

# Healthcare Consumption in Uttar Pradesh

## Iniquitous Growth and the Social Factors Contributing to Impoverishment

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The modest economic growth in Uttar Pradesh over the last decade has not resulted in the betterment in the health and well-being of the people. This study is based on a household survey undertaken in three representative districts to understand the contribution that the provision of healthcare makes to the iniquitous nature of economic growth in the state. By assessing the incidence and intensity of catastrophic expenditures on health by analysing their consumption patterns we find that there is an impoverishing effect that out-of-pocket healthcare expenditures have on the people of the state.

Uttar Pradesh (UP) is India's most populous state. With its 19.9 crore population, were it a country, it would be the sixth largest in the world. As the official website of the state department of health states: "Life in Uttar Pradesh is short and uncertain ... in these respects Uttar Pradesh resembles sub-Saharan Africa ..." (Government of Uttar Pradesh 2016). UP currently has a under-five mortality rate of 64 per 1,000 births, calculated by SRS data (Sample Registration System), which is the third highest in India—with only Madhya Pradesh and Odisha being higher (Census of India nd). If we take the Annual Health Survey 2011–12 estimates, then the under-five mortality is even higher at 92 per 1,000 live births (Census of India 2013). UP's maternal mortality is estimated at 285 per 1,00,000 in 2011–13, which is second only to Assam (Census of India 2013). The undernutrition levels in UP are 42.4% underweight, 56.8% stunting and 14.8% wasting, which is second only to Bihar (Indiastat 2011); its male life expectancy stands at 62.5 at birth and its female life expectancy at 65.8 at birth, as compared to all-India figures of 65.8 for males and 69.3 for females (Census of India 2013). Further, the demographic transition of UP has been slow—among all the major Indian states UP has the highest birth rate (27 per 1,000 in 2014) and the highest fertility rate (3.2) (Census of India 2013).

UP with a per capita net state domestic product (NSDP) at current prices of ₹40,373 (2014–15), is the second poorest state in the country; only Bihar is poorer. This NSDP per capita is significantly less than the all-India NSDP per capita (2013–14) which is ₹74,308. However, on the positive side, UP has witnessed a robust growth over the last decade. The economic growth rate has been reasonable—about 44% over eight years or an average of 5.5% per year—the NSDP per capita rose from ₹12,950 in 2004–05 to ₹18,635 in 2012–13 at constant prices (*Statistics Times* 2015). However, this economic improvement has not been reflected in an improved standard of health and well-being. The estimated proportion of the population living below the poverty line (BPL) is 39.8% or 809.1 million in 2011–12 (using the Rangarajan methodology). Urban poverty is higher at 45.7%, while rural poverty is at 38.1% (Planning Commission 2014). In all four key indicators of the health status of the population—under-five mortality rate, maternal mortality rate, life expectancy at birth and nutritional status in under-five age group—UP performs poorly.

The authors would like to thank the Indian Council of Social Science Research, New Delhi for funding this study.

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The reasons for the iniquitous nature of growth are many, but one dimension of this phenomenon that this paper explores is the contribution that the health sector makes to this rising inequity. We know that high out-of-pocket expenditure (OOPE) on healthcare could lead to inadequate access because of financial barriers and therefore poorer health outcomes. And we know that healthcare costs could lead to a deepening in the level of poverty (Shahrawat and Rao 2011) and could neutralise the effect of poverty alleviation programmes. We note that if consumption expenditure is taken as a measure of poverty, the higher consumption of healthcare due to a high morbidity rate and a higher cost of care could contribute to a higher measured NSDP; though this is at the cost of consuming other essentials of life. It has therefore been recognised that in welfare states, the provision of affordable healthcare ought to be one of the fundamental priorities of the state (Garg and Karan 2006).

This paper attempts to assess the incidence, extent and intensity of catastrophic health expenditures and its contribution to impoverishment in UP, and how this varies within different socio-economic and regional contexts. It also looks at the effectiveness of current approaches to financial protection, against the costs of healthcare, and the implications of this for defining future healthcare strategies.

### Methodology

A household survey to measure healthcare utilisation and expenditure was conducted in three districts of UP, each of which was picked randomly from a list of districts categorised into three separate regions—Kushinagar district from Eastern UP, Aligarh from Western UP and Hamirpur from the Bundelkhand region, respectively. The study aimed to survey 1,200 households from each district and the distribution of the sample from each of the districts was conducted through a multi-stratified random sample, proportionate to the respective districts size. The total sample size was 3,338 households spread across 47 villages and 13 wards of the three districts.

The usual monthly per capita consumption expenditure (UMPCE) of the household(s) has been taken as a proxy for income level and this was collected through a short set of questions based on the methods used by the NSSO (National Sample Survey Office). Each household was asked whether any member of the household had an ailment in the last 30 days (at the time of conducting the survey), or if anyone of them were hospitalised in the preceding 365 days, and if in case there was such a finding, then the cause was sought and codified using the same codes as used by the NSSO 71st round. Data on choice of provider and insurance coverage was also collected. The total OOPE, including the details of medical expenses on drugs and diagnostics, consultancy fees and hospitalisation charges and non-medical expenses like transport were also collected. An equity analysis was done based on district/region, economic quintile, urban–rural residence, religion and caste.

**Measures of catastrophic health expenditure:** Catastrophic payment headcount (HC) is the ratio of households incurring a

catastrophic expenditure to the total sample size (Garg and Karan 2006):

$$HC = 1/n \sum L (T/x > z)$$

where  $L$  is an indicator function and  $L = 1$  if  $T/x > z$  and  $L = 0$  otherwise. ' $n$ ' is the number of households making an expenditure on hospitalisation for various thresholds.  $T$  is the expenditure on hospitalisation during the year and  $x$  is the total annual consumption expenditure. However, this measure does not reflect the amount by which households exceed the threshold.

The CHE (catastrophic health expenditure) threshold, " $z$ " has been defined in four different ways. One is as 10% of the annualised UMPCE and another, more recently in vogue since the advent of the World Health Organization's Global 100 Core Health Indicators, is 25% of annualised UMPCE. Yet another threshold in use is 40% of total annualised non-food expenditure and out of these, a more stringent measure is setting the threshold at 20% of total non-food expenditure. We have chosen to use 10% of UMPCE and 40% of non-food expenditures as the thresholds in the study. While estimating UMPCE we have excluded the cost of hospitalisation.

Average catastrophic payment overshoot ( $o$ ) is used to capture the average degree by which payments (as a proportion of total expenditure) exceed the threshold  $z$ . If the household overshoot is  $O_i = E_i((T_i/x_i) - z)$ , then the overshoot is simply the ratio of aggregate overshoots for all households to the total sample size:

$$O = 1/N \sum O_i$$

where  $N$  is the sample size of households which incurred CHE. While the headcount ratio only captures the incidence of catastrophe occurring, the overshoot ratio captures the intensity of the occurrence as well (Chuma and Thomas 2012).

A logistic regression (logit) model has been used to estimate the probability of a catastrophic health expenditure occurrence. On the basis of literature, it is assumed that households having a catastrophic expenditure are affected by various factors such as regional disparities, social category, place of living and income status (Li et al 2012). The Wald test has been used to determine the significance level of the predictor variable.

### Results and Findings

**Household profile in survey districts:** The demographic characteristics of the sampled population in the three districts are given in Table 1 (p 75). The average household size for the population surveyed was 5.44 and about 81.2% were rural households. We also note that 86.9% of households were Hindus, 12.1% were Muslims and 0.95% were others. OBCs (Other Backward Classes) predominated about 48.5% of surveyed households while SC/ST (Scheduled Caste and Scheduled Tribe) proportion of households was also high, at 22.6%. About 57% of the households sampled had a permanent brick structure for their house—this is an important proxy indicator of being non-poor. Though there are significant differences between

the three districts, the average noted in the entire sample was very similar to the UP average—indicating that it is representative.

Disaggregated by district, we see a gradient from Aligarh in Eastern UP, relatively the most urbanised and least poor of the three regions, to Kushinagar in the eastern region and to Hamirpur in Bundelkhand; the latter easily being the least urbanised and the poorest district of the three. From secondary data, we note that the proportion of households which were issued a BPL card are 17.5% in Aligarh, 36.7% in Hamirpur and 44.7% in Kushinagar—as compared to 29.43% for the state as a whole.

## Household Expenditure on Healthcare

**Ambulatory care:** Household expenditure on healthcare has been analysed for ambulatory and inpatient care separately.

**Table 1: Household Profile in the Survey Area**

Household Characteristics	Category	Aligarh (n=1,117)	Hamirpur (n=1,104)	Kushinagar (n=1,117)	Total (n=3,338)	Uttar Pradesh*
Household size	Average household size	5.24	5.01	6.08	5.44	6.0
Place of residence	Rural	75	77.8	90.8	81.2	77.89
	Urban	25	22.2	9.2	18.8	22.11
Religion	Hindu	77	94	84.8	86.9	79.7
	Muslim	21.6	5.6	14.1	12.1	19.3
	Others	1.4	0.4	1.2	0.95	1
Caste	SCs/STs	25.7	16.4	25.5	22.6	20.5
	OBCs	30.3	57.9	57.4	48.5	50
	General	44	25.7	17.1	29	29.5
Type of house	Pucca	73.9	41.1	55.5	56.9	61.9
	Semi-pucca	16.2	20.1	20.9	19.1	21.9
	Kutcha	9.9	38.8	23.5	24	16.1
Nearest health centre	SC	0.4	7.2	1.8	3.1	-
	PHC	15	49.4	25	29.7	-
	CHC	37	36.3	63	45.5	-
	Sub-district hospital	8.8	2.2	5	5.3	-
	District hospital	30	4.9	4.7	13.2	-
Others	8.9	0	0.5	3.1	-	
Mean distance to hospital	Mean (in kms)	6.04	4.95	3.98	4.99	-

Source: Estimated from field data, \* Census 2011.

**Table 2: Ailment-wise Mean Expenditure on Health by Type of Health Facility for Outpatient Care** (₹)

Type of Ailment	Type of Health Facility						n
	Public n=628		Private n=1,234		Others n=547		
	Mean	Median	Mean	Median	Mean	Median	
Infections	1,002	701	1,872	1,000	540	70	403
Cancers	1,900	400	5,530	2,000	0	0	45
Blood diseases	2,283	1,201	2,750	1,700	600	600	66
Endocrine, metabolic and nutritional	677	300	2,345	1,500	0	0	180
Psychiatric and neuro	424	232	2,927	1,850	800	500	78
Eye	718	400	2,688	1,000	145	145	13
Ear	561	221	1,834	1,310	0	0	126
Cardiovascular	508	200	967	551	250	250	97
Respiratory	1,253	600	1,631	1,225	0	0	207
Gastrointestinal	1,186	580	3,998	2,001	567	550	17
Skin	1,151	1,151	1,712	1,050	0	0	87
Musculoskeletal	550	340	2,148	1,800	465	130	183
Genito-urinary	808	451	3,242	1,500	230	100	661
Obstetrics	801	450	1,915	1,100	473	266	204
Injuries	1,697	552	2,238	1,640	733	350	24
All	2,182	851	2,563	1,200	899	400	2,391

Source: Estimated from field data.

For ambulatory care, healthcare providers have been classified as “public healthcare providers,” “private healthcare providers” and “others.” The category of “others” includes informal and unregistered medical practitioners (who may paradoxically be referred to as “RMP’s” which is an acronym of registered medical practitioners) as well as traditional healers. Of the total of 2,391 cases where ambulatory care was sought in the last 15 days, 51.7% of households sought this service from a formal private provider, another 22.1% from an informal private provider and 26.3% from the public sector (Table 2).

The proportion of people seeking care from informal healthcare providers is high, but the average OoPE they incur for such care is relatively low. The median OoPE, in these cases, is about ₹400 per visit. In contrast, the public sector provider is about twice as costly, the median OoPE being ₹851 and the mean OoPE is as high as ₹2,182. The formal “private health care provider” is about one-third more costly than the public provider, in terms of the median OoPE, and is only 20% costlier, in terms of the mean OoPE. This pattern is seen across all specific causes and ailments for which care is sought—an important exception being mental illness where the public healthcare provider is more affordable than the informal provider. The general perception is that the public provider provides free or highly subsidised care whereas the private sector is much costlier. But we note that in UP, for ambulatory care the public provider charges are comparable to those of the private sector. This is due to a mix of user fees and the need to pay out of pocket for most drugs and diagnostics prescribed—all reform measures that were introduced under the structural adjustment programme of the 1990s.

The difference between the mean and the median is instructive. The median is often the more useful figure for comparison, since a few patients might require high cost interventions due to the nature of their disease, which may skew the average. However, when the mean costs are much higher it indicates that there is a significant subset of patients who are facing a much higher OoPE—this calls for specific financial protection strategies. This difference between the mean and the median OoPE is maximal in public sector hospitals and is within the two for injuries.

**Inpatient care:** Unlike the case of ambulatory care, the mean OoPE for hospitalisation is ₹38,202 (private healthcare provider), which is more than seven times higher than the mean OoPE of ₹5,180 incurred on hospitalisation in public hospitals (Table 3, p 76). On the other hand, in the case of cancer/tumours, the mean OoPE is high in both public as well as private facilities. The mean OoPE on hospitalisation for ailments like cardiovascular diseases, gastrointestinal diseases, bone/joint diseases and external injuries is substantially high even in public hospitals. The difference between the mean OoPE of private healthcare and public healthcare providers is maximal, for ailments like

neurological disorders, cardiovascular diseases and external injuries. However, the relatively low median expenditure for the same ailments suggests that the high hospitalisation expenditure, for certain individuals, may have resulted in a higher mean value for the ailment in public facilities.

**Table 3: Ailment-wise Mean Expenditure on Healthcare by Type of Health Facility for Inpatient Care** (₹)

Type of Ailment	Type of Healthcare Facilities			
	Public Hospitals n = 320		Private Hospitals n = 1,441	
	Mean	Median	Mean	Median
Infection	2,918	2,356	27,758	14,000
Blood diseases	6,956	5,500	36,061	30,350
Endocrine	5,009	3,821	38,232	24,000
Neurological	5,298	5,400	42,355	18,600
Cardiovascular	10,300	6,500	64,636	30,000
Respiratory	3,906	3,500	19,757	15,000
Gastrointestinal	7,022	4,752	38,550	22,175
Bone/joint	13,823	3,101	33,471	17,500
Urinary	4,143	2,651	31,603	20,000
Injuries: external	10,862	8,000	50,860	32,500
Cancer	24,354	21,000	35,400	22,350
Eye	3,429	1,800	17,840	10,000
Total (n = 1,761)	5,180	3,000	38,202	20,000

Source: Estimated from Field data.

This has to be explained in perspective. The NSSO 71st survey (A-97 Table 18b-R) shows that UP has the third highest OOPe in the provision of services by public hospital for rural households and the second highest OOPe for urban households. In contrast, in terms of private sector hospitalisation it is 14th amongst the states, for rural households and 11th for urban households.

In order to understand the pattern of healthcare expenditure for ambulatory and inpatient care for various health seekers, the medical and non-medical expenditures have been taken into account. Medical expenditure includes consultation fees, surgical charges, bed charges and expenses on drugs and diagnostic care. This is substantially more than

**Table 4: Average Total Medical Expenditure per Child Birth in the Survey Area**

Background Characteristics	Category	Mean	Median	Std Error of Mean
District	Kushinagar	1,0310	3,844	878
	Hamirpur	6,834	2,001	1,011
	Aligarh	10,095	4,200	1,008
	All	9,103	3,003	557
	Place of residence	Rural	8,842	3,000
	Urban	10,386	3,160	1,578
	All	9,103	3,003	557
Religion	Hindu	9,287	3,000	623
	Muslim	8,197	3,251	1,204
	Others	5,461	4,800	621
	All	9,103	3,003	557
Caste	SC/ST	7,320	2,830	965
	OBC	9,554	2,900	862
	General	9,665	3,963	947
	All	9,103	3,003	557
Type of hospital	Public hospital	4,943	2,301	348
	Private hospital	20,003	10,950	1,586
	Non-institutional	3,456	2,100	751
	All	9,103	3,003	557

Source: Estimated from field data.

non-medical expenses, but the latter even without counting loss of wages, is significant. Non-medical costs are less in ambulatory care and less for informal providers—since the distance to travel in order to access such care would be less.

**Medical expenditure on child birth:** Out of the total households surveyed, 844 pregnancy cases were reported in the three districts. The average total medical expenditure per child birth accounted to ₹9,103 in the survey sample (Table 4). This is lower in Hamirpur (₹6,834) compared to Aligarh (₹10,095) and Kushinagar (₹10,310). Also, the average medical expenditure per child birth is higher in urban areas (₹10,386) as compared to that in rural areas (₹8,842) (Table 4).

The average expenditure per child birth in private hospitals (₹20,003) is almost four times more than that in public hospitals (Table 4). Socio-economic groups, who tend to use public health services more, will face a lesser expenditure. Religion wise, there is no significant difference in the average expenditure, but in the case of social categories the average expenditure for SCs and STs is much lower (₹7,320) as compared to OBCs (₹9,554) and general category (₹9,665). This also explains why households in Hamirpur district incur a far less expenditure for childbirth as compared to households in the other two districts (Table 5).

The preferences of women towards institutional deliveries have increased in recent years—even in rural areas. In our

**Table 5: District-wise Average Total Medical Expenditure per Childbirth**

Background Characteristics	Category	Average Medical Expenditure Per Childbirth		
		Kushinagar	Hamirpur	Aligarh
Place of residence	Rural	10,062	5,764	10,349
	Urban	12,742	10,270	9,045
	Total	10,310	6,834	10,095
Religion	Hindu	10,324	6,909	11,096
	Muslim	10,237	5,755	6,914
	Total	10,310	6,834	10,095
Social category	SCs/ STs	8,893	4,029	7,320
	OBCs	10,335	7,223	9,554
	General	12,337	7,606	9,665
Type of hospital	Public hospital	4,711	3,873	6,515
	Private hospital	18,144	19,243	26,868
	Non-institutional	2,168	1,088	5,303
	Total	10,310	6,834	10,095

Source: Estimated from survey data.

**Table 6: Utilisation of Delivery Services for Childbirth**

Category	District	Type of Delivery Services		
		Public Hospital	Private Hospital	Non-institutional
Rural	Kushinagar	49.5	42.7	7.8
	Hamirpur	82.5	15.6	1.9
	Aligarh	71.6	18	10.3
	All	65.6	27.7	6.7
Urban	Kushinagar	50	46.7	3.3
	Hamirpur	60.6	33.3	6.1
	Aligarh	66	19.1	14.9
	All	60.1	31.5	8.4
All	Kushinagar	49.5	43.1	7.4
	Hamirpur	77.3	19.8	2.9
	Aligarh	70.5	18.3	11.2
	All	64.7	28.3	7

Source: Estimated from survey data.

sample, more than 90% of the total deliveries in the rural areas as well as urban areas were institutional. In rural areas, nearly 65% of all deliveries took place in government hospitals, while only 27.7% of deliveries took place in private hospitals (Table 6, p 76). In urban areas, nearly 60% of all childbirths took place in public hospitals, while only 31% took place in private hospitals (Table 6). This development is probably due to the implementation of the National Rural Health Mission (NRHM) from 2005 onwards and the Janani Suraksha Yojana (a conditional cash transfer scheme), along with improvements in maternal healthcare facilities in public hospitals.

**Measures of financial hardship:** We have measured financial hardship caused by hospitalisation in the preceding year using two indicators—CHE headcount ratio also known as the incidence of CHE and the catastrophic payment overshoot (O). Headcount or incidence gives the percentage of households exceeding the threshold and payment overshoot captures its intensity.

Using the headcount ratio for CHE, we find that 56.95% of those who were hospitalised in UP faced financial hardship using the 10% total consumption threshold. This rose to 60.73% when we used the 40% non-food expenditure threshold. Further, the average overshoot was 10.32% using the former threshold and it rises to 26.5%, using the latter. Or in other words the intensity of financial hardship faced is seen to be much more when we use only the non-food expenditure threshold (Table 7).

The incidence of catastrophic expenditure was highest in Kushinagar among all the three districts, followed by Hamirpur and Aligarh. In Kushinagar, about 67% of households (two out of three) faced CHE by either method and in the other two districts it was about half of those who needed hospitalisation (Table 7).

**Table 7: Place-wise Measures of Catastrophic Payments**

Place	10% Threshold as Percentage of Total Consumption Expenditure		40% Threshold as Percentage of Annual Non-food Expenditure	
	Headcount Ratio (HC)	Average Overshoot (O)	Headcount Ratio (HC)	Average Overshoot (O)
State Sample				
Rural	55.83	9.94	60.46	26.89
Urban	62.58	12.08	62.74	25.18
Total	56.95	10.32	60.73	26.50
Social category				
SCs/STs	56.47	18.36	64.24	55.96
OBCs	51.45	9.26	55.9	22.57
General	32.95	5.80	34.82	10.06
Kushinagar				
Rural	69.03	11.74	70.8	23.15
Urban	48.54	8.62	48.54	20.98
Total	67.14	11.46	68.75	22.95
Hamirpur				
Rural	50.17	8.77	61.58	20.24
Urban	61.63	10.76	65.31	15.71
Total	52.72	9.21	62.41	19.24
Aligarh				
Rural	44.99	8.84	46.06	37.91
Urban	68.82	14.55	65.95	35.14
Total	51.54	10.39	51.63	37.66

Source: Estimated from survey data.

**Rural–urban disparities:** As clearly indicated, the catastrophic payment headcount ratio is higher for urban households as compared to rural households in Hamirpur and Aligarh. The reason for a higher headcount ratio in the rural areas of Kushinagar could be due to higher levels of poverty, combined with a poor public health infrastructure and a higher use of private healthcare facilities among households in the district. In all the three districts taken together, 55.8% of households in rural areas experienced CHE whereas in urban areas, 62.58% of households do so. Using 40% of non-food expenditure as the threshold we find an even higher percentage—more than 60% in both rural and urban areas—record CHE (Table 7). This is the more sensitive way of measuring CHE, though it is much more difficult to compute.

The poorer sections of the population are characterised by a greater proportion of consumption expenditure being devoted to food, which means much less non-food expenditure. Any incurrence of healthcare costs easily compromises this small level of non-food expenditure. Similar findings have been found in a study on Kenya, which states that the difference in expenditure patterns among various economic groups in developing and underdeveloped countries, is caused by the difference in the levels of average overshoot (O) (Chuma and Thomas 2012). However, the intensity of catastrophic payment on health as measured by average overshoot (O), is about 10% using the 10% threshold and rises to about 26% when we use 40% of non-food expenditure as the threshold (Table 7).

Among the three districts, both the headcount ratio and average intensity (O) is highest in Kushinagar, when we measure using the 10% threshold. Using the 40% threshold, Kushinagar has the highest headcount ratio, but it is Aligarh which has a much higher intensity (O). Thus, on an average those households who experience CHE in Aligarh have to spend 37.66% more than the threshold (Table 7).

**Social disparities:** Social category plays a differential role on the pattern of expenditure on healthcare. In the survey sample, the headcount ratio for CHE is highest for SCs/STs using both the thresholds (Table 7). What is of even greater concern is that the average overshoot is far above the levels of overshoot for households in the other two categories (OBCs and general). Given the higher levels of poverty amongst SCs/STs, such a finding is not surprising—nevertheless it gives us an idea of how much of a crisis healthcare costs are creating for the most marginalised sections of UP. The incidence of CHE did not differ much by religion.

**Income groups-wise disparities:** The findings with regard to financial hardship are however counter-intuitive. We expect it to be maximal amongst the poorest—we find it to be about the same across all income quintiles—marginally lower in the lowest group and highest in the fourth quintile using the 10% of total consumption threshold and with almost no difference using the 40% non-food expenditure threshold (Table 8, p 78).

**Table 8: Income Groups-wise Measures of Catastrophic Payments in the Survey Area**

Income Groups	10% Threshold as Percentage of Total Consumption Expenditure		40% Threshold as Percentage of Annual Non-food Expenditure	
	Headcount Ratio (HC)	Average Overshoot (O)	Headcount Ratio (HC)	Average Overshoot (O)
1st quintile	54	10.01	68.33	68.10
2nd quintile	59.83	7.22	69.5	22.30
3rd quintile	67.17	9.55	67.67	16.32
4th quintile	73.5	14.32	68.17	18.17
5th quintile	62.33	16.29	64.17	22.51
Total	56.95	10.32	60.73	26.50

Source: Estimated from survey data.

A similar pattern is seen with the average overshoot also. This finding is difficult to interpret. One possible reason is that people limit their consumption of healthcare to what they can afford and the provider is also flexible in pricing the product—so that at a certain level of CHE, the overshoot consumption gets capped. To explain further with an analogy, a person in the fifth quintile needs and is prescribed ₹200 worth of drugs—which he buys. But a person in the first quintile, with the same needs and the same prescription, decides to cap his purchase of drugs to ₹40 (which is what he has) and lets the pharmacist decide which drugs will fit into his capacity to pay (this example is well known among health activists working on rational drug therapy and is used to advocate against irrational and unnecessary additions to a patient’s prescription). This capacity to pay could be (in our explanation) in excess of the thresholds by different absolute values, but by similar percentages across the five quintiles. This capping or limiting of consumption, by both patient and provider, would not be limited to drugs alone, but could be extended to the choice of provider, choice of procedure, medication compliance, end of life care and much more.

In summary, those in the lower quintile limit their healthcare consumption even at the cost of incomplete or inadequate treatment, while those in the upper quintile are charged on the basis of what the market can bear—which is one reason why the overshoot costs reach similar levels across all quintiles. Further, households from higher income groups avail private healthcare facilities more easily for a wider basket of services and therefore, their costs are higher.

**Logistic Analysis for Catastrophic Expenditure on Health**

Various factors such as regional disparities, social category, place of living and income status affect the likelihood of a household to make CHES. A dichotomous choice logistic model has been developed to predict the probability of CHE in households. Here, we assume that households having CHES are affected by their social category, place of living (rural/urban), regional disparities and their economic status.

**Logistic analysis for the survey area:** Based on descriptive statistics, an empirical model has been developed to identify the factors affecting CHE:

$$\text{Log } \lambda_i = \alpha + \beta_1 \text{ DIS} + \beta_2 \text{ PLA} + \beta_3 \text{ SOCAT} + \beta_4 \text{ REL} + \beta_5 \text{ INCG} + \epsilon_i$$

where  $\lambda_i$  denotes OPE as a share of total consumption expenditure/non-food expenditure, DIS means district, PLA

means place of living, SOCAT means social category, REL means religion and INCG means income group. The logit model is based on the cumulative logistic probability function and is specified as:

$$P = F(Z) = 1 / (1 + e^{-(\alpha + \beta X)})$$

where Z determines a set of explanatory variables, X; F(Z) is the cumulative logistic function; ‘e’ represents the base of nature of natural logarithms and P is the probability of success when explanatory variable has the value X. Logit models are explained using odd ratios (Ali 2011). If an odd ratio is less than one, the likelihood of occurrence is less (Morgan and Teachman 1988). The result of the coefficients, standard error, significance level and odds ratio for various parameters of the logistic regression model are given in Table 9.

**Table 9: Results of Logistic Regression for Various Catastrophic Threshold Levels**

Variable	10% Threshold as Percentage of Total Consumption Expenditure			40% Threshold as Percentage of Annual Non-food Expenditure		
	Coefficient	z Value	Odds Ratios	Coefficient	z Value	Odds Ratios
Intercept	1.18*	5.8	3.27	1.02*	4.95	2.77
Regional characteristics						
District <sup>1</sup>						
Kushinagar	-0.76*	-6.9	0.46	-0.79*	-7.13	0.45
Hamirpur	-0.84*	-8.36	0.43	-0.4*	-3.87	0.67
Place (Rural =1)	-0.19**	-1.91	0.82	0.01*	0.11	1.01
Social category <sup>2</sup>						
SCs/STs	-0.22**	-1.85	0.803	-0.17	-1.49	0.83
OBCs	0.23	0.19	1.02	0.035	0.29	1.03
Religion <sup>3</sup>						
Hindus	0.26*	2.54	1.7	0.14	1.2	1.15
Others	-0.46	-0.63	0.63	-1.07	-1.42	0.34
Economic status <sup>4</sup>						
Quintile 1	-0.47*	-3.91	0.62	0.09	0.72	1.09
Quintile 2	-0.26*	-2.13	0.77	0.13	2.09	1.74
Quintile 3	0.05	0.43	1.05	0.035	0.28	1.04
Quintile 4	.41*	3.22	1.5	0.095	0.76	1.09
LR chi <sup>2</sup> (11)	165.95			102.01		
Prob > chi <sup>2</sup>	0.0000			0.0000		
Pseudo R <sup>2</sup>	0.0421			0.0270		

<sup>1</sup>Aligarh = Reference Group<sup>2</sup> General Caste = Reference Group

<sup>3</sup>Muslim = Reference Group<sup>4</sup> Quintile 5 = Reference Group

\* = Significant at 1% \*\* = Significant at 5%.

Source: Estimated from field data.

Overall, the model is statistically significant as indicated by the LR statistic(s) and the p value. Thus, it can be said that regional disparities, place of living, social category and income status significantly affect the likelihood that a household will make CHES. This implies that an urban Muslim household in Aligarh district, belonging to the general category and within the highest quintile, is 3.27 times more likely to spend more than 10% of their total consumption expenditure and 2.77 times more likely to spend more than 40% of their annual non-food expenditure as OPE on healthcare (Table 9).

Further, district, place of living and social category play a significant albeit, less important role, as compared to economic status and religion. At the 10% threshold, the coefficients of parameters reflect that households in Kushinagar and Hamirpur districts or, in a rural place or, belonging to the SC/ST category or, within the lower quintiles, are less likely to spend

more than 10% of their total consumption expenditure as OoPE for hospitalisation, as compared to households in Aligarh. Similarly, households belonging to the Hindu religion are 1.7 times more likely to make catastrophic expenditure at the 10% threshold as compared to Muslim households. At the 10% of total consumption threshold, households belonging to the first and second quintile are less likely to make CHes as compared to households in higher income groups. At the 40% threshold, the likelihood for CHE is highest for lower income groups, the main reason being the pattern of their non-food consumption expenditure.

Households from the fourth quintile are, however, 1.5 times more likely to spend more than 10% of their total consumption expenditure on OoPE as compared to households from fifth quintile. At the 40% threshold also, the district plays a less significant role as compared to the place of living. Households belonging to rural areas are more likely to spend more than 40% of their annual non-food expenditure as OoPE on healthcare. This is because rural households have the lowest average total consumption expenditure, as compared to urban households, and most of it is spent on food items.

**Impoverishment effect of expenditure on health:** Large OoPE on healthcare have an impoverishing effect on the household. In this study, the prevalence of poverty has been estimated by using the poverty headcount ratio (Hp). For this, the ratio of the fraction of people living below the official state poverty line before incurring expenditure on health (pre-poverty headcount<sup>1</sup>) to the fraction of people below poverty line after health payments (post-poverty headcount<sup>2</sup>), has been calculated (Hooda 2014). The state specific poverty line for rural as well as urban areas as adopted by Planning Commission for the year 2011–12 has been used (Planning Commission 2014).

The survey sample had only 13% of the population below the poverty line, if we applied the Rangarajan Committee method—a method which has been widely criticised for its underestimation of poverty (Planning Commission 2014). The survey shows that a single episode of hospitalisation almost doubles the population below the poverty line—going up to 21.26% after making a payment on healthcare (Table 10). The impoverishing impact of health payments is highest in

**Table 10: Impoverishment Effect of Expenditure on Health in the Area**

Background Characteristics	Total	No of Households below Poverty Line Pre-payment	Pre-poverty Headcount (Pre-Hp)	No of Households below Poverty Line Post-payment	Post-poverty Headcount (Post-Hp)
Survey area	Total	381	12.76	638	21.26
District	Kushinagar	130	13	212	21.2
	Hamirpur	136	13.6	267	26.7
	Aligarh	115	11.5	159	15.9
Place of residence	Rural	247	10.27	458	19.98
	Urban	126	13.26	180	17.74
Religion	Hindu	234	8.97	491	18.5
	Muslim	137	10.66	145	17.23
	Others	2	25	3	37.5
Caste	STs/SCs	167	11.16	299	19.67
	OBCs	150	8.97	245	18.45
	General	56	11.62	84	17.43

Source: Estimated from survey data.

Hamirpur, followed by Kushinagar and then Aligarh. One of the possible reasons is that, poverty rates in Kushinagar and Hamirpur are already worse than in Aligarh. The incidence of catastrophic expenditure on health is also highest in Hamirpur. Also, the severity of the impoverishment effect is more on rural areas as compared to urban areas. The impoverishment impact of healthcare payments is higher on households from lower social status sections as compared to the impact on households from a higher social status. Also, the impoverishment effect that healthcare payments have is higher on Hindu households as compared to households of families subscribing to other religious faiths.

This shows that OoPE on healthcare imposes a heavy economic burden on households in the state and pushes them towards poverty—especially households in Eastern UP and Bundelkhand compared to those in Western UP. Earlier studies, from various states of India, have shown that high OoPE imposes a high economic burden on households and has an impoverishing effect on the household's living standard (Dilip 2010; Ghosh 2010). Below poverty line households, within the lower social strata, end up bearing more of the economic burden and there is a deepening of poverty and indebtedness as compared to households in the higher strata.

Government strategy's to address the problem of impoverishment due to healthcare costs are twofold—one is through the provision of free or subsidised care in the public healthcare facilities and the other is through coverage for the poor so that they can access private healthcare without facing financial hardship as a consequence. We have already seen that though public provisioning is far more affordable than coverage for private care, the costs of public healthcare are still very high and for those in the poorer quintiles this would still not be priced low enough to prevent CHes.

The state has officially introduced an insurance coverage for all its poor. But, officially only 23% of the eligible beneficiaries have been enrolled. Thus, as the study shows that 10% of households in Kushinagar were enrolled whereas in the other districts no household reported the same. What is more disturbing is that while the mean medical expenditure and mean expenditure per hospitalisation for those enrolled under Rashtriya Swasthya Bima Yojana (RSBY) is slightly lower than for those who are not insured, the median values are slightly higher for those enrolled under RSBY (Table 11). The cashless services that RSBY promises is nowhere in sight.

**Table 11: Insurance Scheme-wise Expenditure on Inpatient Care in Kushinagar**

Expenditure on Health	RSBY		No Insurance	
	Mean	Median	Mean	Median
Medical expenditure	21,347	13,000	22,391	12,700
Non-medical expenditure	1,145	600	1,170	500
Total expenditure	23,678	15,250	23,928	15,000

Source: Estimated from survey area.

## Conclusions

The high levels of morbidity and mortality, the high levels of poverty and the poor state of public health services are three interrelated and mutually synergistic features of contemporary UP.

Poverty leads to ill-health through many pathways: poor access to nutritious food, poor living and working conditions, inadequate time and support for childcare and so on. But in this paper we draw attention to the role played by poor access to public health services.

This paper underestimates both the problem of access and the impoverishing effect of healthcare. It underestimates the problem of access since the lack of access presents itself more often as suboptimal utilisation—either in the form of an inappropriate provider or incomplete and inadequate treatment—because, all the medicine and diagnostics prescribed and procedures ordered by the doctor cannot be paid for. The poor would also have to weigh the loss of wages that seeking healthcare would entail and they would often have to report an illness only when unable to work or when the life of a dependent is at threat. The low hospitalisation rate, the high prevalence of illness and the lower costs of care reported amongst the poor and more marginalised sections are better perceived as reflecting problems of access, than as, the poor having less morbidity.

The study underestimates the impoverishing effect of healthcare because we have measured only the impoverishment due to hospitalisation. If we were to factor in the costs of ambulatory healthcare, the annual healthcare expenditure rises much higher. In one study, 79.3% of all impoverishment due to healthcare costs in India can be attributed to ambulatory care, with hospitalisation contributing only 20.7% of the total healthcare cost (Berman et al 2010).

### Prohibitively High Cost of Public Healthcare

One finding of the study that we draw attention to is the prohibitively high costs of healthcare in the public sector. The NSSO shows that amongst the states, in terms of the average out-of-pocket costs in public hospitals, UP has the third highest rank in rural areas and the second highest in urban areas. This is not an oversight or inadvertent error—it was at the advice of international aid agencies, perhaps with a ready acceptance by administrators that user fees were introduced. Further, these user fees were not to be used for local improvements but to be deposited into the treasury. Healthcare provided by the public sector for the rural sector was by design limited to a small package of child immunisation provisions—which in turn was displaced by pulse polio campaigns for almost a decade. There were also a limited number of reproductive and child health interventions. The aim behind selective healthcare was to limit government provided healthcare to a few priorities and leave the rest to the market. This strategy, largely associated with the World Bank and agencies like the United States Agency for International Development, has indeed succeeded—though in the absence of the healthcare system strengthening.

Now, of course, aid agencies no longer push for user fees, but patients still have to buy most of their medicines and pay for diagnostics in the public hospital and there is no advocacy against OoPE in the public hospital.

Unfortunately, while current governments are seized by the need for public expenditure in building physical infrastructure

like highways, power stations, mines, and others alike and perceive these expenditure as investments, expenditure in healthcare fails to be perceived as an investment—giving returns in a timeframe comparable to or often less than what investments in physical infrastructure provide. Healthier societies are wealthier societies.

There have been many economists who have argued that the reverse is even truer. Wealthier societies are healthier societies. But in the present trajectory of growth and the architecture of the healthcare system, this may not apply to UP. Economic growth has been robust in the state, but it has also been iniquitous. And the growing private healthcare industry of UP may be contributing to both, the high growth rate and the poverty. The service sector is the biggest contributor to UP's economic growth and within this, no doubt the growth of the private sector in healthcare contributes significantly. But the private sector in healthcare grows at the cost of impoverishing the poor—a case of robbing the poor to pay the rich.

In our study, though the headcount of those facing CHE across quintiles is the same, which we hypothesise is due to reduced access, the average overshoot for non-food expenditure is much higher for households from lower quintiles as compared to those in the upper quintiles. This is because the non-food expenditure is low for poor economic groups as compared to higher economic groups and expenditure on healthcare out of it thrusts the former towards catastrophe. Also, the percentage of households enrolled in any kind of insurance scheme is very low across all social and economic categories (Table 6). Hence, the burden of expenditure is to be managed by them alone, which leads to their further impoverishment. It is also to be noted that the average overshoot, for non-food expenditure, decreases with an increase in the income level. The findings that not only do close to two-thirds of the poorest face financial hardship due to healthcare costs, but that the poverty level almost doubles with a single episode of hospitalisation taken along with the high morbidity rates, nullifies the impact of most poverty alleviation programmes.

Given the poor performance of the public health services and the apparent choice that even the poor are making to opt for private healthcare, it is tempting to conclude that what is needed is a shift from public provision of healthcare to government purchasing healthcare through insurance or other means. But there are some cautions in this regard.

First, though these are still early days and coverage with RSBY is low, purchase through insurance does not seem to be providing financial protection even for those who have insurance; a finding of ours which is supported by earlier studies as well (Shahrawat and Rao 2011). This is probably due to the poor regulation of the private healthcare sector and other governance issues—which also ail the public sector.

Second, a case can be made that it is the lack of availability of services by design that leads to the poor performance of the public services. There is an exception to this general trend of private sector preference, in the case of natal care. Our study shows that for this service, the majority of women prefer public healthcare facilities over private healthcare facilities. This is



also visible in other studies and official data (Table 1). However, in case of complications during pregnancy or in the case of a caesarean, people still choose the private sector over the public sector. The NRHM we know brought in a large number of measures to strengthen delivery services in the public healthcare system and remove barriers through the Janani Suraksha Yojana and the Janani Shishu Suraksha Yojana. As the reliable availability of desired services improves in the public healthcare sector, its utilisation increases, as observed in case of natal care. It also shows that the choice of being treated in a private hospital is not an active preference but a distressed migration to the private sector—where people have to pay though it is ruinous, since the public facility is overcrowded or because the service is unavailable. It would also be difficult in a completely unregulated environment to ensure that private players adhere to the rules of the game. Our study also brings out the relatively high role played by the informal and unqualified provider—a finding that supports our contention that the preference for the private

sector is a direct consequence of the poor level of healthcare facilities in the public sector.

And finally, if the government decides to purchase healthcare on behalf of the poor, it is likely that it would have to spend far higher amounts; since even after accounting for subsidies provided to the public sector, healthcare provided by the private sector is much costlier. If purchasing has to go to scale, it is unlikely that the government would have the necessary funds to undertake it. There is a considerable misleading talk in the media and even in the academic community of the crores being wasted on healthcare in UP. While it is true that much more can be done with the money allocated, currently this should not divert us from the stark fact that per capita public healthcare expenditure in UP is amongst the lowest in India and in the entire world (Choudhury and Amar Nath 2012). For reasons of sustaining economic growth, reducing poverty and for improving the well-being of people, it is time for increasing public investment in better quantity and quality of public healthcare services in the state.

## NOTES

- 1 Pre-poverty Headcount = Pre-Hp =  $1/n \sum_1 (Ci \leq PL)$ , where  $Ci$  is per capita consumption expenditure,  $PL$  is official state poverty line and  $n$  is number of individuals.
- 2 Post-poverty Headcount = Post-Hp =  $1/n \sum_1 (Ci - OOP \leq PL)$ .

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