Volume 34, Issue 2

Catastrophic out-of-pocket payment for healthcare and implications for household coping strategies: evidence from West Bengal, India

Swadhin Mondal Institute for the Studies in Industrial Development

David Peters Johns Hopkins Bloomberg School of Public Health, USA

Henry Lucas Institute of Development Studies, University of Sussex, UK

Barun Kanjilal Institute of Health Management Research, INDIA

Abstract

Purpose: To identify the relative risks of catastrophic healthcare expenditures for different types of health need, and the impact of such expenditure on household coping strategies. Methods: Using data from a household survey in West Bengal, the risks of incurring 'catastrophic' healthcare expenditures relating to hospitalization, ambulatory care, chronic illness and delivery were estimated using a logistic regression. A regression model was then used to estimate the relationship between the incidence of catastrophic expenditures at different threshold levels and an 'Aggregate Coping Index', constructed using principle components analysis. Results: The proportion of households in which a member required hospitalization who experienced catastrophic healthcare expenditure was more than three times that for those where a member had a chronic illness but was not hospitalized. However, in the logistic regression model the likelihood of catastrophic expenditure relating to chronic care was around twice that for hospitalization. Catastrophic expenditure on care, irrespective of the precise threshold we adopt, was significantly correlated with our coping strategy index. Conclusions: Catastrophic health spending is an important problem for the population in West Bengal. More attention is needed on the poverty-inducing effects of long-term expenditures on chronic illness, given that existing schemes only address hospitalization.

The authors acknowledge the scientific support extended by 'Future Health Systems: Innovations for equity' (www.futurehealthsystems.org) a research program consortium of researchers from Johns Hopkins University Bloomberg School of Public Health (JHSPH), USA; Institute of Development Studies (IDS), UK; International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), Bangladesh; Indian Institute of Health Management Research (IIHMR), India; Chinese Health Economics Institute (CHEI), China; The Institute of Public Health (IPS), Makerere University, Uganda; and University of Ibadan (UI), College of Medicine, Faculty of Public Health, Nigeria. The authors express their appreciation for the financial support (Grant # H050474) provided by the UK Department for International Development (DFID) for the Future Health Systems research programme consortium. This document is an output from a project funded by DFID for the benefit of developing countries.

Citation: Swadhin Mondal and Henry Lucas and David Peters and Barun Kanjilal, (2014) "Catastrophic out-of-pocket payment for healthcare and implications for household coping strategies: evidence from West Bengal, India", *Economics Bulletin*, Vol. 34 No. 2 pp. 1303-1316.

Contact: Swadhin Mondal - kumar.swadhin@gmail.com, Henry Lucas - h.lucas@ids.ac.uk, David Peters - dpeters@jhsph.edu, Barun Kanjilal - barun@iihmr.org.

Submitted: October 07, 2012. Published: June 20, 2014.

1. Introduction

Out-of-pocket (OOP) payment is the major health financing mechanism across developing countries (O'Donnell 2008; Leive et al. 2008). Such payments often place an enormous burden on underprivileged households (Sun et al. 2007; Van Damme et al. 2004) and may sometimes drive such households deeper into poverty (Kanjilal et al. 2007, Rahman et al, 2013). Empirical studies (Ladusingh and Pandey, 2013; Narayanan et al. 2000; Krishna 2006) show that the poor in India are at high risk of immiseration when they seek medical intervention for major ailments. Ghosh (2011), using data from the 1993-94 and 2004-05 National Sample Surveys, found that the introduction of users fees, reduced government spending on health, an increased role for the private sector and rapid inflation of healthcare costs contributed to increases in the incidence of catastrophic expenditure and impoverishment.

Selvaraj & Karan (2009) also identified reduced public provision and rising medical costs as primary drivers of impoverishment, estimating that the additional percentage of the population falling below the poverty line due to healthcare expenditure grew from 3% in 1993-94 to more than 3.6% in 2004-05. A similar study using data for 2004-2005 (Gupta 2009) estimated that adjusting the poverty line to allow for essential OOP expenditure for health care increased the poverty headcount ratio by 3.6 percentage points in rural and 2.9 percentage points in urban areas. Berman et al. (2010) estimated household impoverishment, calculating the number of households below the poverty line before and after healthcare payments. They found that 6.2% of all households (6.6% in rural areas and 5% in urban areas) suffered impoverishment as a result of healthcare expenditure in 2004. In a substantial majority of cases, around 4.9%, this resulted from expenditure on outpatient care. From another perspective, Peters et al. (2002) estimated that about a quarter of those hospitalised in India fall below the poverty line every year due to catastrophic OOP payments.

In most countries only very limited mechanisms exist to reduce the burden of high healthcare costs on poor households or to mitigate their impact on household livelihoods (Xu et al. 2003; Su et al. 2006; Flores et al. 2008). Protecting households from such costs poses a formidable challenge, particularly for countries with high poverty levels. Against this background, the present study asks two questions: What are the major determining factors for 'catastrophic' health care payments in India? What is the economic impact of such payments on poor households? The study attempts to answer these questions using recent data on West Bengal.

West Bengal is one of the poorer states of India, with per capita income somewhat below that for the nation as a whole¹. It has a long way to go to achieve the goal of universal health coverage. There is no significant risk pooling mechanism for health financing (Kanjilal et al. 2007). Only some 5-10 per cent of households are members of formal health insurance schemes and all of these only cover inpatient treatment (Shahrawat and Rao, 2013). Nonetheless, the infant mortality rate has declined substantially over the longer terms to stand at 32 in 2011, compared to the all-India rate of 44 (SRS, 2012) and life expectancies over 2005-2010 of 67.4 for men and 71.0 for women compared to 64.6 and 67.7 (Government of India, 2013). However in recent years there are concerns that progress has slowed compared to some other states (table 1).

¹ Per capita income (in current prices) in India for the year 2010 was Rs. 46117 whereas in West Bengal it was Rs. 41837 (Planning Commission, Government of India).

	Tuble 1. Infant Mortanty	Rates for west ben	Sai ana mi	iiu
		2000	2008	2011
West Bengal		51	35	32
All India		68	53	44
	Sou	rce: SRS, Various ye	ars	

Table 1: Infant Mortality Rates for West Rengal and All-India

Purohit (2008) argues that a major problem with the health system in West Bengal is that there are wide "differentials in availability and utilization of inputs such as the per capita availability of hospitals, beds, and manpower" across districts. Table 2 indicates such variations across the three districts in the present study and compares them to a major urban centre, Darjiling. It is suggested that remedying these disparities will require a considerable increase in medical and public health expenditure in the least well-served districts. A more recent and highly critical study of health services in West Bengal (Rana and Mishra, 2012), suggests that there has been serious under-funding of the health sector for many years, particularly in rural areas, with the result that large sections of the population have been driven to use private sector providers.

Table 2: Distribution of selected health inputs by districts						
	Hospitals	PHCs per	Hospital	Auxiliary	Life	
	per 10,000	10,000	Beds per	Nurse	Expectancy	
			10,000	Midwives		
				per 10,000		
Bankura	0.28	2.73	8.7	11.4	64.9	
Maldah	0.27	1.36	3.5	6.9	54.5	
North 24 Parganas	0.23	0.82	2.9	13.2	68.4	
Darjiling	0.74	1.93	15.1	25.1	68.9	

Source: Purohit, 2008: 218 and 220

Ghosh (2010), used the NSS data to compare per capita OOP expenditure in West Bengal on inpatient and outpatient medical care costs between 1993/94 and 2004/05 (table 3). The equivalent expenditures derived from the current data are substantially higher, particularly for inpatient care. This may be partly due to the inclusion of reported indirect costs, travel and subsistence for the patient and possibly for one or more carers. It also indicates increased utilisation of inpatient services. Inpatient expenditure doubled as a proportion of healthcare costs between 1993/94 and 2004/05.

		1993/94	2004/05	2007
Inpatient		10	53	169*
Outpatient		64	145	242*
	2			

Source: Ghosh S (2010); *Includes direct and indirect costs

2. Data and Methodology

We used household survey data collected from three representative districts of West Bengal (Malda, North 24 Parganas, and Bankura) over the period January - March 2007. A twostage cluster sampling approach was used to select 748 urban and 2403 rural households. At the first stage, 35 primary sampling units $(PSU)^2$ covering both rural and urban areas were

² In rural areas, the census village is considered a PSU and in urban areas census ward or census enumeration block is considered as primary unit.

selected using a probability proportion to size (PPS) approach. The second stage involved selection of 30 households from each PSU using systematic random sampling. A structured questionnaire was used to collect detailed information from each household on their demographic and socioeconomic profile, expenditures, family member(s) needing healthcare during the previous month, the nature of the health problem, healthcare seeking behaviour, treatment costs at each stage, satisfaction with treatment and coping mechanisms. The sample included 15,206 individuals in 3,150 households.

To estimate household expenditures detailed information was collected on the quantities and values of specific food and non-food household consumption items. To minimize recall errors, a detailed item classification was adopted. Non-food items included clothes, housing (rent/maintenance), medical care, education, transport, social functions/recreation, religious function, consumer durables, contribution to social security or insurance schemes and utilities (electricity, gas, telephone, etc.). Household health care expenditure was defined as the outof-pocket expenditures on drug and medicines, consultation fees, hospital bed charges, cost of transport to the treatment site and daily leaving costs, including food and lodging for escorts of the ailing household member.

The recall periods for the healthcare questions were: previous year for hospitalisation and childbirth; three months for outpatient care; and one month for chronic illness. It should be noted that differences in recall period can affect the comparability of estimates. Other surveys have typically adopted shorter recall periods for outpatient services and there is some evidence that this may result in higher expenditure estimates (Lu et al, 2009). However, Xu et al (2009) suggest that "Longer recall period may increase recall bias, but … can capture more infrequent spending. The overall effect is not clear" and many household consumption surveys seek information on health expenditure over the previous year. In the present study a major consideration was that a longer recall period increases the number of households reporting use of outpatient services. Where an individual reported more than one instance of healthcare need over the recall period, data was collected on their most recent experience. Household healthcare expenditure was defined as the sum of OOP expenditures on medicines and supplies, consultation fees, hospital bed charges, transport charges to the treatment site and daily living costs, including food and lodging for the ailing household member and any accompanying helpers.

3. Catastrophic Health Care Expenditure

Household OOP expenditure on healthcare has typically been designated as catastrophic if it exceeds a given proportion of household income or expenditure over a set time period. In general terms, Berki (1986) defines catastrophic expenditure as constituting a sufficiently large proportion of a household budget to threaten a substantial reduction in that household's customary standard of living. Similarly, Wagstaff and Doorslear (2003) and Russell (1996) define healthcare expenditure as catastrophic if it exceeds 10 per cent of household total annual expenditure, arguing that healthcare expenditure on this scale typically requires the sacrifice of consumption goods, possibly including basic goods. An alternative approach is to define catastrophic expenditure in terms of a household's ability to pay without sacrificing basic goods consumption. Thus Kawabata and Carrin (2002), Kawabata (2003) and Xu et al. (2003) define healthcare expenditure as catastrophic if it exceeds 40 per cent of household non-food expenditure. This latter approach has been adopted in the current study.

However, we are aware that using a single catastrophic threshold is inadequate because the impact of high health care expenditures varies across economic groups and we therefore consider various thresholds (20–60 per cent). We also measure the catastrophic spending

curve as defined by Wagstaff (2008). This plots OOP payments as a percentage of household annual non-food expenditure against the number of households making such payments.

4. Analytical Methods

The share of health care expenditure in non-food expenditure is defined as $\psi_i = h_i / \theta_i$, where h_i is the average household monthly expenditure on health, and θ_i is the average household monthly non-food expenditure. We adopt a simple logit specification to predict the probability of catastrophic health expenditure in households using selected background indicators relating to type of healthcare need, household social and demographic characteristics and household economic status.

The logit function can be written:

Where, $P(y_i = 1 | x_{ij})$ is the probability that a household will experience catastrophic healthcare expenditure, x_{ij} denotes the values of the independent variable j for household i, and the parameters β_i are to be estimated.

As indicated above, health care expenditure was defined as catastrophic if it exceeded 40 per cent of total non-food household expenditure. Four dichotomous variables identified the types of healthcare need: (1) household had a member who was hospitalised during the previous year; (2) household had a member who suffered an acute illness in the previous three months but was not hospitalised due to that illness³; (3) household had a member with a chronic illness which persisted over the previous month⁴; and (4) household had a female member who gave birth in the previous year. Note that these variables are not mutually exclusive – a single household could be categorised as experiencing multiple healthcare needs. The other variables included in the model were: household size, rural/urban location and economic status. To allow for non-linear effects, this last was included using dummy variables to denote the quintiles groups derived from the distribution of total household expenditure per capita.

We also estimated the impact of catastrophic payment at various thresholds on an indicator relating to the coping mechanisms adopted to finance health care. These range from meeting costs out of current income to extreme measures such as reducing food consumption or withdrawing children from school. The most common mechanisms reported in the survey were categorised under the following headings:

- Payment from current income
- Payment from savings
- Borrowing with/without interest
- Reducing purchase of consumer durables
- Reduced spending on social obligations/functions
- Reducing food consumption
- Reducing other consumption expenditure

 $^{^{3}}$ Acute illness means extremely severe illness, pain, brief and dangerous diseases such as a cut, an infection, or other physical injuries. This type of illness usually comes on fast and often goes away in no more than a few weeks or months if treated properly. Acute illness can become chronic when the cause is difficult to treat.

⁴ Chronic illness refers to intractable ill health that exists more than three months and does not resolve in response to treatment. It is viewed more as its own disease rather than as a symptom of another health problem.

- Withdrawing a child from education
- Postponing marriage of a daughter
- Stopping medical treatment of another household member
- Selling/mortgaging property
- Stopping purchase or expansion of a house

The adoption of such mechanisms was taken as indicating the vulnerability of a household to the impact of high expenditure on healthcare. Aggregate coping indices (ACI) for each household who spent at least one rupee on hospitalisation, outpatient care or delivery care during the relevant reference periods were developed using factor analysis on the set of dichotomous variables relating to the above list and identifying the first component as the measure of vulnerability (annex 1). We did not attempt to estimate an index for chronic care, given that the related expenditure represented a long term 'stress' on household resources rather than a 'shock' that could be easily linked to specific short-term coping responses.

Finally, we developed a regression model where ACI is considered the dependent variable and the catastrophic expenditure threshold level is considered an independent variable. In this model we predict the implications of different levels of catastrophic healthcare expenditures on the ACI. The functional form of the equation can be written as:

$$Y_t = \alpha_t + \beta_1 x_{t1} + \beta_2 x_{t2} + \beta_3 x_{t3} + \beta_4 x_{t4} + \beta_5 x_{t5} + \varepsilon_t \dots \dots \dots \dots (2)$$

Where, Y_t = aggregate coping index, t denotes the type of healthcare need (hospitalisation, outpatient care, or delivery), and the x_{ti} indicate whether a household has reached a catastrophic expenditure threshold for each type of healthcare need, with thresholds set at 20%, 30%, 40%, 50% and 60% of non-food consumption. The equation thus attempts to model the extent to which different levels of catastrophic expenditure impact on the level of severity of the coping strategies used to meet that expenditure.

5. Results

Average reported expenditure on inpatient care for affected households was Rs. 4,532, around 10.8% cent of household annual expenditure (table 1). The corresponding estimates for outpatient care were Rs.1,184 (3.5%), for chronic care Rs. 2,741 (5.2%), and for delivery Rs. 687 (4.2%) (Table 4). As might be expected, health costs were higher in urban than rural areas but, with the exception of delivery, represented a smaller proportion of household expenditures, reflecting the generally higher overall expenditures of urban households. Average expenditure on delivery services was almost twice as high in urban areas, probably mainly a result of the different mix of providers.

Note that while expenditure on chronic care was reported to be at least 2.5 times that for outpatient care, the differences expressed in terms of percentages of total expenditure were much less. This suggests that decisions on chronic care expenditures may be determined by a household's economic situation to a greater extent than those on other types of care. Among poorer households, expenditure on chronic illness, often affecting older household members, may be given lower priority if there are more immediate demands on household income. It is perhaps worth making the general point that the poorest households may often decide to delay, or sometimes avoid, spending on healthcare even when it is obviously needed. Catastrophic healthcare expenditure is only possible for households that can gather the necessary resources.

The above evidence on the relatively higher impact of inpatient treatment is confirmed by the catastrophic spending curves. Figure 1 shows that some 21% of affected households spent

over 40% of their annual non-food expenditure on inpatient care. The proportions were much lower for outpatient care, chronic illness and delivery.

treatment					
	Expenditure per affected household (HH) (in Rupees)	Health expenditure as a percentage of total annual expenditure per affected household			
Rural					
Hospitalisation	4,340	11.55			
Outpatient	1,170	4.03			
Chronic	2,637	5.73			
Delivery	592	3.96			
Urban					
Hospitalisation	5,141	9.21			
Outpatient	1,232	2.45			
Chronic	3,030	4.14			
Delivery	1,117	4.69			
All					
Hospitalisation	4,532	10.81			
Outpatient	1,184	3.49			
Chronic	2,741	5.16			
Delivery	687	4.15			

Table 4: Health expenditure per household as percentage of total expenditure by
treatment

Figure 1: Catastrophic spending curves based on non-food expenditure by type of healthcare



The source of treatment had an important bearing on the expenditures incurred by households seeking care (table 5). Households using private nursing homes/hospitals for inpatient care spent over 25% of their annual expenditure, while clients of government facilities reported spending only 7%.

Table 5. OOT cost of inpatient care by public and private nospitals				
	OOP cost per affected OOP cost as percent of			
	household (in Rupees)	annual HH expenditure		
Government Hospital				
Rural	2,674	7.6		
Urban	2,973	5.5		
Total	2,746	6.8		
Private hospital				
Rural	10,937	25.7		
Urban	14,410	25.6		
Total	11,734	25.7		

Table 6 presents the estimated odd ratios obtained from the logit model. Households having a member with a chronic illness had by far the highest odds of incurring catastrophic healthcare expenditure, controlling for other variables. This would seem to imply that the ongoing stress placed on household resources by chronic illness has a cumulative impact that can often outweigh the sudden shocks imposed by acute healthcare needs.

Inpatient care was also associated with a high odds ratio of incurring catastrophic OOP expenditure at all thresholds. For example, the odds of spending at least 20% of non-food expenditure on healthcare was 1.42 times higher in the case of households with a hospitalised member, and this ratio increased consistently across the catastrophic spending thresholds, though only attaining statistical significance at the 50% threshold, probably because of the limited number of households with a member requiring hospital care. Note that households with members requiring only outpatient care appeared less likely to experience catastrophic healthcare expenditure. This can be understood by considering that this group excludes households meeting inpatient acute care costs, who are therefore included in the comparator group.

Among the controlling variables, the risk of incurring catastrophic payment was around twice as high for those living in rural areas and for non-Hindus across all catastrophic payment thresholds. As might be expected, poor households were also at greater risk, though the use of two poverty indicators produced somewhat contrary findings. Those above the official poverty line were 0.8 times, and non-food deficit households 0.7 times, less likely to face catastrophic expenditure. However, the effects associated with the poverty line indicator were all insignificant except at the 60% threshold, while the food-deficit indicator identifying the poorest households - was significant at all thresholds. Employment in agriculture or a casual labourer increased the risk of catastrophic expenditure compared to being employed in the non-agricultural sector. Other factors were generally either limited in effect or not statistically significant. Being self-employed or engaged in trade or business activities, substantially increased the risk of catastrophic expenditure but with high variability such that the effects were not statistically significant. Household size had a positive association with catastrophic payments, but the association was limited across the catastrophic expenditure thresholds. Households with aged members and children were more likely to incur catastrophic expenditure at the 20% threshold but not at higher levels.

	Catastrophic thresholds				
	20%	30%	40%	50%	60%
Health Care					
At least one hospitalization	1.42	1.78	1.57*	1.82*	1.61*
No hospitalization but at least one acute	0.00	0.05	0.00	0.00	0.50
illness	0.90	0.95	0.90	0.89	0.79
At least one birth	1.10	0.90	0.83	0.64	0.61
At least one chronic illness	3.71*	3.49*	3.37*	3.48*	3.35*
Household Characteristics					
More than 5 members	1.15	1.01	0.99	1.08	1.10
Rural household	1.54*	1.46*	1.68*	1.69*	1.59*
General caste	0.98	0.92	0.98	0.85	0.87
Hindu	0.58*	0.58*	0.57*	0.47*	0.43*
Male-headed household	0.82	0.91	0.79	0.63*	0.62
Number of elderly persons in a household	1.65*	1.82*	1.69*	1.59*	1.51*
No. of children below 5 years old	1.07	0.99	0.99	1.03	1.03
Economic Status of the household					
Household above poverty line ¹	0.86*	0.84*	0.80*	0.80*	0.75*
No food deficit	0.75*	0.79*	0.72*	0.75*	0.79*
Education					
Illiterate	0.99	0.85	0.76	0.67	0.72
Primary education	1.00	0.94*	0.88*	0.93*	0.87*
Secondary education	1.00	0.90	1.16	1.07	1.14
Occupation					
Agriculture and allied activities	1.01	1.15*	1.16*	1.18*	1.23*
Causal labour	1.24*	1.23*	1.20*	1.36*	1.10*
Self-employed	1.27	1.29	1.40	0.94	0.95
Unemployed or retired persons	0.88*	1.04*	1.04*	1.08*	1.05*
Business	1.74	2.03	1.78	2.01	2.12
Number of observations	3,150	3,150	3,150	3,150	3,150
LR chi2(23)	283.57	193.51	140.35	121.31	100.89
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000
	-	_			
Log likelihood	1621.29	1246.00	-966.95	-785.35	-650.67
*Indicates significant at 5% level.					

Table 6: Estimated odd ratios for different catastrophic thresholds

Finally, we assessed the impact of catastrophic payment at various thresholds on our aggregate coping index. Overall, we find a high positive correlation between the ACI and catastrophic expenditure. This implies that an increase in OOP expenditure for health care as a proportion of total non-food expenditure will increase the risk of coping strategies that include withdrawal of children from school, reducing food consumption, increased

indebtedness and asset sales. As might be expected, the risk typically increased with higher catastrophic thresholds but to a limited degree, suggesting that radical coping strategies could be triggered at the lowest threshold. In table 7, the regression coefficients are highest for hospitalisation but also significant for outpatient care at each threshold. Delivery is also positively correlated with ACI but statistically insignificant, probably because of the level of variation across households, given that many households will be able to plan for the cost of services in the period leading up to delivery.

Variables	Catastrophic expenditure thresholds			
	20%	30%	40%	50%
Hospitalisation (N=567)	0.19*	0.19*	0.26*	0.18*
Outpatient visits (N=3112)	0.08*	0.08*	0.10*	0.13*
Institutional delivery (N=491)	0.18	0.16	0.13*	0.12

 Table 7: Estimated regression coefficients – ACI on catastrophic expenditure threshold

*= Significant at 5% level

6. Discussion and Conclusions

A common assumption is that catastrophic healthcare expenditure is typically the result of hospitalisation for an acute illness (Xu et al. 2003; Berki 1986). However, here we find that while hospitalisation was certainly correlated with catastrophic expenditure, the effect associated with chronic illness was even more pronounced. On reflection, the expenditure risk associated with chronic illness is not surprising. It will generally both increase long-run household outgoings and reduce the supply of household labour (of the person affected and possibly those caring for them) and hence household income. Even if the medical costs of treatment do not directly result in catastrophic expenditure, by acting as a long-term drain on household resources, chronic illness may make a household more vulnerable to demands arising from acute illness or other shocks to household wellbeing.

It also seems plausible that the poorer the household the more reluctant they will be to take on the often considerable burden of inpatient care costs, either fearing the impact of such costs on other aspects of household well-being or simply being unable to raise the money to fund treatment. This would almost certainly be the case in terms of private hospitals, where the study found that treatment costs were was almost four times as expensive as at a government facility, resulting in a much higher risk of catastrophic expenditure (Kanjilal et al. 2007; Limwattananon et al. 2007). It may well be the case that some poor households simply cannot afford catastrophic healthcare expenditure on inpatient services and instead have to cope with the even more catastrophic effects of not obtaining treatment. This may be one reason for the slightly contradictory findings as to the two poverty indicators in our findings.

Rural households were more susceptible to incurring catastrophic payment than urban (Yardim et al. 2009). With the exception of delivery services, the cost of care in rural areas is not substantially less in rural as compared to urban areas. Rural households will typically also have more limited choice of local qualified provider and face higher travel and daily leaving cost, including food and lodging for the escorts of the ailing household member. Access issues may also result in delaying care seeking behaviour for conditions which then become more disabling and expensive to treat.

Catastrophic expenditure on care, irrespective of the precise threshold we adopt, is significantly correlated with our coping strategy index, i.e. the higher the relative expenditure on either inpatient or outpatient care the more extreme will be the likely coping mechanisms

adopted and the greater the likelihood of long-run damage to household well-being. The impact of catastrophic expenditure on hospitalisation is around twice that for outpatient care, possibly indicating that the need for inpatient care, and the associated expenditure, may arise relatively suddenly, not allowing time to arrange funding from sources that would have less impact on household well-being. Note that there is no clear relationship between catastrophic expenditure on delivery services and the coping index. Again, this may relate to the time period over which plans can be made to identify appropriate funding sources.

To cope with catastrophic expenditure on health care, most Indian households have to find relatively large sums of money from whatever sources are available, often at very short notice and sometimes resulting in long-term damage to their well-being. Extending risk pooling to the poor via occupational schemes would be very difficult in India because most work in the informal sector (Ranson 2002; Ekman 2004). Providing health care free at the point of service to the entire population is not a feasible option and devising mechanisms to target free care to the poorest is extremely problematic (Shahrawat and Rao, 2013). Community-based schemes also have inherent limitations that impede the achievement of universal coverage (Panda et al, 2013). It seems clear that no single scheme will fully address the diverse needs of poor households for ambulatory, inpatient and chronic care and policy makers will have to seek a targeted mix of social support mechanisms if they wish to address those needs.

References

- Berki SE. (1986) A look at catastrophic medical expenses and the poor. *Health Affairs* (*Millwood*). 5:138-45
- Berman, P., Ahuja, R., & Bhandari, L. (2010). The Impoverishing Effect of Healthcare Payments in India: New Methodology and Findings. *Economic & Political Weekly*, XLV(16):65-71.
- District Level Household & Facility Survey- 3 (DLHS-3), (2007-08) Reproductive and child health project, Ministry of Health and Family Welfare, Government of India.
- Ekman B. (2004) Community based health insurance in low income countries: a systematic review of the evidence. *Health Policy and Planning*. 19: 249-70
- Flores G, Krishnakumar J, O'Donnell O and Doorslaer E V.(2008) Coping with health care costs: implications for the measurement of catastrophic expenditures and poverty. *Health Economics*. 17(12):1393–1412.
- Garg C and Karan A K.(2005) Health and Millennium Development Goal 1: Reducing outof-pocket expenditures to reduce income poverty - Evidence from India. EQUITAP Project Working Paper No. 15, May, 2005. [Online available http://www.equitap.org/publications/wps/EquitapWP15]
- Ghosh, S. (2011). Catastrophic Payments and Impoverishment due to Out-of-Pocket Health Spending. Economic & Political Weekly, XLVI(47): 63-70.
- Ghosh, S. (2010).Catastrophic Payments and Impoverishment Due to Out-of-Pocket Health Spending: The Effects of Recent Health Sector Reforms in India. Asia Health Policy Program working paper 15. Stanford University. Walter H. Shorenstein Asia-Pacific Research Center. Freeman Spogli Institute for International Studies.
- Government of India, 2013. SRS Based Abridged Life Tables 2003-07 to 2006-10. http://www.censusindia.gov.in/vital_statistics/SRS_Based/SRS_Based.html

- Gupta I. (2009) Out-of-pocket Expenditures and Poverty: Estimates From NSS 61st Round. Draft paper. Institute of Economic Growth, New Delhi.
- Kanjilal B, Mukherjee M, Singh S, Mondal S, Barman D, Mandal A.(2007) Health, Equity and Poverty Exploring the links in West Bengal. FHS Working Paper 4, India, [Online available http://www.futurehealthsystems.org/publications]
- Kawabata K, Xu K and Carrin. (2002) Preventing impoverishment through protection against catastrophic health expenditure. Bull. World. Health Organization. 80(8): 612
- Krishna A. (2006) Pathways Out of and Into Poverty in 36 Villages of Andhra Pradesh, India World Development. 34(2):271-288
- Ladusingh, Laishram and Anamika Pandey (2013). Health Expenditure and Impoverishment in India. Journal of Health Management. 15(1):57-74
- Leive A and Xu K. (2008) Coping with out-of-pocket health payments: empirical evidence from 15 African countries. Bull World Health Organ. November, 2008. 86 No.11: 849-856
- Limwattananon S., Tangcharoensathien V. and Prakongsai P.(2007) Catastrophic and poverty impacts of health payments: results from national household surveys in Thailand. Bulletin of the World Health Organization. 85:600–606
- Lu C, Chin B, Li G, Murray CJ. Limitations of methods for measuring out-of-pocket and catastrophic private health expenditures. Bull World Health Organ 2009;87(3):238-44, 244A-244D.
- Narayan D, Chambers R, Shah M and Petesch P. (2000) Voices of the Poor: Crying out for Change. Oxford University Press. New York.
- O'Donnell O. (2008) Who pays for health care in Asia?. Journal of Health Economics, 27. Issue 2, March 2008:460-475
- Pal R (2010) Analysing Catastrophic OOP Health Expenditure in India: Concepts, Determinants and Policy Implications, working paper 2010-001, Indira Gandhi Institute of Development Research (IGIDR), Mumbai
- Panda, Pradeep and Chakraborty, Arpita and Dror, David M. and Bedi, Arjun S., Enrolment in Community Based Health Insurance Schemes in Rural Bihar and Uttar Pradesh, India (2013). International Institute of Social Studies, Erasmus University Rotterdam; Working Paper No. 555, ISSN 0921-0210. Available at SSRN: http://ssrn.com/abstract=2246260
- Peters DH, Yazbeck AS, Sharma RR, Ramana GNV, Pritchett LH, Wagstaff A (2002). Better Health Systems for India's Poor: Findings, Analysis, and Options. Human Development Network, (Health, nutrition, and population series). Washington DC: World Bank: 1–376.
- Planning Commission, Govt. of India (Website: http://www.planningcommission.nic.in).
- Purohit, Brijesh C (2008). Efficiency of the Health Care System: a Sub-State Level Analysis For West Bengal (India). Review of Urban and Regional Development Studies 23(3):212-225.
- Rahman, Md. Mizanur, Stuart Gilmour, Eiko Saito, Papia Sultana, Kenji Shibuya (2013). Health-Related Financial Catastrophe, Inequality and Chronic Illness in Bangladesh. PLOS ONE 8(2). www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0056873

- Rana, P K and B P Mishra (2012). Ailing Health Status in West Bengal Critical Analysis. *Journal of Law, Policy and Globalization*. Volume 2. http://works.bepress.com/context/bhabani_mishra/article/1000/type/native/viewcontent
- Ranson MK. (2002) Reduction of Catastrophic health care expenditure by community based health insurance scheme in Gujarat, India: current experience and challenges, *Bulletin of the World Health Organization*. 80: 613-621

Sample Registration System (SRS) (2008) Bulletin of SRS 43 (1)

- Selvaraj, S., & Karan, A.K. (2009). Deepening Health Insecurity in India: Evidence from National Sample Surveys since 1980s. Economic & Political Weekly, XLIV(40): 55-60.
- Shahrawat, Renu and Krishna D Rao (2013). Insured yet vulnerable: out-of-pocket payments and India's poor. *Health Policy and Planning*. 27(3): 213-221.
- SRS Bulletin. Sample Registration System. Registrar General of India. http://censusindia.gov.in/Vital_Statistics/SRS_Bulletins/Bulletins.aspx
- Su TT, Kouyate B and Flessa S.(2006) Catastrophic household expenditure for health care in a low-income society: a study from Nouna District, Burkina Faso. *Bulletin of World Health Organization*. January, 2006, 84, No.1:21-27
- Suryanarayana, M H, Ankush Agrawal and K. Seeta Prabhu (2011). *Inequality adjusted Human Development Index for India's States*. UNDP.
- Sun Xi, Jackson S, Carmichael G, Sleigh A C.(2009) Catastrophic medical payment and financial protection in rural China: evidence from the New Cooperative Medical Scheme in Shandong Province. *Health Economics*. 18:103-119
- Van Damme W, Leemput L V, Por I, Hardeman W and Meessen B. (2004) Out-of-pocket health expenditure and debt in poor households: evidence from Cambodia, *Tropical Medicine and International Health*. 9:273-80
- Wagstaff A. (2008) Measuring Financial Protection in Health, Working Paper No. 4554, The *World Bank*, March 2008
- World Health Organization, World Health Report 2000, Geneva, WHO
- Xu K, Ravndal F, Evans DB, Carrin G. Assessing the reliability of household expenditure data: results of the World Health Survey. Health Policy 2009;91(3):297-305.
- Xu K, Evans D B, Kawabata K, Zeramdini R, Klavus J and Murry CJL. (2003) Household catastrophic health expenditure: a multicountry analysis, Lancet, July 12, 2003, 362:111–117
- Yardim M, Cilingiroglu N, Yardim N.(2009) Catastrophic health expenditure and impoverishment in Turkey. *Health Policy*. 94, Issue1:26-33

	Component Weights			
	Out-			
	Hospitalisation	patient	Delivery	
Payment from current income	-0.0415	0.1157	0.1276	
Payment from savings	0.0199	0.0875	0.0314	
Borrowing with interest	0.1009	0.1527	0.1096	
Borrowing without interest	0.1121	0.0148	0.0803	
Reduced purchase of consumer durables	0.6010	0.2466	0.6038	
Reduced spending on social				
obligations/functions	0.5945	0.1952	0.1455	
Reduced spending on food consumption	0.0857	0.3025	0.4285	
Reduced spending on other consumption	0.2827	0.1892	-0.0380	
Withdrawing child from education	0.1707	0.4446	0.3326	
Postponing a daughter's marriage	0.2417	0.0908	0.6164	
Stopping medical treatment of any other				
member	0.4422	0.4587	0.1437	
Selling property	-0.0463	0.0757	-0.0678	
Mortgaging property	0.0122	-0.0138		
Stopping purchase or expansion of a house	0.4337	0.5283	-0.0261	
Other sources	0.0196	0.0028		

Annex 1: Aggregate coping indices calculated using principal components analysis