivers	Non-poor groups exempt from charges
Philippines	Inpatient (incl. Medicines)	Consultation and medicines at primary care facilities and hospital out-patient (donations accepted). Shortages mean medicines often purchased privately.	Poor qualify as charity patients and exempted from hospital charges. Shortages mean medicines must often be purchased.	Elderly >60
Sri Lanka	Family planning services. Patients occasionally asked to buy medicines/supplies	All medical and medicines except family planning	When charges made, staff generally exempt the poor informally	None
Taiwan	All medical care and medicines. Fee schedule for outpatient care. For inpatient, co-payment of 10% (5% if chronic) if length-of-stay <30 days, rate increases thereafter	Family planning and vaccinations/ immunisations	Low income exempt from NHI co-payments	Residents of remote areas
Thailand	All medical care and medicines. After October 2001, fixed fee (30 Baht) scheme means very minimal co-payment	Non-personal health care; EPI vaccination	Poor exempted from user fees and co-payments. Informally, those 'unable to pay' are exempted	Children <12; elderly >60; public health volunteers; monks
Vietnam	Fees for most services introduced in 1989. Medicines rarely provided free of charge	Outpatient services at commune health centres	Fee exemptions for individuals who have certification of indigency from neighbourhood or village People's Committee	Families of health personnel, certain classes of patients (like handicapped, TB), orphans

Comparing shares of OOP payments for inpatient care, ambulatory care and medicines is difficult given differences across surveys in the categorisation of expenditures. For this reason, we do not attempt to compare catastrophic payments due to different categories of expenditure. Nonetheless, the estimates presented in Table I reveal some consistencies in the composition of OOP payments that deserve comment. There are also some cross-country differences that do not seem spurious but reflections of differences in environment and policy. In general, inpatient care does not absorb the largest share of OOP payments. More is spent out-of-pocket on ambulatory care and on medicines. If this were not the case, the catastrophic impact of OOP payments would be greater since they would be concentrated on a fewer number of households receiving inpatient care. South Korea is the one exception, where 40% of OOP payments are for inpatient care. This is to be expected given that social insurance covers only 30–40% of the costs of inpatient care (Table II). In contrast, there is 90–95% coverage of inpatient costs in Taiwan and, as a result, only 10% of OOP payments are for inpatient care.

The share of total OOP payments that goes on medicines is generally larger in the poorer, more rural countries. The share is 70% or more in Bangladesh, India and Vietnam. This is consistent with the greater prevalence of self-medication in poorer and particularly rural societies in which access to health services is constrained by income and distance (Chang and Trivedi, 2003). Self-medication, which often has little or no positive effect on health, is a recognised problem in South Asia (Mudur, 1999). Arguably, absorption of constrained household budgets by payments for medication is even more catastrophic when there is so little return in terms of health. But the entire OOP share attributed to medicines is not due to self-treatment. It includes medicines prescribed during treatment but purchased by the patient separately. In Bangladesh and Vietnam, the OOP shares on medicines are 70 and 88%, respectively, when all expenditures on medicines are included – those prescribed during treatment and not. When payments for prescribed medicines are included with the respective inpatient and ambulatory expenditures, the share of OOP spent on medicines, which is due to self-medication, is only 6.3% in Bangladesh and 37% in Vietnam. Nonetheless, spending on drugs, prescribed or not, generally accounts for a very large fraction of OOP payments. Drug pricing and charging policy, but also utilisation practices, deserve particular consideration in formulating policies to limit the impact of health care payments on household welfare.

HOUSEHOLD BUDGET SHARES OF OUT-OF-POCKET PAYMENTS

The incidence of catastrophic payments, defined as payments in excess of a threshold budget share, depends upon the location and dispersion of the distribution of OOP payments relative to household resources. Before presenting measures of catastrophic payments, we examine the OOP budget shares distributions. For low- and middle-income countries, the household budget is defined as the value of consumption, including that from home production (see Table III). For the high-income territories (Hong Kong, Taiwan and South Korea), the household budget is given by expenditure on market goods and services. Each survey contains detailed data on OOP payments for health care, covering at least payments for inpatient care, outpatient care and medicines (Table III). These data are potentially subject to both recall bias and small sample bias due to the infrequency with which some health care payments are made. Longer recall periods should reduce bias through infrequency of purchase but at the cost of increasing recall bias. Survey estimates of aggregate health care payments tend to show discrepancies from production-side estimates, where the latter are available. There also tend to be discrepancies, at times substantial, between estimates of total private expenditure obtained from surveys and from national accounts procedures (Deaton, 2004). In the present context, there is a problem if measurement error in OOP payments for health care differs substantially from that in other items of expenditure. It is very difficult to verify whether this is the case and there is little option but to rely on the expenditure survey estimates of the OOP budget share.

Table III. Variable definitions – Living standards and OOP health payments

| | Household living standards | | OOP health payments | |
	Concept[a]	Period[b]	Services covered	Recall Period[c]
Bangladesh	Consumption	1 year	Fees, hospital/clinic charges, medicines, test/investigation, transport, tips and other health service charges	1 month
China	Consumption	1 year	Inpatient, outpatient, medicines, etc.	1 year
Hong Kong SAR	Expenditure	1 month	Inpatient, outpatient, medicines, traditional medicine, dental, medical supplies/equipment, health supplement, other health care	Inpatient = 1 year; others = 2 weeks
India	Consumption	1 month	Fees, inpatient and outpatient hospital charges, medicines, tests, abortion, ambulance charge	Inpatient = 1 year; others = 1 month
Indonesia	Consumption	1 month	Inpatient, outpatient, medicines/self-medication	Inpatient = 1 year; others = 1 month
Korea Rep.	Expenditure	1 month	Inpatient, outpatient, medicines, dental, medical supplies/equipment, tests	1 month
Kyrgyz Rep.	Expenditure	1 year	Inpatient, outpatient, medicines	Inpatient = 1 year; others = 1 month
Malaysia	Consumption	1 year	Inpatient, outpatient (western and traditional), medicines, dental, medical supplies/equipment, tests	1 month
Nepal	Consumption	1 year	Fees (western and traditional), medicines (western and traditional), hospital expenses, tests	1 month
Philippines	Consumption	1 year	Fees, hospital charges; medical and dental charges; medicines; other medical goods and supplies	6 months
Sri Lanka	Consumption	1 year	Fees, hospital charges, medicines, tests, spectacles, dental, homeopathy and acupuncture, charms and others	1 month
Taiwan	Expenditure	1 year	Inpatient, outpatient, medicines, medical equipment, dental, nursing home, tests, traditional medicines, medical supplies	1 year
Thailand	Consumption	1 month	Inpatient, outpatient, medicines, self-medication, traditional medicine	Inpatient = 1 year; others = 1 month
Vietnam	Consumption	1 year	Inpatient care costs plus total other amount paid in money and in-kind for diagnosing and treating illness and injury	1 year

[a] Consumption includes the value of goods consumed from household production and where feasible the use value of durables and implicit rental value of housing. Expenditure is the value of goods purchased for consumption.
[b] Expenditures on different items are reported for different recall periods. The period given is the one for which total consumption/expenditure is computed.
[c] All OOP payments are scaled to the same period used to compute total consumption/expenditure.

There is substantial variation across territories in the mean OOP budget share (Table IV). Averaged across all households, OOP payments for health care absorb 4–5.5% of total household consumption in China, India, Bangladesh and Vietnam. All four of these countries rely on OOP payments for at least 60% of health financing. With the exception of (urban) China, they are among the poorest countries examined here. Associated with poverty, population health deficiencies drive up expenditures on health care and medicines. The mean OOP budget share is much lower – 1.4–2.7% – in Malaysia, Thailand, Indonesia, the Philippines, Sri Lanka, Hong Kong, Kyrgyz and Nepal. With the exceptions of Indonesia, Kyrgyz and Nepal, these countries are less poor than the first group and rely less heavily on OOP financing. The low mean OOP budget shares in Indonesia and Nepal, despite their heavy reliance on OOP financing, indicate low aggregate levels of spending on health care. This reflects the severity of poverty and the prioritisation of subsistence needs. In the two high-income territories operating a social insurance model with co-payments – Korea and Taiwan – the mean OOP budget share is in the middle of the range, around 3.8%. The lower average budget share in Hong Kong (2.3%) is understandable given its higher levels of income and population health and, in comparison with Korea, its lower reliance on OOP financing.

Within each territory, there is a great deal of variation in the OOP budget share across households, suggesting that OOP payments are highly unpredictable. With the exceptions of India, Kyrgyz, Taiwan and Vietnam, the standard deviation of the share is at least 1.9 times the mean. This coefficient of variation is greatest in the four countries with the smallest mean shares – Malaysia, Thailand, Indonesia and the Philippines. The distributions are all highly right-skewed with the mean twice the median or more in all cases but for Taiwan, China and Vietnam. Using the median as measure of central tendency, Taiwan is among the territories with the highest OOP budget shares. This, together with the relatively limited variance and skewness in Taiwan, is explained by high rates of utilisation (O'Donnell et al., 2005), extensive co-payments for most services but high insurance coverage of inpatient care. It is less clear why the distribution is relatively dense in Vietnam. A possible explanation is that the extensive practice of self-medication gives rise to consistently high OOP payments (Chang and Trivedi 2003).

With the exceptions of China and Taiwan, concentration indices of OOP budget shares are positive, indicating that the better-off spend a larger fraction of their resources on health care. This can also be observed in the quintile specific means of the OOP budget share. The gradient is steepest in Bangladesh, the Philippines, Indonesia and India. In Bangladesh, the richest fifth of households, on average, spend almost 9% of the household budget on health care, while the poorest fifth spend less than 3%. Bangladesh, India and Indonesia are among the poorest countries included in the study. The most plausible explanation of the steep income gradients in these countries is that the better-off can respond to health problems with the purchase of medical care and medicines, while the poorest of the poor cannot afford to divert resources from other pressing demands on very constrained budgets. However, one should not overlook the fact that the poorest households in Bangladesh – a very poor country – spend a larger fraction of their available resources on health care than the richest households in high-income Hong Kong. This is explained by the tremendous differences in population health and insurance coverage. China and Vietnam are similar to Bangladesh and India in having a high mean OOP budget share but differ in that the distribution does not display a steep income gradient. In China, the rich actually spend relatively less out-of-pocket on health care. A consequence, one might suppose, of the lack of any fee exemptions for the poor, the collapse of collective payment schemes in rural areas and the greater health insurance cover enjoyed by the better-off, urban population (Henderson et al., 1995; Bloom and Gu, 1997; Carrin et al., 1997; Akin et al., 2004). Fee waivers exist in Vietnam but, at the time of the survey, were restricted to the indigent identified by village committees (Table II). Hong Kong appears to shield the poor better from charges than the social insurance systems of Korea and Taiwan.

Our finding that the OOP budget share is most often increasing with the household budget is inconsistent with the common assertion that the poor spend proportionately more out-of-pocket on health care in low-income countries (Whitehead et al., 2001). The evidence cited to support this

Table IV. OOP payments for health care as a percentage of household consumption (/expenditure)

	Bangladesh	China	Hong Kong	India	Indonesia	Korea Rep.	Kyrgyz Rep.	Malaysia	Nepal	Philippines	Sri Lanka	Taiwan	Thailand	Vietnam
OOP payments as percentage of total household consumption (/expenditure)														
Mean	5.10	4.11	2.29	4.84	1.83	3.83	2.40	1.37	2.77	1.94	2.11	3.74	1.71	5.49
Coefficient of variation	1.92	1.97	2.38	1.59	2.93	1.96	1.81	2.47	2.28	2.66	1.95	1.27	2.46	1.32
Median	1.15	2.33	0.17	2.17	0.00		0.60	0.18	1.15	0.41	0.91	2.35	0.40	2.94
Concentration index	0.2414	-0.0357	0.0480	0.1600	0.1618	0.0037	0.0986	0.1301	0.0781	0.1951	0.1117	-0.0467	0.1082	0.0270
Quintile means														
Poorest 20%	2.94	4.57	1.87	3.30	1.23	4.15	1.77	1.11	2.44	1.19	1.64	4.25	1.25	4.86
2nd poorest	3.17	5.27	2.27	4.41	1.46	3.42	1.96	1.10	2.71	1.60	1.82	3.85	1.48	5.44
middle	4.55	5.39	2.25	5.23	1.69	3.61	2.59	1.14	2.90	1.84	2.00	3.68	1.71	5.74
2nd richest	5.98	4.59	2.15	6.16	2.11	3.89	2.93	1.48	2.86	2.18	2.21	3.52	2.02	5.85
Richest 20%	8.86	3.45	2.67	6.48	2.69	4.08	2.77	2.00	3.64	2.93	2.86	3.38	2.07	5.57
OOP payments as percentage of household non-food consumption (/expenditure)														
Mean	10.66	5.92	3.36	10.72	4.18	5.31	7.48	2.13	9.15	4.18	5.32	4.63	2.93	12.64
Coefficient of variation	1.55	2.18	2.25	1.31	2.39	1.84	1.55	2.24	2.41	2.16	1.56	1.25	2.29	1.09
Median	3.20	5.26	0.24	5.76	0.00		1.88	0.28	4.08	1.03	2.47	2.89	0.71	7.31
Concentration index	0.1608	-0.1851	-0.0125	0.0870	0.0697	-0.0457	0.0783	0.0763	-0.0464	0.0773	0.0074	-0.0969	0.0166	-0.0536

Note: If sample weights exist, they are applied in computation of all statistics to give population estimates.

assertion is not from nationally representative expenditure surveys but from health surveys conducted in one, usually rural, region (Ensor and Pham, 1996; Pannarunothai and Mills, 1997; Fabricant et al., 1999; Segall et al., 2002).[2] Such surveys ignore payments made by the better-off urban population and do not measure total household resources as accurately as expenditure surveys, often relying on income, which, particularly for poor households, is less indicative of living standards in developing countries than is consumption. Support for our finding that the OOP budget share typically increases with total household consumption is provided by a study of India that is based on nationally representative expenditure survey data (Peters et al., 2001).

The relationship between the OOP budget share and the size of the budget will be biased in a positive direction, however, if health care is financed from savings, credit or the sale of assets rather than from the sacrifice of current consumption. In that case, the total expenditure of households spending heavily on health care will be temporarily raised above permanent income. They appear better-off than they actually are.

Besides the endogeneity of total consumption, the tendency for the OOP budget share to rise with the size of the household budget may reflect the fact that poor households devote the larger part of available resources to covering subsistence expenses on food and shelter. The disruptive effect of OOP payments on the living standards of the poor might be better assessed through their share of household resources net of non-discretionary expenses. Definition of the latter is obviously problematic. Non-food expenditures are an approximation (Wagstaff and Van Doorslaer, 2003). The mean share of OOP payments in household non-food expenditures is presented in the bottom part of Table III. The differences between the OOP shares of total and of non-food expenditures are greater in the poorer countries, reflecting the greater share of resources devoted to food. The OOP share remains highest in Bangladesh, India and Vietnam, with 10.6–12.6% of non-food expenditures spent on health care. In Kyrgyz and Nepal, both of which are very poor, the ratio of OOP payments to total expenditure is relatively moderate but the OOP share of non-food expenditure is very high. The relative position of China moves in the opposite direction, reflecting its higher level of income. The switch in denominator results in a consistent fall in the value of concentration indices. This is to be expected given that the item removed from the denominator – food – is a necessity. Six of the indices are now negative, indicating that the OOP share of non-food expenditure falls as the level of non-food expenditure rises. This relationship is particularly strong in China.

CATASTROPHIC PAYMENTS

Reliance on OOP financing leaves households exposed to the risk of incurring high medical expenses should a household member fall ill. If the health care expenses were large relative to household resources, the disruption to material living standards could be substantial and may be considered catastrophic. Ideally, longitudinal data would be used to estimate the extent to which living standards are seriously disrupted by the purchase of medical care in response to illness shocks. This would allow one to identify how spending on non-medical goods and services changes following some health shock (Gertler and Gruber, 2002). But appropriate panel data are not available for all countries included in this study. An approximation to the disruptive effect of health expenditures on material living standards must be made. We follow a number of authors in defining medical spending as 'catastrophic' if it exceeds some fraction of total household resources (Berki, 1986; Wyszewianski, 1986; Wagstaff and Van Doorslaer, 2003; Xu et al., 2003; Russell, 2004). The idea is that spending a large fraction of the household budget on health care must be at the expense of consumption of other goods and services. This opportunity cost may be incurred in the short term, if health care is financed by cutting back on

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[2] See also unpublished reports cited by (Fabricant et al., 1999), that are also usually specific to one rural region.

current consumption, or in the long-term, if it is financed through savings, the sale of assets or credit.[3] The welfare loss from the sacrifice of current consumption will be greater. But long-term consequences could also be severe. For example, if depleted savings or assets are not sufficient to meet subsequent economic shocks, or if the household sinks into a spiral of debt. The health payments budget share alone does not tell us what financing strategy has been adopted and therefore does not allow distinction between short and long term effects.

Approximating the catastrophic economic consequences of illness through high health payments budget shares has a number of limitations. First, it identifies only the households that incur catastrophic medical expenditures and ignores those that cannot meet these expenses and so forgo treatment. Through the subsequent deterioration of health, such households probably suffer a greater loss of welfare than those incurring catastrophic payments. Recognising this, Pradhan and Prescott (2002) attempt to estimate exposure to, rather than incurrence of, catastrophic payments. Second, there is no distinction between types of medical care purchased. A wealthy household with the capacity to spend a large fraction of its budget on cosmetic surgery would not usually be considered to have experienced a catastrophe, but it would be considered catastrophic for a poor household to spend the same fraction on essential medicines for a sick child. However, in low-income settings in particular, little medical care consumption would be considered frivolous. Below, we present estimates of catastrophic payments that differentially weight large health budget shares incurred by the rich and the poor. Third, the choice of the threshold budget share above which health payments are considered catastrophic is obviously subjective. A common choice has been 10% of total expenditure (Pradhan and Prescott, 2002; Ranson, 2002; Wagstaff and Van Doorslaer, 2003); with the rationale that this represents an approximate threshold at which the household is forced to sacrifice other basic needs, sell productive assets, incur debt, or be impoverished (Russell, 2004). Here we consider a range of thresholds defined with respect to both total consumption and non-food consumption. As argued above, use of the latter might be more appropriate to assess the disruptive effect of OOP payments on the living standards of the poor.[4] Notwithstanding these limitations, most households that spend a substantial fraction of their budget on health care can be expected to experience a disruption to their material living standards. Such spending may therefore be used as a proxy to part of the catastrophic economic consequences of illness.

In Table V, we present the *catastrophic payment headcount* (H_C) – the percentage of households incurring catastrophic payments (Wagstaff and Van Doorslaer, 2003). Let T_i be OOP payments of household i, x_i be household consumption (total or non-food), z be the threshold budget share and E_i be an indicator equal to 1 if $T_i/x_i > z$ and zero otherwise. Then, $H_c = \left(\sum_{i-1}^{n} E_i/n \right) \times 100$, where n is the sample size. The headcount necessarily falls as the threshold is raised. For example, 28% of Bangladeshi households spend in excess of 5% of the total household budget on health care and a substantial 4.5% spend in excess of a quarter of the budget on health care.[5] Changing the threshold does not affect substantially the countries that have the highest/lowest incidence of catastrophic payments (Figure 1). Catastrophic payments are most prevalent in Bangladesh,

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[3] For evidence on strategies households adopt to finance medical expenditures see (Ensor and Pham, 1996; Sauerbron *et al.*, 1996; Wilkes *et al.*, 1998; Peters *et al.*, 2001; Skarbinski *et al.*, 2002; van Damme, 2004; Bonu *et al.*, 2005).
[4] Researchers at the World Health Organisation (Xu *et al.*, 2003) set the threshold at 40% of *capacity to pay,* defined as *non-subsistence effective income.* This is household expenditure net of the estimated cost of subsistence food needs. Subsistence spending on food is defined as the average food expenditure of households in the 45th-50th percentile of the food budget share distribution. Since the food budget share is declining with the total budget, this will roughly correspond to the food expenditure of those with median welfare (taking food share a money metric indicator of utility). Actual food expenditure is used for those spending less than this value. We prefer to avoid the problem of estimating subsistence food needs and keep the analysis more transparent by referring to OOP as a share of total and of non-food expenditure.
[5] We have computed standard errors for all point estimates but do not give them in the tables. With large samples, the simple parameters of interest are estimated with a high degree of precision. Presentation of standard errors would clutter the tables to little advantage.

Table V. Percentage of households incurring catastrophic payments for health care

	Threshold	OOP payments as share of total household expenditure				OOP payments as share of non-food expenditure		
		5%	10%	15%	25%	15%	25%	40%
BANGLADESH	Headcount (H_C)	27.63%	15.57%	9.87%	4.49%	24.55%	14.73%	7.13%
	Concentration index (C_E)	0.1821	0.2332	0.2797	0.391	0.2123	0.3145	0.458
	Rank weighted headcount (H_C^W)	22.60%	11.94%	7.11%	2.73%	19.33%	10.10%	3.86%
CHINA	Headcount (H_C)	28.37%	12.61%	7.01%	2.80%	21.05%	11.23%	4.81%
	Concentration index (C_E)	0.0103	−0.0078	0.0293	0.1597	−0.1147	−0.1202	−0.0334
	Rank weighted headcount	28.08%	12.71%	6.80%	2.36%	23.47%	12.58%	4.98%
HONG KONG	Headcount (H_C)	12.98%	5.86%	3.04%	1.09%	5.86%	2.46%	0.86%
	Concentration index (C_E)	0.0168	−0.0019	0.0935	0.1676	−0.0590	−0.0050	0.0875
	Rank weighted headcount	12.76%	5.87%	2.76%	0.91%	6.20%	2.47%	0.78%
INDIA	Headcount (H_C)	25.59%	10.84%	5.52%	1.83%	20.92%	9.76%	3.44%
	Concentration index (C_E)	0.0722	0.0915	0.1425	0.2780	0.0623	0.1213	0.2601
	Rank weighted headcount	23.74%	9.85%	4.73%	1.32%	19.62%	8.57%	2.54%
INDONESIA	Headcount (H_C)	9.57%	4.43%	2.59%	1.13%	8.28%	4.40%	1.95%
	Concentration index (C_E)	0.0978	0.2001	0.3006	0.4777	0.0822	0.1828	0.3590
	Rank weighted headcount	8.63%	3.54%	1.81%	0.59%	7.60%	3.60%	1.25%
KOREA REP.	Headcount (H_C)	20.94%	10.36%	6.11%	2.56%	9.79%	4.82%	1.85%
	Concentration index (C_E)	−0.0453	−0.0244	0.0011	0.0956	−0.0640	−0.0195	0.0860
	Rank weighted headcount	21.89%	10.61%	6.10%	2.32%	10.42%	4.91%	1.69%
KYRGYZ REP.	Headcount (H_C)	15.53%	5.84%	2.30%	0.50%	18.05%	9.29%	2.64%
	Concentration index (C_E)	0.1720	0.2097	0.2372	0.2372	0.1035	0.1210	0.1916
	Rank weighted headcount (H_C^W)	12.86%	4.62%	1.75%	0.38%	16.18%	8.16%	2.13%
MALAYSIA	Headcount (H_C)	6.62%	2.01%	0.98%	0.36%	2.48%	0.78%	0.21%
	Concentration index (C_E)	0.0562	0.1633	0.3018	0.5238	0.0491	0.2123	0.5742
	Rank weighted headcount	6.25%	1.68%	0.68%	0.17%	2.36%	0.61%	0.09%
NEPAL	Headcount (H_C)	14.72%	5.90%	3.09%	1.18%	17.12%	9.24%	4.57%
	Concentration index (C_E)	0.1039	0.0320	0.0963	0.2193	−0.0743	−0.1125	−0.1415
	Rank weighted headcount	13.19%	5.71%	2.79%	0.92%	18.39%	10.28%	5.21%
PHILIPPINES	Headcount (H_C)	9.21%	4.60%	2.68%	1.14%	7.23%	3.81%	1.58%
	Concentration index (C_E)	0.1529	0.1952	0.2404	0.3755	0.1093	0.1526	0.2593
	Rank weighted headcount	7.80%	3.70%	2.04%	0.71%	6.44%	3.23%	1.17%

Table V. *Continued*

| Threshold	OOP payments as share of total household expenditure				OOP payments as share of non-food expenditure		
	5%	10%	15%	25%	15%	25%	40%
SRI LANKA							
Headcount (H_C)	10.97%	2.98%	1.54%	0.47%	9.32%	3.40%	1.31%
Concentration index (C_E)	0.1240	0.2368	0.3217	0.4845	−0.0549	−0.0207	−0.1036
Rank weighted headcount	9.61%	2.27%	1.05%	0.24%	9.83%	3.47%	1.44%
TAIWAN							
Headcount (H_C)	19.14%	6.35%	2.79%	0.87%	4.47%	1.49%	0.41%
Concentration index (C_E)	−0.0124	−0.0245	−0.0534	−0.0872	−0.0347	−0.0738	−0.02328
Rank weighted headcount	19.38%	6.50%	2.94%	0.95%	4.63%	1.60%	0.42%
THAILAND							
Headcount (H_C)	8.43%	3.52%	1.92%	0.80%	4.54%	1.83%	0.71%
Concentration index (C_E)	0.1230	0.2043	0.2693	0.3916	0.0566	0.1793	0.2002
Rank weighted headcount	7.39%	2.80%	1.41%	0.49%	4.28%	1.50%	0.57%
VIETNAM							
Headcount (H_C)	33.77%	15.11%	8.47%	2.89%	29.37%	15.10%	5.97%
Concentration index (C_E)	−0.0315	0.0270	0.0971	0.2955	−0.1299	−0.1020	−0.0116
Rank weighted headcount	34.84%	14.70%	7.65%	2.03%	33.19%	16.64%	6.04%
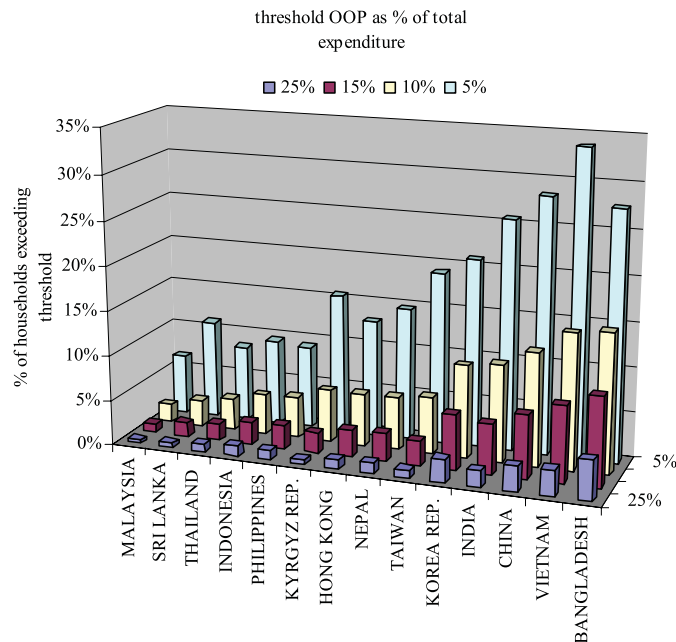
Figure 1. Percentage of households incurring catastrophic payments – various thresholds for OOP
as % of total expenditure

Vietnam, China and India. Vietnam has a higher proportion of households than Bangladesh spending in excess of 5% of the budget on health care but the ordering is reversed at all higher threshold values. At the lower threshold value of 5%, Korea is close to Taiwan, with around 20% of households spending in excess of this threshold. But at higher thresholds, Korea is closer to the high incidence group and actually has a higher proportion of households than India, spending in excess of 15% and even 25% of the budget. In fact, direct payments for health care absorb in excess of 25% of total expenditure in a remarkable 2.5% of Korean households. This reflects the very extensive use of co-payments, the non-coverage of many treatments and, in particular, the partial coverage of expensive inpatient care provided by the Korean social insurance system. By contrast, in Taiwan protection against very high OOP expenditures is similar to that in tax-financed Hong Kong. The incidence of catastrophic payments is lowest in Malaysia, Sri Lanka, Thailand, Indonesia and the Philippines, with less than 5% of households spending more than 10% of total expenditures on health care.

  Table V also provides the catastrophic payments headcount defined at 15, 25 and 40% of non-food expenditures. Bangladesh, China, India and Vietnam continue to have the highest incidence of catastrophic payments. Comparing the headcounts defined at 25% of non-food expenditure with those at 10% of total expenditure, which are broadly similar in magnitude on average, we see that there are some significant re-rankings of the other countries (Figure 2). In particular, Kyrgyz and Nepal now join the other low-income countries in having a high proportion of households spending in excess of 25% of non-food expenditure. The degree of poverty in Kyrgyz and Nepal means that food absorbs a very large share of the household budget and the share of total resources that can be devoted to health care is limited. Once basic food needs have been met, health care accounts for a large fraction of the remaining resources for a substantial fraction of the population. The high-income territories shift down the ranking. Korea is no longer amongst the countries with the highest incidence and Taiwan now has the
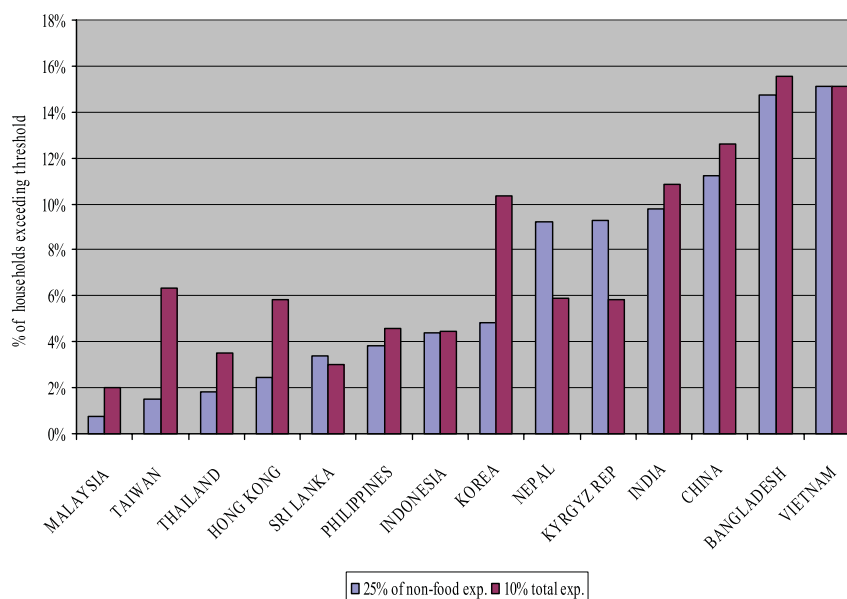
Figure 2. Incidence of catastrophic payments defined relative to total and to non-food expenditures

second lowest incidence. The grouping of territories by prevalence remains constant irrespective of the threshold of non-food expenditure share used.[6]

The incidence of catastrophic payments should be higher where health spending is larger as a share of national income and there is greater reliance on OOP financing of health care. It will also be increasing with the variance and the density of the right-hand tail of the OOP payments distribution. Figure 3 confirms, as has been demonstrated previously (Xu *et al.*, 2003), that countries relying most on OOP financing generally have the greatest incidence of catastrophic payments. Of course, reliance on OOP financing is negatively correlated with national income and so there is a negative relationship between the incidence of catastrophic payments and national income. India and Nepal appear to have a lower incidence, given their level of reliance on OOP financing, than Bangladesh and Vietnam. In part, this is due to differences in the magnitude of health spending. The mean health payments budget share is lower in Nepal than in both Vietnam and Bangladesh and is lower in India than in Vietnam (Table V). The incidence is lower in India than in Bangladesh not because mean spending is lower but because the OOP budget share distribution displays less variance and right skewness (Table V). While China relies on OOP financing only slightly more than Indonesia, the prevalence of catastrophic payments is much higher in China than Indonesia. This is due to the greater propensity to spend on medicine in China (Table V). There is also some evidence that social protection is effective in reducing exposure to catastrophic health payment risks in Indonesia (Pradhan and Prescott, 2002).

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[6] There are some apparent inconsistencies between our estimates of the catastrophic payment headcount at 40% of non-food expenditure and those of Xu *et al.* (2003) at 40% of capacity to pay. The respective figures are as follows, with the Xu *et al* estimates in parentheses: Bangladesh – 7.13% (1.21%); Indonesia – 1.95% (1.26%); South Korea – 1.85% (1.73%); Kyrgyz – 2.64% (0.62%); Philippines – 1.58% (0.78%); Sri Lanka – 1.31% (1.25%); Thailand – 0.71% (0.80%); Vietnam – 5.97% (10.45%). Since Xu *et al* define capacity to pay as the smaller of estimated subsistence food needs and actual food expenditure, our estimates should always be greater than theirs. Clearly this does not hold for Vietnam and, to a lesser extent, Thailand. Our estimates of the headcount are, in a relative sense, much higher for Bangladesh and the Philippines.
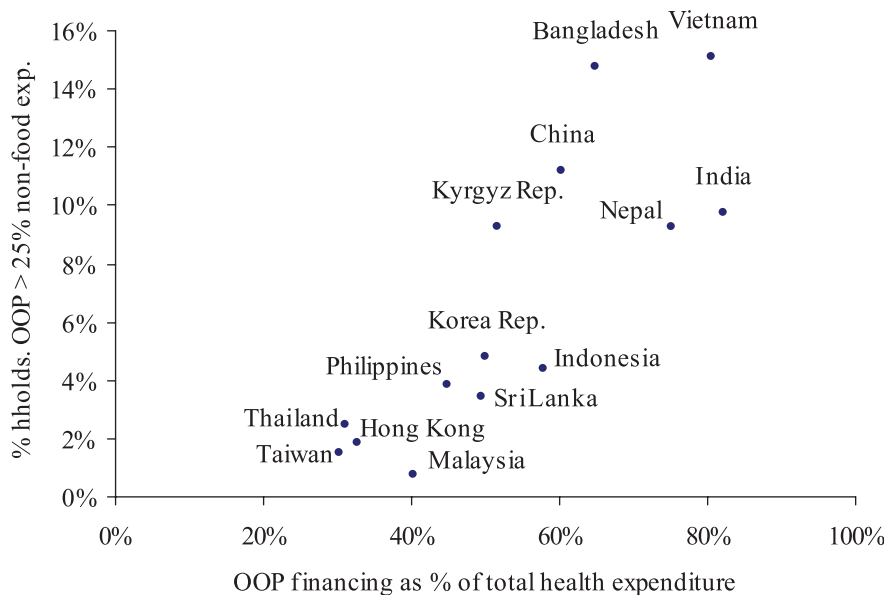
Figure 3. Catastrophic headcount against OOP financing share (OOP > 25% of non-food exp)

The correlation of catastrophic payments indicator (E_i) with household rank in the distribution of living standards is reflected in the concentration indices (C_E) presented in Table V (Wagstaff and Van Doorslaer, 2003). A positive index means incidence is rising with household living standards. Using total consumption as the measure of living standards and the reference for catastrophic payments, incidence is generally increasing with living standards. The better-off are more likely to spend large fractions of total consumption on health care. The strength of the correlation increases as the threshold is raised. This is consistent with health care being a luxury good, although we should be careful in placing an income elasticity interpretation on a bivariate relationship. Switching to non-food consumption gives smaller concentration indices that are more often negative. This is to be expected given food expenditures are a larger share of the budget of poorer households.

There is cross-country variation in the correlation between the incidence of catastrophic payments and living standards that seems to be attributable to differences in national income, financing structure and user charging policy. Figure 4 shows the concentration indices for the catastrophic headcount defined at 10% of total consumption. In the higher-income countries, there is either no correlation or the poor are more likely to incur catastrophic payments. Only in Taiwan are the poor more likely to spend in excess of 15% of total expenditure on health care (Table V). Catastrophic payments are made disproportionately by the better-off in Malaysia, Philippines, Indonesia, Thailand, Kyrgyz, Bangladesh and Sri Lanka. In each of these countries, with the exception of Kyrgyz and to a lesser extent Malaysia, the poor are exempted from public sector user charges where they exist (Table II). This is not the case in China and Vietnam, where there is a high incidence of catastrophic payments that the poor are no less likely to incur.

If one wishes to place a normative interpretation on catastrophic payments, then it may be considered appropriate to give more weight to excess payments incurred by poorer households. Large expenditures on health care that are incurred by better-off households at the cost of expendable consumption may be judged quite differently from payments made by poor households that are forced to cut back on consumption of basic necessities. A statistic that reflects not only the incidence but also the distribution of catastrophic payments is computed by multiplying the catastrophic headcount by the complement of
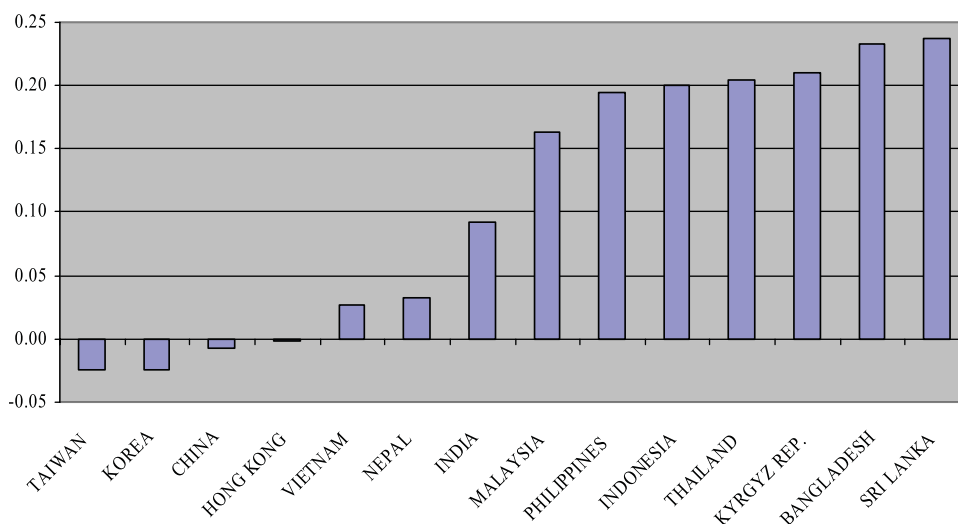
Figure 4. Concentration indices for catastrophic headcount (OOP > 10% total exp)

its concentration index, $H_C^W = H_C \cdot (1 - C_E)$ (Wagstaff and Van Doorslaer, 2003). This statistic is equivalent to a weighted sum of a catastrophic payment indicator variable, E_i, with weights declining linearly from 2 to 0 as one moves from the worst-off to the best-off household.[7] If households exceeding the threshold tend to be better-off, the concentration index C_E will be positive, and H_C^W will be less than H_C. This is generally the case, with the opposite arising consistently only in Taiwan and, occasionally, depending on the threshold, in China, South Korea and Vietnam (Table V). But the difference between the weighted and unweighted indices is generally modest (Figure 5). Taking account of the distribution has relatively little impact on the cross-country picture. Given the high concentration of catastrophic payments on the better-off in Bangladesh, its weighted incidence moves down relative to that of China and Vietnam.

   The headcount gives the incidence and not the intensity of catastrophic payments. Intensity may be measured by the payment in excess of the threshold averaged over all households exceeding the threshold – the *mean positive overshoot* (MPO) (Wagstaff and Van Doorslaer, 2003). Define a household's excess payment, or threshold overshoot, by $O_i = E_i((T_i/x_i) - z)$. Then, MPO $= \sum_{i=1}^{n} O_i / \sum_{i=1}^{n} E_i$. Both the prevalence and intensity of catastrophic payments are reflected in the *mean catastrophic payment overshoot* (O) – payments in excess of the threshold average over *all households*. We can write $O = H_c \times$ MPO, making clear that the mean overshoot is increasing with both the incidence and the intensity of catastrophic payments.

   Since the majority do not incur catastrophic payments, the mean overshoot (O) is dominated by the incidence. It is not surprising, therefore, that the overshoot statistics presented in Figure 6 display the same general pattern across countries as the headcount statistics (see also Table VI). There are, however, a few notable exceptions. Defining catastrophic payments at 25% of non-food expenditure, Nepal has the highest mean overshoot (Figure 6), although it had only the fifth highest incidence (Figure 2), implying a very high intensity of catastrophic payments. Amongst those spending more than

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[7] Such weighting obviously introduces normative judgements with respect to relative societal tolerance of catastrophic payments incurred at different points in the income distribution. This is inevitable in any attempt to summarise both the level and the distribution of some variable in one statistic. Without wishing to claim that the specific weighting scheme adopted reflects a social consensus, we suggest that the majority would wish to place more weight on catastrophic payments incurred by poorer households.
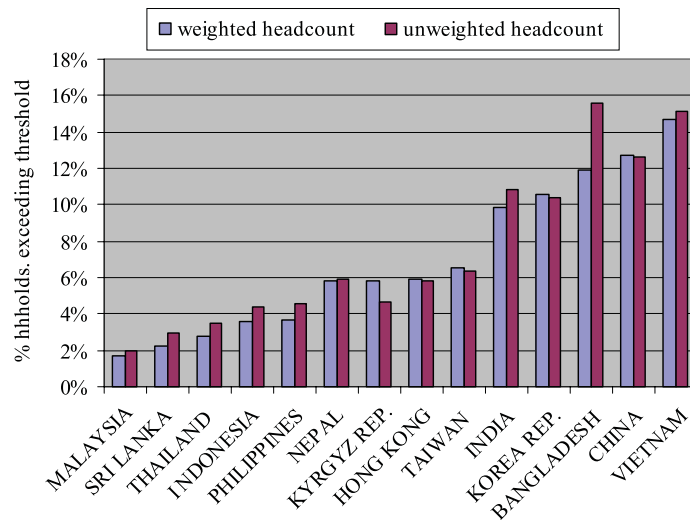
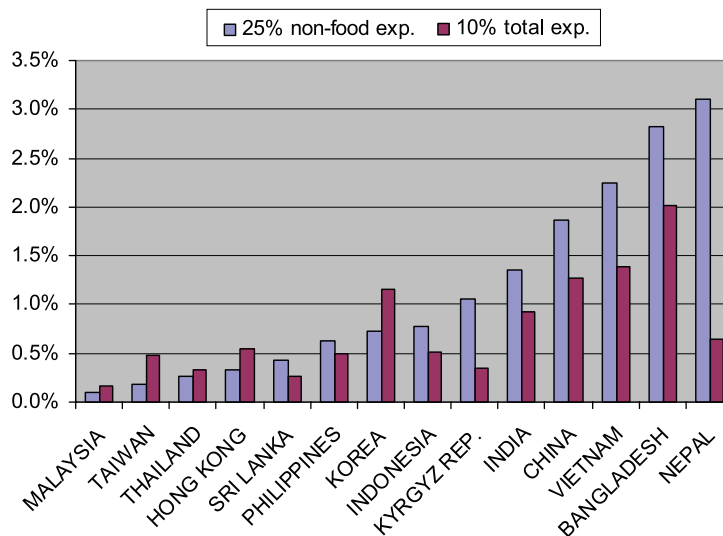Figure 5. Distribution weighted and unweighted incidence of catastrophic payments (OOP > 10% total exp)

Figure 6. Mean catastrophic overshoot

25% of total non-food expenditure on OOP payments in Nepal, the average OOP share exceeds this threshold by 34 percentage points (Table VI), giving a staggering 59% OOP budget share. In Bangladesh, the average budget share for those exceeding the 25% of non-food expenditure threshold is 44% and among the equivalent 'overshooters' in Taiwan, it is 37%. But only 1.5% of households exceed the threshold in Taiwan, compared with almost 15% in Bangladesh. The much lower cross-country variability in the intensity of catastrophic payments than in the prevalence reflects the fact that, given other needs, there is an upper limit on the proportion of household resources that can be devoted to medical expenditures. Concentration indices for 'excess' health payments generally display similar patterns to the corresponding indices for the incidence.

Table VI. OOP health payments in excess of catastrophic payments threshold budget share

	Threshold	Share of total consumption/expenditure				Share of non-food consumption/expenditure		
		5%	10%	15%	25%	15%	25%	40%
BANGLADESH	Mean overshoot (O)	3.04%	2.02%	1.40%	0.72%	4.74%	2.83%	1.26%
	Concentration index (C_O)	0.3299	0.3915	0.4528	0.567	0.3844	0.4667	0.592
	Rank weighted overshoot (O^W)	2.04%	1.23%	0.76%	0.31%	2.92%	1.51%	0.51%
	Mean positive overshoot (MPO)	11.01%	12.98%	14.15%	16.07%	19.32%	19.22%	17.70%
CHINA	Mean overshoot (O)	2.22%	1.28%	0.81%	0.35%	3.39%	1.86%	0.73%
	Concentration index (C_O)	0.0639	0.1056	0.1631	0.2594	−0.0697	−0.0265	0.0653
	Rank weighted overshoot (O^W)	2.08%	1.14%	0.68%	0.26%	3.62%	1.91%	0.69%
	Mean positive overshoot (MPO)	7.84%	10.12%	11.52%	12.38%	16.09%	16.57%	15.24%
HONG KONG	Mean overshoot (O)	0.98%	0.55%	0.34%	0.13%	0.73%	0.34%	0.11%
	Concentration index (C_O)	0.0854	0.1410	0.2052	0.3140	0.0237	0.0762	0.1719
	Rank weighted overshoot (O^W)	0.90%	0.47%	0.27%	0.09%	0.71%	0.31%	0.09%
	Mean positive overshoot (MPO)	7.56%	9.40%	11.08%	12.06%	12.40%	13.66%	12.76%
INDIA	Mean overshoot (O)	1.77%	0.92%	0.53%	0.20%	2.80%	1.35%	0.45%
	Concentration index (C_O)	0.1449	0.2080	0.2788	0.4144	0.1609	0.2451	0.3915
	Rank weighted overshoot (WO)	1.51%	0.73%	0.38%	0.12%	2.35%	1.02%	0.27%
	Mean positive overshoot (MPO)	6.91%	8.49%	9.65%	11.03%	13.39%	13.83%	12.96%
INDONESIA	Mean overshoot (O)	0.83%	0.51%	0.34%	0.17%	1.38%	0.77%	0.32%
	Concentration index (C_O)	0.3125	0.4208	0.5069	0.6367	0.2688	0.3770	0.5391
	Rank weighted overshoot (O^W)	0.57%	0.29%	0.17%	0.06%	1.01%	0.48%	0.15%
	Mean positive overshoot (MPO)	8.71%	11.48%	13.09%	14.64%	16.68%	17.62%	16.64%
KOREA	Mean overshoot (O)	1.90%	1.16%	0.76%	0.36%	1.42%	0.73%	0.27%
	Concentration index (C_O)	0.0325	0.0778	0.1263	0.2302	0.0233	0.0916	0.2073
	Rank weighted overshoot (O^W)	1.84%	1.07%	0.67%	0.28%	1.39%	0.66%	0.22%
	Mean positive overshoot (MPO)	9.07%	11.23%	12.48%	13.94%	14.52%	15.20%	14.82%
KYRGYZ REP.	Mean overshoot (O)	0.84%	0.35%	0.15%	0.04%	2.38%	1.06%	0.28%
	Concentration index (C_O)	0.1224	0.1938	0.2039	0.2830	0.0851	0.1120	0.1192
	Rank weighted overshoot (O^W)	0.74%	0.28%	0.12%	0.03%	2.18%	0.94%	0.25%
	Mean positive overshoot (MPO)	5.44%	6.02%	6.71%	7.46%	13.19%	11.44%	10.70%
MALAYSIA	Mean overshoot (O)	0.36%	0.17%	0.10%	0.05%	0.24%	0.10%	0.03%
	Concentration index (C_O)	0.2542	0.4204	0.5370	0.7232	0.2641	0.4730	0.7388
	Rank weighted overshoot (O^W)	0.27%	0.10%	0.05%	0.01%	0.18%	0.05%	0.01%
	Mean positive overshoot (MPO)	5.39%	8.58%	10.58%	13.15%	9.62%	12.46%	14.82%
NEPAL	Mean overshoot (O)	1.11%	0.64%	0.43%	0.24%	4.35%	3.11%	2.15%
	Concentration index (C_O)	0.0579	0.0474	0.0475	−0.0418	−0.2368	−0.2949	−0.3695
	Rank weighted overshoot (O^W)	1.06%	0.61%	0.41%	0.25%	5.38%	4.02%	2.94%
	Mean positive overshoot (MPO)	7.54%	10.85%	13.88%	20.59%	25.42%	33.66%	47.15%
PHILIPPINES	Mean overshoot (O)	0.82%	0.50%	0.32%	0.14%	1.15%	0.62%	0.24%
	Concentration index (C_O)	0.2766	0.3427	0.4089	0.5429	0.2055	0.2674	0.3819
	Rank weighted overshoot (O^W)	0.60%	0.33%	0.19%	0.07%	0.91%	0.46%	0.15%
	Mean positive overshoot (MPO)	8.94%	10.81%	12.01%	12.68%	15.89%	16.36%	15.36%
SRI LANKA	Mean overshoot (O)	0.56%	0.27%	0.16%	0.07%	0.97%	0.42%	0.15%
	Concentration index (C_O)	0.2969	0.4412	0.5553	0.7575	0.1064	0.2376	0.4258
	Rank weighted overshoot (O^W)	0.39%	0.15%	0.07%	0.02%	0.87%	0.32%	0.08%
	Mean positive overshoot (MPO)	5.09%	8.89%	10.41%	15.56%	10.74%	13.70%	15.05%
TAIWAN	Mean overshoot (O)	1.03%	0.47%	0.26%	0.10%	0.45%	0.18%	0.06%
	Concentration index (C_O)	−0.0293	−0.0457	−0.0528	−0.0421	−0.0442	−0.0430	−0.0088
	Rank weighted overshoot (O^W)	1.06%	0.50%	0.28%	0.11%	0.47%	0.19%	0.06%
	Mean positive overshoot (MPO)	5.40%	7.46%	9.39%	11.79%	9.97%	12.07%	14.04%
THAILAND	Mean overshoot (O)	0.61%	0.33%	0.20%	0.07%	0.55%	0.26%	0.08%
	Concentration index (C_O)	0.2474	0.3337	0.3907	0.5349	0.1508	0.1970	0.2172

Table VI. *Continued*

	Threshold	Share of total consumption/expenditure				Share of non-food consumption/expenditure		
		5%	10%	15%	25%	15%	25%	40%
	Rank weighted overshoot (O^W)	0.02%	0.01%	0.01%	0.00%	0.47%	0.21%	0.06%
	Mean positive overshoot (MPO)	7.25%	9.39%	10.41%	9.05%	12.22%	14.22%	11.13%
VIETNAM	Mean overshoot (O)	2.53%	1.39%	0.81%	0.30%	4.35%	2.24%	0.76%
	Concentration index (C_O)	0.0960	0.1845	0.2821	0.4594	−0.0681	−0.0197	0.0809
	Rank weighted overshoot (O^W)	2.28%	1.13%	0.58%	0.16%	4.65%	2.28%	0.69%
	Mean positive overshoot (MPO)	7.48%	9.18%	9.58%	10.46%	14.81%	14.83%	12.66%

Notes: Definitions of mean overshoot and mean positive overshoot provided in text. Concentration index is for the household level overshoot, O_i. Rank weighted overshoot is equal to $O \times (1 - C_O)$.

CONCLUSION

There is still heavy reliance on out-of-pocket financing of health care in Asia. The OOP share of health funding is at least a third in all territories included in this study, exceeds three-fifths in Bangladesh and China and over three quarters in Vietnam, India and Nepal. This paper has substantially increased the comparative evidence on the magnitude, the distribution and the economic consequences of OOP payments for health care in Asia. It will facilitate more informed discussion of health care financing across the continent. The main findings are as follows. First, heavy reliance on OOP financing appears to have important consequences for household living standards. For example, OOP payments for health care absorb more than one quarter of household resources net of food costs in at least 10% of all households in Bangladesh, China, India, Nepal and Vietnam. Such levels of spending can only be accommodated through the diversion of considerable resources from current consumption and/or through the accumulation of debt or the exhaustion of savings and assets with long-term consequences for household welfare. Second, there are important differences across countries in the incidence of catastrophic health payments. It is generally higher in low-income countries that rely more on OOP financing and lower in high/middle-income countries that make greater use of prepayment mechanisms. But there is also substantial variation at similar levels of national income. Third, the distribution of catastrophic payments also differs across countries. In high-income countries, they tend to be evenly distributed, or even slightly concentrated on the less well-off. In most low-income countries, however, it is households with higher total expenditure that are more likely to spend a large fraction of those resources on health care. This may reflect the inability of the poorest of the poor to divert resources from other basic needs and possibly the protection of the poor from user charges offered in some countries. But in China, Kyrgyz and Vietnam, where there were no exemptions of the poor from charges at the time of the surveys analysed, the poor were as likely, or even more likely, to incur catastrophic payments.

It is not surprising that catastrophic payments are generally more pervasive in low-income countries financing health care principally by direct payments and less pervasive in high-income countries with more developed prepayment methods of finance. But the analysis reveals interesting differences within each of these two groups. Malaysia, the Philippines, Sri Lanka and Thailand have managed to contain the OOP health financing share below that found in most low and middle income countries and all have a relatively low incidence of catastrophic payments. Bangladesh, China, India, Nepal and Vietnam stand out in relying heavily on OOP financing and having a high incidence of catastrophic payments. While the second group of countries is, in general, poorer, there is little difference between the average incomes of China and Sri Lanka. The latter is striking as a low-income country that manages to rely on OOP payments for just less than half of health financing and still further because the catastrophic impact of these payments are modest. This reflects the near absence of charges in the public sector. The majority of OOP payments are made by

the better-off for private alternatives to public care. Indonesia relies on OOP financing only slightly less than China but has much smaller catastrophic impact of health payments. In part, this may be due to targeted exemptions in Indonesia, implemented through a health card, that have had some success in shielding poor families from high health payments (Pradhan and Prescott, 2002). The lack of such a scheme in China not only results in a greater prevalence of catastrophic payments but also in a greater concentration of OOP payments on low-income households. But the low incidence of catastrophic payments in Indonesia also reflects the low propensity to spend on health care.[8] Thailand has been even more successful than Sri Lanka in constraining the living standards consequences of OOP health payments. Its more developed economy with a larger formal sector allows a greater share of health funding to be raised from taxes. In addition, an effective health card system has protected the poor from charges and the introduction of universal coverage, with a flat rate minimal charge, has further weakened the impact of OOP payments on household budgets. In Malaysia, charges for public sector care have been kept low and catastrophic payments largely avoided. Among the three high-income territories, the incidence of catastrophic payments is much higher in Korea than in Hong Kong and Taiwan due to the substantial co-payments within the Korean social insurance system and, particularly, the partial coverage of inpatient care.

While this study significantly expands the available evidence on the living standards consequences of OOP payments for health care in Asia, it provides only a partial picture of a multifaceted problem. Besides the occurrence of catastrophic payments, lack of insurance against health care expenses imposes other costs on household welfare that should be examined in complementary analyses. First, households may be impoverished by health payments. We have addressed this issue for the low/middle income countries included in the study elsewhere (Van Doorslaer *et al.*, 2006). Second, OOP payments raise the price barrier to the quantity and quality of care consumed. As noted above, poor households may not be observed to incur catastrophic payments since they cannot afford to divert spending from subsistence food needs. The flip side of catastrophic payments is the catastrophic loss of health and subsequent erosion of earnings capacity due to inability to afford health care. It is therefore important to complement the study of health care payments with that of health care utilization (O'Donnell O *et al.*, 2007). In addition to medical spending, illness shocks have catastrophic economic consequences through lost earnings. In fact, Gertler and Gruber (2002) find earnings losses to have a more disrupting effect on household living standards than medical spending following a health shock in Indonesia. The lack of sickness and disability insurance may impose an even greater welfare loss than that of health care insurance.

APPENDIX A

The description of surveys is given in Table AI.

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[8] In 2000, total expenditure on health was only 2.7% of GDP in Indonesia, compared, for example, with 5.3% in China (World Health Report, 2002).

Table AI. Description of surveys

Territory	Year	Survey	Survey institution	National coverage	Survey design	Sampling unit	Response rate	Sample size
Bangladesh	1999–2000	Household Income Expenditure Survey	Bangladesh Bureau of Statistics	Nationally representative	Stratified, cluster sampling. weights applied	Household	100%	7440
China	2000	Sub-sample of Urban/Rural Household Survey	National Bureau of Statistics	Original survey nation representative. Analytical sample randomly selected from all holds in 10 provinces	Stratified, Weights applied	Household	100%	9700 (from total survey of 85 000)
Hong Kong SAR	1999–2000	Household Expenditure Survey (HES)	Census & Statistics Department, Government of HK SAR	All land domestic households, except those receiving welfare	Stratified. Weights applied	Household	79.50%	6116
		HES on CSSA[a] (welfare) households	as above	All CSSA (welfare) cases, with some exceptions[b]	Stratified. Weights applied	Household	95.50%	1510
India	1999–2000	National Sample Survey, 55th round	National Sample Survey Organisation	Nationally representative	Stratified, sample weights applied	Household	100%	120 039
Indonesia	2001	Socioeconomic Survey (SUSENAS)	National Board of Statistics	Nationally representative	Stratified, cluster sampling. Self-weighted	Household	98%	218 568
Korea Rep.	2000	Urban Household Survey	National Statistical Office	Urban only (78.5% of population)	Stratified, cluster sampling	District, then household	82%	62 632
Kyrgyz Rep.	2000–2001	Household Budget Survey	National Statistical Committee	Nationally representative	Stratified, sample weights applied.	Household	>90%	3000
Malaysia	1998/1999	Household Expenditure Survey	Government Dept of Statistics	Nationally representative	Stratified, sample weights applied.	Household	82%	9198
Nepal	1995–1996	Living Standards Survey	Central Bureau of Statistics	Nationally representative	Stratified, cluster sample. Weights applied	Household	99.6%	3388

Table AI. *Continued*

Territory	Year	Survey	Survey institution	National coverage	Survey design	Sampling unit	Response rate	Sample size
Philippines	1999	Poverty Indicator Survey	National Statistics Office	Nationally representative	Stratified	Household	100%	37 454
Sri Lanka	1996–1997	Consumer Finance Survey	Central Bank of Sri Lanka	Excluded Northern Province due to civil war	Stratified. Weights applied	Household	98%	8880
Taiwan	2000	Survey of Family Income and Expenditure	DG of Budget, Accounting and Statistics, Office of Statistics (DGBAS)	Nationally representative	Stratified, cluster sampling. Weights applied	City/county then household	100%	13801
Thailand	2002	Socio-economic Survey	National Statistical Office	Nationally representative	Stratified, weights applied	Household	93%	17 489
Vietnam	1998	Living Standards Survey	Govt of Vietnam and World Bank	Nationally representative	Stratified, weights applied Stratified, cluster sampling. Weights applied	Household	99%	5999

[a]Comprehensive Social Security Assistance. For CSSA household members not on CSSA, expenditure estimate at 25 percentile of HES sample of same household size and housing type.
[b]Covers 99% of CSSA families and 65% of CSSA single persons.

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