Health and Morbidity In India (2004-2014)

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August 2016

Executive Summary

- **The NSSO data from round 60 (2004) and round 71 (2014) make it possible for us to compare healthcare in India over the ten years.** The decade from 2004 to 2014 saw sweeping policy initiatives in Indian healthcare sector. One of the overarching initiatives was the National Rural Health Mission which later expanded into the National Health Mission. The main investments in NRHM were for reproductive, maternal, new-born, child and adolescent health. The other significant policy intervention was the launch of several publicly funded health insurance schemes in India. In particular, we analyse changes in health-seeking behaviour of Indian households, changes in their out of pocket health expenditures and changes in their major sources of healthcare financing, over time.

- **Our main results for health seeking behaviour shows that households still overwhelmingly depend on private providers for healthcare services.** While as much as 75 per cent of outpatient (OPD) care is exclusively private, 55 per cent of inpatient (IPD) care is from private hospitals in India. **The dependence on private healthcare is declining and more significantly for IPD.** Indian households' dependence on public care has risen by 6 per cent for OPD care and by 7 per cent for IPD care. Most of these increases are driven by rural women seeking more public healthcare, over the last 10 years.

- **Janani Suraksha Yojana led to a significant increase of 15 per cent in institutional childbirth in India with a commensurate decline in deliveries at home**. The disaggregated data also shows that there was a large **increase of 22 per cent in deliveries in government hospitals, which was mirrored by an 8 per cent decline in childbirth at private hospitals and a 16 per cent decline in childbirth at home**. Given that the fundamental objective of the JSY was to raise institutional deliveries, the NSSO data shows that the scheme performed well over the 10 years.

- **Health insurance coverage is associated with a 17 per cent increase in probability of being hospitalised in a government hospital and an 8 per cent increase in probability of being hospitalised in a private hospital.**

- **Overall out-of-pocket spending has risen significantly, and this is mostly from a rise in IPD spending. OPD spending of households did not see any significant change during these ten years.**

- **There are large disparities across rural and urban households in terms of real OOP expenses for IPD such as doctor's fees, medicines and diagnostics.** Compared to a rural household, an urban household spends **five times more on diagnostics**, **2.6 times more on medicines and 2.4 times more on doctors' fees**. It is also important to note that the rural-urban differences were very small in 2004 with absolutely no difference in the average real expenditures on medicine per inpatient case.

- **Households with catastrophic health expenditures have risen significantly over time,** for all three threshold levels (health expenditure exceeding 10 per cent, 25 per cent and 40 per cent of usual consumption expenditure), and across both rural and urban India. Once

again, this increase was much larger for urban households than for rural households.

- **Impoverishment caused due to poor health has remained unchanged over the ten years**. We estimate that overall the percentage of Indian households that fell below the poverty line due to OOP health expenditures has remained unchanged at approximately **7 per cent** of the population.

- **Healthcare financing data shows that households are increasingly relying on their own income and drawing down their own savings to finance their healthcare expenses.** Reliance on borrowing, contributions from friends and relatives and all other major sources have come down steadily over the 10 years. This holds for both rural and urban households in India.

- **Data for health insurance coverage shows that while private health insurance is largely limited to the richer urban households, in contrast, public insurance coverage is evenly distributed across all quintile groups**.

- **Overall, the different regression analyses show that having public health insurance coverage in India has not been associated with lower health burden as measured by (i) total real OOP expenditure, (ii) probability of catastrophic health expenditures or (iii) impoverishment caused by health expenditures.** However, we do find an increase in use of services associated with insurance, and in particular a significant increase in hospitalization. This could mean that people suffering from ailments are more likely to be treated if they are covered by insurance. So on the whole, it appears that the public health insurance programs have been ineffective in lowering health expenditures of Indian households, but have improved access to IPD care on average.

- The study also shows **significant variations across states** in terms of healthcare spending, private OOP burden, insurance coverage and exclusive dependence on private healthcare services.

Contents

1. Introduction

The decade from 2004 to 2014 saw the Indian economy grow at an impressive rate. This was also the time when the government brought sweeping policy initiatives into the healthcare sector. New health schemes were introduced at the national level as well as state levels. After a decade of experimentation, India is still faced with national and international criticism for its low investments in healthcare and for overall poor health outcomes. This study aims to systematically analyse health and morbidity in India during this time period. The NSSO data from round 60 (2004) and round 71 (2014) make it possible for us to compare healthcare in India over the 10 years. In particular, we analyse changes in health-seeking behaviour of Indian households, changes in their out-of-pocket health expenditures and changes in their major sources of healthcare financing, over time. We are able to map some of the major healthcare initiatives of the government to these changes in outcomes of health-seeking, out-of-pocket expenditure and health financing.

The years from 2004 to 2014 have witnessed many significant policy changes in the healthcare sector of India. One of the overarching initiatives was the National Rural Health Mission (NHRM) which later expanded into the National Health Mission. The main investments in NRHM were for reproductive, maternal, newborn, child and adolescent health. It was also a timely response to the Millennium Development Goals with a special focus on reducing maternal and infant mortality in India. The other significant policy intervention was the launch of several publicly funded health insurance schemes in India. While the central government rolled out the Rashtriya Swasthya Bima Yojna, a national health insurance scheme for people living below the poverty line in 2008, proactive states like Andhra Pradesh launched the popular Aarogyasri insurance scheme a year earlier in 2007. Several other states also followed with their own government funded health insurance schemes. Besides large schemes the government also launched several National Disease Control Programmes. New commitments were made to address water and sanitation problems. The government also emphasised the need to have regular scientific evaluations of different health interventions in the country.

In this study, we use National Sample Survey (NSS) data from surveys conducted by the Government of India. These are recall-based household surveys on multiple topics, including healthcare and consumer expenditure. More specifically, we use the 60th and 71st rounds of the NSS which included a questionnaire focused on healthcare, with questions on morbidity and the consumption of healthcare for all individuals within the surveyed households. Over the 10 years, the similarity of information collected in the two rounds of the surveys, gives us an opportunity to make scientific comparisons to understand the big changes in health and morbidity outcomes for Indian households.

Our main results for health-seeking behaviour show that households still overwhelmingly depend on private providers for healthcare services. While as much as 75 per cent of out-patient care is exclusively private, 55 per cent of in-patient care is from private hospitals in India. This dependence, however, is declining and more significantly so for in-patient care. Indian households' dependence on public care has risen by 6 per cent for out-patient care and by 7 per cent for in-patient care. Most of these increases are driven by rural women seeking more public healthcare, over last 10 years. More precisely, our analysis of the data shows that the Janani Suraksha Yojana incentives led to a significant increase of 15 per cent in institutional childbirth in India with a commensurate decline in deliveries at home. The disaggregated data also shows that there was a large increase

of 22 per cent in deliveries in government hospitals, which was mirrored by an 8 per cent decline in childbirth at private hospitals and a 16 per cent decline in childbirth at home. Given that the fundamental objective of the JSY was to raise institutional deliveries, the NSSO data shows that the scheme performed well over the 10 years. At the same time, it is important to note that our analysis points to the increase in public hospitalisation being incentive driven, which does not allow us to draw an inference about either the quality of services provided or the sustainability of the increase.

The results also point to a significant association of health insurance coverage and hospitalisation in India. We note that having insurance coverage is highly correlated with being hospitalised. In particular, being insured is associated with a 17 per cent increase in probability of being hospitalised in a government hospital and an 8 per cent increase in probability of being hospitalised in a private hospital.

In terms of the out-of-pocket (OOP) health expenditure, a common measure of health burden, we note that the overall OOP spending has risen significantly, and mostly from a rise in in-patient spending and not from out-patient spending of households. The results show that there was a significant increase in a household's real total OOP expenditure of ₹750, over 10 years. This amounts to an increase of approximately 20 per cent in households' total OOP over 10 years. Disaggregating the data further, we note that the increase in total OOP expenditure was essentially from significant rise in in-patient, and not from out-patient spending. At the household level, in-patient expenses rose by ₹563 over the 10 years, while out-patient expense did not see any significant change in this time period.

There are serious disparities across rural and urban households when we disaggregate total OOP for an in-patient case into different components such as doctors' fees, expenditure on medicines and costs of diagnostics. Compared to a rural household, an urban household spends five times more on diagnostics, 2.6 times more on medicines and 2.4 times more on doctors' fees. It is also important to note that the rural-urban differences were very small in 2004 with absolutely no difference in the average expenditures on medicine per in-patient case. This has changed remarkably in the 10 years, with urban households paying 57 per cent more for medicines per in-patient case than rural households. The biggest difference between rural and urban areas has arisen from the increase in average expenditure on diagnostics per in-patient case, where urban households pay more than 73 per cent of what rural households pay.

Over time, we find that households with catastrophic health expenditures have risen significantly for all three threshold levels (15 per cent, 25 per cent and 40 per cent), and across both rural and urban India. Once again, this increase was much larger for urban households than for rural households. In terms of impoverishment caused due to poor health, we estimate that overall the percentage of Indian households that fell below the poverty line due to OOP health expenditures has remained unchanged at approximately 7 per cent of the population, over the 10 years.

In terms of sources of financing for healthcare expenditures, the data shows that households are increasingly relying on their own income and drawing down their own savings to finance their healthcare expenses. Reliance on borrowing, contributions from friends and relatives and all other major sources have come down steadily over the 10-year period. This holds for both rural and urban households in India.

From the healthcare financing perspective, it is important to understand the role of health insurance, and in particular, the role of recent public health insurance programmes in reducing health burden of Indian households. First and foremost, the data for insurance coverage shows that while private health insurance is largely limited to the richer urban households, in contrast, public insurance coverage is evenly distributed across all quintile groups. Overall, the different regression analysis show that having public health insurance coverage in India has not been associated with lower health burden as measured by total OOP expenditure, probability of catastrophic health expenditures or impoverishment caused by health expenditures. However, we do find an increase in use of services associated with insurance, and in particular a significant increase in hospitalisation. This could mean that people suffering from ailments are more likely to be treated if they are covered by insurance. So on the whole, it appears that the public health insurance programmes have been ineffective in lowering health expenditures of Indian households, but have improved access to IPD care on average.

The rest of the paper is organised as follows – section 2 describes the policy background and context within which we must interpret health and morbidity changes in India over 10 years, section 3 looks at health-seeking behaviour of Indian households and includes descriptive statistics and hypothesis testing of specific interventions. Section 4 outlines the analysis for changes in out-of-pocket health expenditures and includes the descriptive statistics, in-patient-out-patient disaggregated analysis, changes in expenditures per case, catastrophic health expenditures and impoverishment due to poor health. Section 5 outlines the analysis for changes in health financing in India, and looks at the role of health insurance, particularly public health insurance. Section 6 provides a brief analysis of inter-state variations in OOP expenditures, government spending, insurance coverage and catastrophic expenditures at the individual state level. Section 7 concludes the paper.

2. Background and Context

The years from 2004 to 2014 have witnessed many significant policy changes in the healthcare sector of India. We briefly outline them in this section to layout the context within which changes in health and morbidity outcomes of India must be understood. All our data analysis and results will be explained within this context, with special emphasis on relevant policies and schemes of the government.

At the onset, Table 1 outlines changes in healthcare expenditures between 2004 and 2014. Out-of-pocket expenditure remained the main source of funding for healthcare. There was a small reduction from about 68 per cent out-of-pocket expenditures to about 62 per cent of total healthcare expenditures. The public healthcare expenditure increased from about 24 per cent to 30 per cent of total healthcare expenditure and also increased as a percentage of total government expenditure from about 4 to 5 per cent during this period. External resources for health include funds or services in kind from organisations or governments of other countries. This source represents only a small portion of the total healthcare expenditure and that has reduced from about 2 per cent to 1 per cent between 2004 and 2014.

Table 1: Broad changes in health expenditures (2004-14)

	2004	2006	2008	2010	2012	2014
External resources for health (as % of total health expenditure)	2.23	1.23	1.52	1.27	1.15	0.95
OOP health expenditure (as a % of total health expenditure)	67.85	65.75	64.39	63.37	64.88	62.42
Public health expenditure (as % of total health expenditure)	24.23	26.15	26.79	27.13	26.97	30.04
Public health expenditure (% of total government expenditure)	4.04	4.40	4.34	4.29	4.49	5.05
Total health expenditure (% of GDP)	4.22	4.25	4.34	4.28	4.39	4.69

Source: The World Bank, 2016

2.1.   National Health Mission

In 2005, the Government of India decided to launch the National Rural Health Mission which was later expanded into the National Health Mission. The National Rural Health Mission saw a new level of commitment to healthcare by the government. It was also a response to the Millennium Development Goals with a special focus on reducing maternal and infant mortality. Eighteen of India's 36 states were selected as high focus states. This meant that these eighteen states received proportionately more funding from the central government. The main investments from the National Rural Health Mission have been for reproductive, maternal, newborn, child and adolescent health. One of the main initiatives was to strengthen human resources in the public healthcare system to support mothers, newborns and children. The plan was that every village should have an Accredited Social Health Activist (ASHA). There were about 931,000 ASHAs in thirty two states and union territories as per the data provided by the states as of 2015-16 (NHM, ASHA Status of Selection and Training, 2015). One of the main responsibilities of ASHAs is to educate pregnant women about the importance of antenatal care and institutional deliveries (NRHM, 2009). They also help pregnant women seek care in public facilities, and are paid based on activities they do. For example, if an ASHA facilitates an institutional delivery she receives a cash incentive. The mother coming for the institutional delivery also receives a cash incentive. The ASHAs are generally not trained to provide services to the men in the villages (MoHFW, 2005).

The National Health Mission has also made investments in infrastructure with mother and child wings in community hospitals. Many government hospitals across the country have also been able to establish newborn intensive care units. One of the most innovative investments by the National Health Mission has been ambulance services. A toll free number has been introduced and a not for

profit organisation has been contracted in most states to manage ambulance services across urban and rural areas (NHM, 2013).

2.2. National Disease Control Programmes

The Union Government of India has launched several National Disease Control Programmes. These programmes are managed by the Ministry of Health and Family Welfare under the National Health Mission. The budget for the National Disease Control Programmes was ₹12 billion (about USD 200 million) in 2013. That represented only about 4 per cent of the total public healthcare funding that year.[2]

The Revised National Tuberculosis Control Programme (RNTCP) is one of the main programmes. The programme has demonstrated high coverage of treatment among the notified cases of tuberculosis while the case notification is estimated at less than 60 per cent. Other National Disease Control Programmes include programmes to control vector borne diseases, blindness, iodine deficiency disorders, mental health, non-communicable disease, and disease surveillance, eradication of leprosy, and prevention and management of burn injuries. These programmes have been introduced over time with the control of vector borne diseases dating back to the 1950s, the cancer control programme launched in the 1970s and the mental health programme launched in the 1980s. Most of these programmes are underfunded and struggle with implementation at the local level (Chauhan, 2011) (NVBDCP, 2016) (Park, 2011).

2.3. Publicly Funded Health Insurance Schemes

The population covered by a government funded health insurance programme increased from about 55 million people in 2003-04 to about 370 million in 2014. Nearly two-thirds, 180 million, of the population covered by this kind of insurance lived below the poverty line (MoHFW, 2014). The largest of government funded health insurance programme is Rashtriya Swasthya Bima Yojna. It was introduced in 2008 by the union government for people living below the poverty line. The premium was paid by the government and provided coverage up to $500 per family and year. Hospitals were contracted in all the states where the insurance was introduced to provide cashless healthcare services for the families covered by the insurance. Almost all the contracted hospitals were private hospitals (Palacios, Das, & Sun, 2011).

In 2007 the state government of Andhra Pradesh launched an insurance programme with coverage up to ₹200,000 (about $3,300) per family and year. The programme was introduced across the state and covered more than 80 per cent of the population within two years. Several other state governments were inspired by the political visibility of this insurance programme and introduced similar health insurance programmes. The main objective of these health insurance programmes was to reduce the catastrophic expenditures on hospital based care. These insurance programmes contracted both public and private hospitals to provide cashless services. The majority of services

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[2] As per the Union budget (link)

of these programmes have been provided in private hospitals (Selvaraj & Karan, 2012) (Rao et al. 2011).

2.4.   Water and Sanitation Programmes

India has one of the highest percentages of open defecation in the world with about half of the population not using a toilet or latrine. India is also facing a crisis in availability of clean water. In 2013, the budget allocated for the Ministry of Drinking Water and Sanitation was ₹140 billion (about USD 2.4 billion)[3]. As per the Census of 2011, 87 per cent of rural households have access to water through various sources. Yet the coverage of tap water was only about 30 per cent with a few states in the country having very low coverage with Bihar at 2.6 per cent, Jharkhand at 3.7 per cent and Assam at 6.8 per cent being the lowest (Bihar State Water and Sanitation Mission, 2014).

The responsibility for sanitation and water supply is spread across different ministries and departments and the federal and state levels. At the federal level, rural sanitation and water supply are the responsibility of the Ministry of Drinking Water and Sanitation. The same responsibility for urban areas is split between the Ministry of Housing and Urban Poverty Alleviation and the Ministry of Urban Development. These ministries set national policies and advise state governments. State governments are responsible for actually assuring the sanitation services and the water supply to the end user. For example, the national urban sanitation policy is prepared by the Ministry of Urban Development and includes guidelines for investments in infrastructure and interventions for behaviour change. State governments are required to develop state sanitation strategies based on the national sanitation policy. There is a wide range in effort across the states and cities.

The rural water supply guidelines were made effective from 2009 and these included water conservation, encouraging usage of multiple sources of water, convergence of all water conservation programme, tackling arsenic, nitrate and fluoride contamination and increasing funds for these programmes. The 12th Five-Year Plan focuses on improving "infrastructure and recognizing the benefits of improved water and sanitation services to health and economic welfare." As per a press release the Union Minister of Urban Development has reported that 890 million toilets have been built under Swachh Bharat Mission.[4]

2.5.   Evaluations of Reforms

There have been some evaluations of the healthcare sector in India over the last decade. The results are mixed and few find improvements in healthcare services and outcomes. Janani Suraksha Yojana is a programme under the National Health Mission with an objective to improve maternal and newborn survival by incentivising institutional deliveries in public hospitals. Evaluations have found the programme increases institutional deliveries. There are mixed results about the programme's impact on maternal or newborn mortality. One evaluation found no or limited reduction in

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[3] As per the budget (link)
[4] http://www.mygovernment.co.in/89-lakh-toilets-built-rural-india-1-year-govt-says/

mortality (Randive, Diwan, & De Costa, 2013) and another evaluation identified an association with reduced mortality (Lim, Dandona, Hoisington, James, Hogan, & Gakidou, 2010).

Evaluations of the health insurance introduced by the union government have found mixed results. Maharashtra introduced the programme but less than 1 per cent of the population actually got covered (Thakur and Ghosh, 2013). Some States with higher insurance coverage have still not seen any improved access to care or reduction in out-of-pocket expenditures. Some other states have seen an improved use of hospital based services (Devadsan, 2007) (Ghosh, 2014). One evaluation found that government funded health insurance programmes seem to perform better with time (Ravi and Bergkvist, 2013). An evaluation of a state funded health insurance found a major increase in hospitalisation among the poor but no reduction in out-of-pocket expenditures (Rao et al., 2014) (Bergkvist et al., 2014).

3. Data and some Socio-Demographic Statistics

Most of the healthcare in India is still provided by not fully qualified healthcare providers in the informal sector. The services are paid for out-of-pocket by the households. The fragmentation of the market makes it hard to get an overview of the entire healthcare system, and how this system is evolving. Given that majority of funding for healthcare services is out-of-pocket, the best source of data to understand changes in the healthcare system is from the households. The National Sample Surveys (NSS) of the Indian Government are critical for such analysis.

For our analysis, we make use of the NSS data from surveys conducted by the National Sample Survey Office[5] (NSSO) of the Government of India. The NSSO conducts recall based household surveys on various topics including health, consumer expenditure and employment. The 60th (January-June 2004) and 71st round (January-June 2014) rounds of the NSS included questionnaires focused on morbidity and the consumption of healthcare. The particular details collected from households included information on whether members of the household had been ailing in the last 15 days, admitted in hospital in the last one year, their detailed expenditures and financing of these healthcare expenditures.

In the 71st round, 65,932 households were surveyed of which 36,480 were from rural areas and 29, 452 in urban areas. In the 60th round, 73,868 households were surveyed of which 47,302 were rural households and 26,566 were urban ones. There were minor changes between the two rounds recording of certain variables. We correct for such changes to make the two rounds comparable, for instance, including childbirth in hospitals in the hospitalisation statistics within the 2004 wave. We also deflate all the expenditures using the Tendulkar committee price indices. These indices are calculated from NSS consumption expenditure surveys using methods first suggested by Deaton and Tarozzi (2000). This is a marked improvement from the government published Consumer Price Index which has several problems.

As a proxy for wealth, we construct an asset index using information about household characteristics including source of lighting, source of energy for cooking, source of drinking water and type of latrine. We use this index as a common control variable in the regression models that

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[5] Previously National Sample Survey Organisation

we employ. The asset index was created using a principal component analysis. The asset index, A_h, for household h is defined as follow:

$$A_h = \sum_k \left[f_k \frac{a_{ik} - \bar{a}_k}{s_k} \right],$$

where a_{ik} is the value of asset k for household h, $\bar{a}_k$ is the sample mean, s_k is the sample standard deviation, and f_k are the weights associated with the first principal component.

This analysis works best when asset variables are correlated and the distribution of asset ownership varies across households in the sample. The assets that are more unequally distributed between households are given more weight in the analysis. Similarly, variables with low standard deviations carry a lower weight.

There have been several improvements in the socio-demographic measures of the Indian population represented by the NSSO over the 10 years (2004-2014). Some very broad socio-demographic and economic statistics are reported in Table 2. We note that there is a significant 15 per cent increase in real monthly per capita consumption expenditures of the households over the 10 years. There is also a big improvement in the literacy rates in the country with a massive decline in the percentage of illiterate population from 42 per cent to 31.5 per cent. Directly from a health viewpoint, it is also important to note that significantly more number of households gained access to latrines over this decade in India. This number is likely to have risen even more after 2014 when the *Swachch Bharat Abhiyaan* (Clean India Mission) was launched nationally. We are, however, limited by data of 2014 and not beyond.

The other major development in this time frame has been the rapid expansion of health insurance in the country. While only 1 per cent of the population had any coverage in 2004, this increased significantly to above 15 per cent in 10 years. In 2004 the existing insurance schemes included government health insurance like Central Government Health Scheme (CGHS) and the Employees State Insurance Scheme (ESIS). By 2014, this has risen sharply. There is a serious difference between the NSSO estimates of health insurance coverage and the World Bank's statistics which showed that more than 25 per cent of Indians were covered by some health insurance by 2010 (La Forgia and S. Nagpal 2012). The difference could be due to the sources of data. While NSSO is based on household sample, the government data provides estimates of beneficiaries under specific insurance schemes. Other studies have reported similar differences between government reported insurance coverage and households' perception of their coverage. One common issue is lack of information. Many people are not aware of their coverage and how to benefit from insurance (Thakur and Ghosh, 2013).[6]

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[6] This discrepancy needs a more thorough investigation. Are people unaware of their health insurance coverage (therefore NSSO gives an under-estimate); is there a significant overlap across schemes (therefore aggregation is complicated) or are the coverage data for different scheme inaccurate (therefore over-estimate of actual coverage)?

Table 2: Broad Socio-Demographic Characteristics of Households

	2004	2014
Rural households (%)	72.0	67.4
Hindu households (%)	83.9	82.3
Muslim households (%)	10.8	12.5
SC households (%)	8.3	9.1
Age	26.1	28.5
Households with no latrine (%)	60.0	41.2
Women in the population (%)	48.8	48.5
Population aged 60 and above (%)	6.9	7.8
Population not literate (%)	42.4	31.5
Average monthly household consumption expenditure(₹ 2004-05)	3008	3459
Population insured (%)*	1.0	15.2

*Includes coverage under CGHS, ESIS

These broad socio-demographic statistics of India, as represented by the NSSO, in Table 2 will be used as common control variables in all our regression analysis in the subsequent sections. There are a large number of specific descriptive statistics that pertain to different aspects of healthcare such as health-seeking, out-of-pocket expenditure, health financing and morbidity details. These descriptive statistics will be outlined and explained within individual sections of this study.

4. Healthcare seeking behaviour

We start our enquiry of changes in India's health and morbidity outcomes over the 10 years, by looking at the nature of health-seeking behaviour of Indian households. Table 3 outlines broad morbidity and health-seeking statistics. The first thing to note is the 10 per cent increase in the proportion of ailing people in the Indian population, from 2004 to 2014. This data is for self-reported sickness by individuals through household surveys, and is therefore, not verified by any medical practitioner. Given that the nature of the data (self-reported) is the same in the two rounds of the NSSO, these statistics are comparable over time, and an important measure to consider. So more people in India are reporting being sick from some ailment than 10 years before.

In terms of accessing some form of healthcare, data shows that significantly more people are availing medical services in 2014 compared to 2004. Table 3 shows a decline of people not seeking medical services when they were sick from 15.1 to 12.4 out of every 1000. This implies that *there is an 18 per cent increase in Indians seeking some form of healthcare when they report being sick*. People seeking more care with increased income is common in emerging markets (Thoa et al. 2013) (Tipping, 2000). This should not necessarily be interpreted as people being sicker and in need of more care.

There are, however, a large fraction of the sick population who do not seek any form of medical care. *And among those who are not availing medical facilities, quality of care seems to be the paramount cause not finance constraints.* Long waiting, lack of faith, poor quality are the metrics being used to gauge "quality" of care. It is noteworthy that while 4 out of 1000 people reported

financial reasons for not availing medical care in 2004, this number has fallen dramatically to 0.7 in 2014. This could be due to strong income effect, where rising incomes might be leading to ease in health financing for households. Alternately, or perhaps additionally, this might be the impact of the publicly funded health insurance schemes implemented in the last 10 years nationwide by the central and state governments.

Table 3: Morbidity and health seeking (per 1000 population)

	2004	2014
Proportion of ailing persons[1]	91.1	97.8
People not availing medical services	15.1	12.4
No medical facility available in the neighbourhood	1.4	1.5
Reasons for not availing medical services		
Facilities available but no treatment sought owing to: lack of faith	0.4	
Facility of satisfactory quality not available		0.4
Long waiting	0.2	0.4
Financial reasons	4.0	0.7
Ailment not considered serious	5.4	7.5
-By Male	4.9	6.7
-By Female	5.8	8.3
Other	3.7	1.9

[1]Explicitly includes chronic ailments

Another statistic that stands out is the number of people who do not avail medical care because they consider their ailments to be non-serious. This number has risen significantly over the last 10 years. We explore whether there is a gender perspective to this and find that *many more women report that their ailment is not considered serious enough to avail medical care. This gender gap has widened over the last 10 years*.

We now study the health-seeking behaviour for out-patient care and in-patient care separately, as they entail differences in health decisions and morbidities. Table 4 outlines health seeking for out-patient care, which uses data for whether members of the household had reported being sick and sought out-patient care in the last 15 days. Given the short recall period, this is likely to be an accurate measure of demand for out-patient in India. It is important to note, however, that there are significant seasonal variations across states in India and so a simple annualisation of the data for last 15 days must be avoided.

Table 4 highlights that *there is a significant increase in the percentage of people who report being sick* in the last two weeks. This increase is consistent with the overall proportion of ailing people reported in Table 2. *Most of this increase is coming from urban areas which report an 18 per cent increase in ailing population. A gender disaggregation shows that it is essentially a large 13 per cent increase in the number of women who report being sick in last 15 days that is driving the overall numbers.* There is no overall change in reported ailment levels for male population in India.

Of the people who report being sick in the last two weeks, the percentage that seek care has remained the same at approximately 84 per cent in 2004 and 2014. Since the overall numbers of ailing people, however, has increased, this would imply an increase in overall number of people seeking healthcare in India. The data shows that there is more than 5 per cent increase in demand for out-patient care in 10 years.

To study the relative significance of the private and public healthcare sectors in India, we look at people's' dependence on these for out-patient care. Table 4 highlights that the *private sector remained the main source of out-patient care in 2014, with 75 per cent* of all out-patient visits exclusively to private care providers. *This exclusive dependence on private out-patient care has fallen by 6 per cent since 2004 and it is commensurate with an increase in public out-patient care.* The disaggregated data shows that the decrease in dependence on private healthcare happened across rural-urban and male-female sub-populations. The decline was larger, however, for rural population and *specifically rural women who saw approximately 8 per cent decline in dependence on exclusive private care.* The only sub-population whose dependence on private healthcare remained high and unchanged in last 10 years were urban males.

Table 4: Health Seeking for Out-patient Care (last 15 days)

	2004	2014	Diff
Whether ailing (% of population)	9.1	9.8	0.6***
Rural	8.8	8.9	0.1
Urban	9.9	11.8	1.8***
Male	8.6	8.7	0.1
Female	9.7	11.0	1.3***
Sought care (% of ailing)	84.3	84.9	0.6
Out-patient care(% of ailing)	75.4	79.5	4.1***
Exclusively private care (% of sought care)	79.7	74.9	-4.8***
Rural	78.8	72.1	-6.7***
Urban	81.9	79.3	-2.6***
Male	80.2	76.3	-3.9***
Female	79.2	73.8	-5.4***
Rural male	79.4	74.1	-5.4***
Rural female	78.2	70.4	-7.8***
Urban male	82.2	80.0	-2.1
Urban female	81.7	78.8	-2.9**

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

It is important to understand that the number of people seeking private healthcare is most likely underestimated. This is because the NSSO surveyors are instructed to mark all those who went to both government and private facilities as 'only going to government facilities'. So the actual dependence on private care will be higher than reported in the data. That is why we limit our analysis to exclusive dependence on private sector. Moreover, recent ongoing research suggests that a significant number of people switch from government to private facilities in India (Indrani Gupta et al, 2016).

Despite the decline in exclusive dependence on private care, it still remains significantly high in India. So we examine why people do not avail government healthcare services. Table 5 below outlines the reported reasons. *"Poor quality" of available services was reported to be the main reason for avoiding public healthcare. When the quality is satisfactory, it is long waiting time which proves to be a serious bottleneck along with distance to the public healthcare facilities.* Financial constraint is the least significant of reported causes for people not availing government services. This is consistent with changes in the constraints to overall health seeking in India over the last 10 years. As explained before, this could be due to strong income effect, where rising incomes might be leading to ease in health financing for households. Alternately, or perhaps additionally, this might

be the impact of the publicly funded health insurance schemes implemented in the last 10 years nationwide by the central and state governments.

Table 5: Reasons for not availing government services (per 1000 population)

	2004	2014
Required specific services not available*	3.0	6.9
Available but quality not satisfactory	26.8	28.8
Quality satisfactory but facility too far	11.9	7.8
Quality satisfactory but involves long waiting	6.8	18.4
Financial constraint	-	0.3
Other	8.7	5.1

Next, we focus on hospitalisation data to study the changes to health-seeking behaviour of Indian households for in-patient care, in the last 10 years. Table 6 provides the details of this. *There has been a significant increase of 42 per cent in hospitalisation rate in India.* In 2014, 4.4 per cent of people report that they were hospitalised in the last one year, compared to 3.1 per cent in 2004. A disaggregation shows that this increase is larger for rural population (53.5 per cent increase) compared to urban population (17.5 per cent increase) and larger for female population (58 per cent increase) compared to male population (16.6 per cent increase). A further disaggregation shows that *the largest increase in hospitalisation was for rural women (75.7 per cent increase) and the smallest increase for urban men (10 per cent increase).* We explore different possible drivers for this increase in hospitalisation in the next section of the study.

Table 6: Health Seeking for In-Patient Care (last one year)

	2004	2014	Diff
Whether hospitalised (%)	3.1	4.4	1.3***
Rural	2.8	4.3	1.5***
Urban	4.0	4.7	0.7***
Male	2.4	2.9	0.4***
Female	3.8	6.0	2.2***
Rural male	2.3	2.7	0.4***
Rural female	3.3	5.9	2.5***
Urban male	3.0	3.4	0.3***
Urban female	5.1	6.3	1.2***
Public care (%)	42.3	45.4	3.1***
Rural	43.8	50.3	6.5***
Urban	39.1	35.5	-3.7***
Male	40.5	36.9	-3.5***
Female	43.0	50.0	7.0***
Rural male	41.5	39.5	-2.0***
Rural female	45.1	56.1	11.1***
Urban male	38.2	32.1	-6.1***
Urban female	38.9	36.8	-0.02*

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

We analyse next the relative significance of private and public sector for hospital care in India. Like the previous statistics for out-patient care, the Indian population depends significantly on private institutions for in-patient care too. The dependence on private sector, however, is lesser in in-patient care, compared to out-patient care. The data shows that *more than 45 per cent of hospitalised people were in the public hospital system in 2014. This is an increase of more than 7 per cent since 2004.* Disaggregation shows that while more rural households are moving towards public hospitals (15 per cent increase), fewer urban households are going to public hospitals (9.5 per cent decline) for in-patient care.

Further disaggregation also shows that this *overall increase in usage of public hospitals is almost entirely driven by rural women who saw an increase of 24.6 per cent in utilisation of public hospitals over 10 years.* Interestingly, over the same time period, the proportion of men—both rural and urban—going to public hospitals has *reduced* significantly by 5 per cent and 15.5 per cent respectively. There was no change, on the other hand, in the usage of government hospitals by urban female in India over the study period.

4.1.   The Effect of Janani Suraksha Yojana (JSY) on Health-Seeking Behaviour in India

Given the statistically significant changes in the health-seeking behaviour of Indian households over the time period of 2004-2014, we will now explore some of the likely causes of these. The two most significant changes that we highlighted in the last sub-sections was the massive increase of 42 per cent in hospitalisation rate in India and the significant increase in usage of public hospitals by rural women in India. The two policies of the government that could affect these changes are the large scale rollout of publicly provided health insurance schemes in India and the aggressive implementation of the JSY under the NRHM. We will analyse each of these two drivers separately.

Hypothesis 4.1: Janani Suraksha Yojana increased the usage of public hospitals by women in India from 2004-2014.

Janani Surakshya Yojana (JSY) is a conditional cash transfer programme launched in India in April 2005. The objective of the programme was to improve maternal and neonatal health by promoting delivery in institutional settings by pregnant women. The programme provided cash incentives to pregnant women and health workers (ASHAs) to facilitate childbirth in a public or private health facility. As we can see in the summary statistics in Table 77, prima facie childbirth has increased as an 'ailment' causing hospitalisation in the NSSO data. There has been a steady decline in the fertility rate in India since 2004 (2.88 births per woman) to 2014 (2.4 births per woman), so the only way to comprehend this increase in hospitalisation of women for childbirth in India must be from the lens of changing policies and other socio-economic factors in the country.

Table 7: Incidence of hospitalisation per 1000 population in public and private facilities

	2004		2014	
	Public	Private	Public	Private
All other ailments	11.5	16.7	14.3	22.8
Childbirth – Caesarean/ Normal/ Any other (both live birth and stillbirth)	3.4	3.5	8.9	5.0

Through our analysis, we attempt to make the causal link between the implementation of JSY by the government and the increase in hospitalisation of women. We exploit the variations in the implementation strategy of the government to estimate the causal relationship between JSY and hospitalisation. While the programme was implemented all over India, it emphasised 10 states that were 'low performing' in the sense that they had low levels of institutional delivery at the baseline. Besides the variation in the category of states, there was also an eligibility criterion that was used across states. In low performing states, all women were eligible for JSY support, while in high performing states, only women from under-privileged sections of society were eligible. The under-privileged category included women below poverty line and SC/ST women.

We use these variations to estimate a difference-in-difference effect of JSY on hospitalisation of women in India. We compare hospitalisation between women in states that were low performing, where all women were eligible for incentives, to women in states that were high performing with only women from under-privileged sections of society being eligible. We also compare women in 2004, when the programme was not in effect, to 2014, when it was. The difference between these two effects is the difference-in-difference estimator, and assuming that hospitalisation in these states were otherwise growing at a similar rate, it allows us to establish whether JSY had any causal effect on hospitalisation. We use a regression of the form

$$y_{it} = \alpha + \beta_0 Post_t + \beta_1 Eligible_i + \beta_2 (Eligible_i \times Post_t) + X_i \beta' + \varepsilon_{it}$$

where y_{it} is an outcome variable measuring hospitalisation of a woman i at time t. $Eligible_i$ is an indicator which takes the value one if the ith woman was eligible under the JSY programme and zero otherwise. The variable $Post_t$ is an indicator which takes the value one if time period t, is in 2014. X_i is a set of characteristics of the ith woman and ε_{it} is a random error term. The coefficient β_2 on the interaction of $Eligible_i$ and $Post_t$ is the parameter of interest.

Table 8 reports the results of the difference-in-difference regression analysis outlined above, for all hospitalisation of women in India. The sample of hospitalised women in our data is approximately 350,000 over the two rounds of NSSO. The coefficients on the interaction term (JSY=1* Post (2014)) are of most relevance as they are the diff-in-diff estimate of the impact of JSY on overall hospitalisation of women in India over the study period. 'Post' is a dummy variable which equals 1 for 2014 NSSO round and 0 for the 2004 round which is before the programme was implemented. The first column shows the results for overall hospitalisation of women, the second column shows the results for public hospitalisation of women and the third column shows private hospitalisation of women. The standard errors are clustered at the state level.

Table 8: The Effect of JSY on Hospitalisation of Women in India (Difference-in-Difference)

	(1) Hospitalisation	(2) Public Hospital	(3) Private Hospital
JSY=1* Post (2014)	0.013***	0.014***	-0.001
	(0.004)	(0.003)	(0.002)
JSY=1	-0.019***	-0.007**	-0.013**
	(0.006)	(0.003)	(0.005)
Post (NSSO Round=71)	0.011***	0.006**	0.005**
	(0.003)	(0.003)	(0.002)
Age	0.001***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Rural dummy	-0.002*	-0.005***	0.002
	(0.001)	(0.002)	(0.001)
Asset Index	0.003	-0.006***	0.009***
	(0.002)	(0.001)	(0.001)
Female*Insurance	-0.000	-0.001	0.001
	(0.006)	(0.004)	(0.003)
SC/ST*Insurance	0.016***	0.011***	0.004
	(0.004)	(0.003)	(0.005)
Constant	0.037***	0.018***	0.020***
	(0.004)	(0.002)	(0.004)
Observations	351835	351835	351835
R^2	0.007	0.004	0.009

Clustered standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results show that JSY had a significant, positive impact on overall hospitalisation of women in India. It increased the probability of a woman being hospitalised by approximately 1.3 per cent. This finding is consistent with other literature on JSY effectiveness (Debnath 2012). As the summary statistics in Table 6 indicates there was a large increase in hospitalisation overall, particularly in public hospitalisation of rural women. The results in Table 8 show that while there was a significant increase in hospitalisation of women in public facilities, there was no effect of the programme on hospitalisation of women in private facilities in the country. This is an important distinction particularly because the JSY was meant to incentivise all institutional childbirth. There are many accredited private health institutions eligible under the JSY throughout the country. The structure of the incentives, however, are such that while the mother gets paid for institutional delivery in any hospital (public or private), the ASHA workers are only paid against delivery in government hospitals. What we see from the empirical evidence is that the JSY programme is essentially driving women to hospitalisation in public institutions and not everywhere. This potentially implies that the ASHA workers have become critical decision makers in the process of childbirth in rural India.

It is important to study the relative availability of private and public hospitals in rural India, to fully understand this movement towards public hospitals. The results also show that richer women, as indicated by a higher asset index, saw an increase in private hospitalisation and a simultaneous decline in public hospitalisation.

As a sharper identification, we extend the analysis beyond hospitalisation of women and focus specifically on childbirth data. So we repeat the above analysis for all childbirth data in our sample. So now our sample narrows down to the 27,616 childbirths between the two rounds of NSSO. The results are reported in Table 9, with the standard errors clustered at the state level.

Table 9: The Effect of JSY on Childbirth in India (Difference-in-Difference)

	(1) Institutional delivery	(2) Public hospital	(3) Private hospital	(4) Delivery at home
JSY=1*Post (2014)	0.145***	0.224***	-0.078**	-0.167***
	(0.027)	(0.034)	(0.034)	(0.026)
JSY=1	-0.206***	-0.099**	-0.107***	0.217***
	(0.051)	(0.040)	(0.029)	(0.051)
Post (NSSO Round=71)	0.385***	0.225***	0.160***	-0.091***
	(0.029)	(0.027)	(0.031)	(0.026)
Age	-0.004***	-0.003***	-0.000	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)
Rural	-0.025*	-0.022	-0.003	0.022
	(0.013)	(0.017)	(0.021)	(0.017)
Asset index	0.097***	-0.033***	0.130***	-0.110***
	(0.009)	(0.011)	(0.013)	(0.011)
Female*Insurance	0.032	-0.006	0.037**	-0.029
	(0.022)	(0.030)	(0.017)	(0.027)
SC/ST*Insurance	0.045	0.063	-0.018	-0.043
	(0.044)	(0.043)	(0.034)	(0.039)
Constant	0.594***	0.302***	0.292***	0.035
	(0.037)	(0.043)	(0.045)	(0.033)
Observations	27616	27616	27616	27616
R^2	0.338	0.175	0.167	0.174

Clustered standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results from the above analysis state that the JSY lead to significantly more institutional deliveries in public hospitals and fewer deliveries at home and in private hospitals. These results are statistically significant. More specifically, the analysis shows that JSY lead to approximately 15 per cent higher institutional deliveries in India. This increase is commensurate with a decline of similar magnitude in child deliveries at home. The data also shows that there is a tremendous

increase of more than 22 per cent in deliveries in government hospitals. This increase is fuelled by an 8 per cent decline in childbirth at private hospitals and a 16 per cent decline in childbirth at home.

So our analysis of the data shows that the JSY hypothesis holds true and the programme led to significant increase of 2 per cent in overall public hospitalisation of women in India. More specifically, the JSY led to a significant 15 per cent increase in institutional childbirth in India with a commensurate decline in deliveries at home. This was the fundamental objective of the JSY and the NSSO data shows that the scheme performed well. However, without data on quality, and given that research (Lim, et. al 2010, Randive,et. al, 2013), has not shown an impact on outcomes, the value of incentivising institutional delivery for the sake of institutional delivery is questionable.

4.2. The Effect of Heath Insurance on Health-Seeking Behaviour in India

Next we turn towards studying the impact of largescale rollout of health insurance schemes on health-seeking behaviour in India over the 10 years. Given that health insurance schemes in India are targeted towards in-patient care, we will study whether people are more likely to access in-patient care if they are covered by an insurance instrument. Beyond health seeking, we will explore the exact impact of insurance coverage on the out-of-pocket expenditure for households subsequently in section 6.

Hypothesis 4.2*:* Health Insurance coverage raised the probability of individuals seeking in-patient hospital care in India, between 2004-14.

Health insurance has been one of the major policy interventions in India in the 10 years from 2004-14. Several state level health insurance schemes were introduced such as Rajiv Aarogyasri in Andhra Pradesh (2007) and the national level RSBY (2008). A comprehensive list of the health insurance schemes and their coverage is available in the literature (Ravi and Bergkvist, 2015). There are large variations in the coverage of these different schemes but they all target hospitalisation burden and are therefore focused on in-patient expenditures. In this subsection, we will analyse whether having access to any health insurance coverage raised the probability of an individual seeking hospitalisation in India over the 10 years.

To try and measure the effect of insurance on hospitalisation, we fit a PROBIT model of the following form:

$$\Pr(y_{it} = 1 \mid hospitalisation_{it}) = \Phi(\alpha + \beta_1 \times insurance_{it} + \beta X_{it})$$

Where y_{it} is the dummy for in-patient care for a case i in the year t, $insurance_i$ is a dummy that takes the value 1 if the individual is covered by a health insurance and 0 otherwise. X_{it} is a vector of control variables for different confounding factors that affect hospitalisation. These explanatory factors include asset index, whether the individual is a scheduled cast or scheduled tribe, whether household is from rural or urban area, age and gender of the individual. We also include in our analysis the controls for state fixed effects. These pick up systematic variations in the outcome

variables, which is hospitalisation here, from state to state. Φ represents the Cumulative Distribution Function of the standard normal function as we are fitting a probability model. The coefficients that we report are the marginal probabilities of the outcome due to the specific explanatory variable.

Table 10: Probability analysis of Hospitalisation

	(1) Hospitalisation	(2) Public Hospital	(3) Private Hospital
Insurance	0.14***	0.17***	0.08***
	(0.02)	(0.03)	(0.03)
Public insurance above 30k	-0.09***	-0.03	-0.06*
	(0.03)	(0.04)	(0.03)
Female	0.37***	0.46***	0.22***
	(0.01)	(0.01)	(0.01)
SC/ST	0.01	0.10***	-0.10***
	(0.01)	(0.01)	(0.02)
Age	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)
Rural	0.01	-0.03**	0.03**
	(0.01)	(0.02)	(0.01)
Asset Index	0.00	-0.10***	0.09***
	(0.01)	(0.01)	(0.01)
Female*Insurance	-0.17***	-0.20***	-0.12***
	(0.02)	(0.03)	(0.03)
SC/ST*Insurance	0.06**	0.06**	0.06*
	(0.02)	(0.03)	(0.03)
Constant	-2.25***	-2.29***	-3.12***
	(0.04)	(0.05)	(0.06)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Religion FE	Yes	Yes	Yes
Observations	333104	333104	333104

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; These are coefficient from PROBIT analysis

The results are reported in Table 10 and indicate that *being insured is strongly associated with an increase in probability of being hospitalised (overall) and in both public and private hospitals in India. In particular, having insurance is associated with a 17 per cent increase in probability of being*

hospitalised in a government hospital and an 8 per cent increase in probability of being hospitalised in a private hospital.

It is important to remember that in this analysis, 'insurance' includes all forms of insurance—private and public with huge variations in coverage. There are variations in the coverage amounts of different health insurance schemes offered by the government. While the national RSBY has a coverage of ₹30,000 the state schemes are higher with Yeshasvini (Karnataka), Aarogyasri (Andhra Pradesh) and Vajpayee Aarogyasri (Karnataka) providing coverage of ₹200,000 each and Kalaignar (Tamil Nadu) proving coverage of ₹100,000. To focus our analysis on coverage amount, we study the public insurance coverage above ₹30,000 and see whether this is systematically correlated with hospitalisation probability. The analysis shows that individuals with coverage greater than ₹30,000 are less likely to be hospitalised overall.

The insurance schemes have made a difference to individuals who are from the schedule caste and schedule tribes. As the results show, being a schedule caste or schedule tribes does not have any significant relation with being hospitalised. But schedule caste and schedule tribe individuals who have insurance coverage are significantly more likely to be hospitalised in both private and public hospitals than schedule caste and schedule tribe individuals who do not have insurance.

The results also show that richer people, as indicated by higher asset index, have a much lower probability of going to public hospitals and a much larger probability of going to private hospitals. In the next section, we study the changes in health burden of Indian households, as measured by out-of-pocket expenditure, over the 10 years 2004-14.

5. Out-of-pocket expenditure

Out-of-pocket expenditure is any direct expense by households, including all kinds of payments to health practitioners, suppliers of pharmaceuticals, therapeutic appliances, and other goods and services for improvement in the health of individuals. Typically, this is a part of the private health expenditure. Healthcare in low and middle income countries is often paid for out-of-pocket by the people. It is well known that high out-of-pocket expenditure for health brings financial burden on families and it also influences the health-seeking behaviour with delayed treatments.

In this section we will analyse the data to see the changes in OOP in the 10 years of our study period. We will expand the analysis to see changes in OOP occurring from in-patient and out-patient health expenditures as well as the major ailments which dominate aggregate health spending in India. Beyond this, we will also study the nature of the OOP expenditure by evaluating the changes in catastrophic expenditures over time and the changes in impoverishment of households caused by health expenditures.

This section of the study focuses on the private health burden of Indian households as measured as out-of-pocket expenditure. Table 11 outlines the private OOP as a percentage of total health spending and the share of this arising from out-patient care. *The numbers show that private OOP expenditures on health comprised 67 per cent of total health spending in India which includes private and government health expenditures.* This shows that India has one of the highest private OOP expenditures in the world. It is higher than many African and Asian countries listed (World Bank,

2016).[7] What is heartening, however, is that *the OOP burden has fallen marginally in the 10 years* from 2004, when it was above 70 per cent.

A disaggregation of the data shows that the bulk of OOP spending is on out-patient. Out-patient comprised 63.5 per cent of the total OOP spending in 2014 which was much higher at 71.3 per cent 10 years before. The government spending numbers for 2013/14 are revised estimates

Table 11: Out-of-pocket expenditure on health

	2004	2014
Out-of-pocket expenditure as a percentage of (OOP + govt. spending**)	70.3	67.1
Out-patient expenditure as a percentage of total OOP	71.3	63.5

**2013-14 numbers are revised estimates of the government

Now, we look at the total in-patient and out-patient spending per household in the two rounds of the NSSO survey. The statistics are available in Table 12 and show that *overall out-of-pocket spending has risen significantly, but mostly due to the rise in the in-patient spending by households and not from the rise in out-patient spending.*

Table 12: Total OOP health expenditure per household

	2004	2014	Diff
Total real in-patient care expenses per household	1103.6	1842.2	738.3***
Total real out-patient expenses per household	2751	3112.67	361.5***
Total OOP expenses per household	3854.75	4954.6	1099.8***

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Next we disaggregate the data to see the changes in OOP for different sub-categories of population over the 10 years. Table 13 reports the real per capita annual OOP expenditure on health. The data shows that the overall real OOP expenditure increased by approximately ₹300, which amounts to more than 37 per cent over the 10-year period. This increase was for both urban and rural population in the country. *What is remarkable, however, is that while the rural Indian population has seen an increase of 24 per cent in OOP, the urban Indian population has seen two times that increase.* OOP in urban India rose by a massive 50 per cent over the 10 years. This difference in rising health burden between rural and urban population is consistent with the expansion in usage of public hospitalisation by rural women, given that public in-patient and out-patient care is significantly cheaper than private in-patient and out-patient care. Also recall from

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[7] http://data.worldbank.org/indicator/SH.XPD.OOPC.ZS

section 5 that the increase in urban in-patient and out-patient care is primarily in private healthcare which is more expensive than public healthcare.

Moving beyond the overall rural-urban subcategories, we now look at the consumption expenditure quintiles in each category. The first thing to note is that the OOP expenditure rises with each quintile group. This means that richer individuals spend more on healthcare compared to poorer ones. And this has been universally consistent across quintile groups for both urban and rural areas in both rounds of the NSSO.

Studying the changes in OOP over time, we see a deeply worrying result for the rural population. *While the top 4 rural quintile groups have not seen any statistically significant change in OOP expenditure over 10 years, the poorest rural population indicated by the bottommost quintile have seen an extraordinary increase of 77 per cent in OOP during this time.* While this increase in OOP spending can be viewed as a "catching-up" by the poorest, it is particularly disconcerting given that all public health insurance schemes in the country target this segment of the population.

The results for the urban population show that the increase in OOP health burden has been spread across different quintile groups. The 2nd quintile has seen a 45.6 per cent increase; the 3rd quintile has seen the biggest increase of 58 per cent while the richest quintile has seen an increase of 50 per cent. These are all statistically significant increases in each quintile group.

Table 13: Average OOP expenditure on health by consumption quintiles

	2004	2014	Diff
Annual Out-of-pocket expenditure on health (per person in the population, 2004-05 prices)	799.0	1098.0	299***
Rural	699.3	866.2	166.9***
Urban	1091.6	1639.4	547.8***
Rural population			
1st quintile	329.2	582.8	253.5***
2nd quintile	459.3	664.7	205.4
3rd quintile	683.7	675.0	-8.7
4th quintile	760.0	919.3	159.3
5th quintile	1555.7	1781.4	225.7
Urban population			
1st quintile	556.5	756.3	199.8*
2nd quintile	788.1	1148.2	360.1***
3rd quintile	1025.8	1621.3	595.5***
4th quintile	1445.1	2218.4	773.3*
5th quintile	2323.2	3475.5	1152.3**

Note: quintiles are based on monthly per capita consumption expenditure of households, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.1.   Real changes in out-of-pocket expenditures

Having studied the descriptive statistics for the out-of-pocket expenditures and the changes over time, we now analyse the driving factors behind these through regression analysis. We analyse the total out-of-pocket expenditures and then study the disaggregated data for in-patient and out-patient expenditures over time.

We estimate an equation of the following form

$$y_{it} = \alpha + \beta_1 \times year_t + \beta X_{it} + \varepsilon_{it}$$

Where y_{it} is the total real out-of-pocket expenditure for household i in the year t, $year_t$ is a time dummy variable and X_{it} is the vector of control variables which includes whether the household has insurance coverage, whether they are eligible for JSY support, rural/urban, household size and monthly per capita consumption expenditures.

We do the analysis with four specifications, reported in the four columns of Table 14. The first column reports the results without the state fixed effects and the second column includes state fixed effects. Columns 3 and 4 report the results for total OOP for in-patient and out-patient expenditures respectively. The fit of the regressions as shown by R square values are low, which means that these factors are not enough to explain total out-of-pocket expenditures of households in India, and that there are several other factors not included in the regression. This is normal for such analysis where we are limited by the availability of specific data and our interest is in establishing statistically significant relationship between certain factors and the outcome variable which is total OOP here. The objective here is not to understand all factors that can explain a household's total OOP for different categories of health expenditures.

The results (Column 2) show that *there was a significant increase in real total OOP expenditure of more than ₹750 over 10 years. To put this in the appropriate context, the per capita expenditure in 2004 was ₹799 (Table 13) and with the average household size of 4.8 (2004) these results show an increase of approximately 20 per cent in households' total OOP over 10 years.*

Moving to in-patient and out-patient expenses (columns 3 and 4), we note that *the increase in total OOP expenditures for households were essentially from significant increase in in-patient care and not from out-patient care. At the household level, in-patient expenses rose by ₹563 over the 10 years, while out-patient expense did not see any significant change in this time period.*

The results also show that people who had health insurance coverage did not see any significant difference in their total real OOP health expenditures, relative to people without any health insurance. On the whole this is a disappointing result given that the rationale for health insurance coverage is to reduce the total financial burden of poor health. We will explore different components of total OOP by looking at disaggregates into in-patient and out-patient care to see if insurance cover made any difference to these components.

Larger families have higher total OOP expenses arising from higher in-patient and higher out-patient expenses. This is normal and expected. Wealthier households, as indicated by higher monthly consumption expenditure have higher total OOP which is also an expected result.

Table 14: Household total annual out-of-pocket expenditure on health

	(1)	(2)	(3)	(4)
	Household total OOP	Household total OOP	Household annual In-patient expenditure	Household annual Out-patient expenditure
Dummy = 1 for 2014	717.35***	753.56***	563.20***	190.36
	(146.07)	(147.17)	(60.25)	(130.18)
Insurance	548.66**	462.69	128.74	333.95
	(254.93)	(288.65)	(179.62)	(211.67)
JSY eligibility	-374.44**	-54.63	-248.60**	193.97
	(185.53)	(268.37)	(102.83)	(237.23)
Household size	945.25***	943.53***	412.71***	530.82***
	(35.67)	(36.39)	(19.27)	(27.52)
SC/ST	-891.82***	-998.36***	-152.38*	-845.98***
	(186.43)	(236.79)	(89.63)	(208.11)
Rural	-155.73	-328.56	56.20	-384.77**
	(241.02)	(239.10)	(155.77)	(155.19)
MPCE	3.32***	3.29***	1.76***	1.53***
	(0.34)	(0.35)	(0.26)	(0.16)
Constant	-2451.20***	-3223.21***	-2791.55***	-431.66
	(501.35)	(752.03)	(447.23)	(517.88)
State FE	No	Yes	Yes	Yes
Religion FE	No	Yes	Yes	Yes
Observations	137814	137811	137811	137811
R^2	0.028	0.033	0.021	0.019

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

There are some interesting findings on SC/ST households and their changing health burden over time. The results show that people from SC/ST category have significantly lower OOP than others.

It is not obvious why this must be the case, so it requires some deeper analysis. When we study the different components of total OOP for SC/CT, we note that while these households are spending significantly less on out-patient care, there is no difference in in-patient spending. This is consistent with the findings in Tables 8 and 10 which show that SC/ST individuals have higher probability of public hospitalisation when they have insurance coverage. So these results can be interpreted as evidence supporting the public insurance schemes that target SC/ST for in-patient expenses. Now given that none of the insurance schemes cover out-patient expenses, it is possible that SC/ST individuals are not seeking out-patient care, thereby spending significantly lesser on out-patient care relative to others in the population. Earlier evaluations have similar results with in-patient insurance associated with reductions in out-of-pocket expenditures for out-patient care even though it is not covered by the insurance. One likely reason is that people seek in-patient care to a greater extent and skip out-patient services. All in-patient services are not covered by insurance and the result is no impact on expenditure on in-patient care, increased use of hospital care and reduction in out-of-pocket expenditure on out-patient care (Bergkvist et al. 2013).

5.2.   Changes in real expenditures per out-patient and in-patient case

We will now analyse the changes in expenditures per case for a household. The basic motivation is to check whether healthcare has got more expensive for individual cases of in-patient and out-patient care. So we study the changes in OOP by disaggregating the expenses into in-patient and out-patient health expenditures per case. The results for out-patient expense per case are reported in Table 15. *The broad results show that there is no statistically significant change in real OOP expenditure per case for out-patient care either in rural or urban areas, over the 10 years.* The rural-urban difference has, however, exacerbated. As the results show, urban households used to pay ₹41 more per out-patient case than rural households in 2004. And 10 years later, the urban households are paying ₹93 more per out-patient case than rural households. These differences are statistically very strong in both rounds of the NSSO.

Table 15: Out-patient expenditure per case

	2004	2014	Diff
Average total expenditure(₹ 2004-05)	315	321	5.06
Rural	303	287	-16.2
Urban	345	380	35.1*
Difference	-41***	-93***	
Male	335	328	-7
Female	296	314	18.6
Difference	39.2**	13.38	

* p < 0.10, ** p < 0.05, *** p < 0.01

Next we move to health burden of in-patient care by studying the data for in-patient per case. The results are presented in Table 16. *There is a significant increase in the real OOP expenditure per in-*

patient case by 23 per cent. This overall increase is essentially arising from the significant 32 per cent increase in in-patient care per case in urban healthcare sector. On the whole, rural in-patient expenditure did not increase significantly in real terms, while urban in-patient expenditure significantly increased in real terms. This is consistent with results in Tables 13 and 14 which showed increase in overall OOP burden for both rural and urban population, but no change in the OOP burden from out-patient care for either rural or urban. *So the total increases in health burden is basically arising out of increased in-patient burden in India, particularly for urban populations.* If we do a disaggregation by gender, we see that the OOP expenditure is significantly higher for men than for women in India. And this gap has doubled in 10 years. But the underlying factor for this gender variance is the rural-urban divide. The lower female OOP expenditure is essentially due to predominantly public in-patient care for women in rural areas. While higher OOP expenditures for males is predominantly private in-patient care for men in urban areas and rural areas.

Next, we disaggregate the total OOP expenditures for an in-patient case into doctors' fees, medicine expenditures and costs of diagnostics. Compared to a rural household, the increase in spending of an urban household is 5 times more on diagnostics, 2.6 times more on medicines and 2.4 times more on doctors' fees. It is important to note that the rural-urban differences were small in 2004 with absolutely no difference in the average expenditures on medicine per in-patient case, between rural and urban households. This has, however, changed remarkably, with urban households now paying ₹1090 more for medicines per in-patient case than rural households.

The biggest difference between rural and urban areas has arisen from the increase in average expenditure on diagnostics per hospitalisation case. Urban households witnessed a fivefold increase in their diagnostic expenses as compared to rural households. It is important to note, however, that diagnostic expenses are the smallest among all other in-patient expenses.

Table 16: In-patient expenditure per case

	2004	2014	Diff
Average total expenditure(₹ 2004-05)	6552	8053	1501***
Rural	5752	5904	151
Urban	8217	10866	2649***
Diff (rural-urban)	-2464***	-4962***	
Male	7694	10195	2501***
Female	5492	6059	566***
Diff (Male-Female)	2201***	4136***	
Average doctor fee	606	2340	1734***
Rural	534	1754	1219***
Urban	763	3533	2770***
Diff(rural-urban)	-229***	-1778***	
Average medicine expenditure	1294	2256	962***
Rural	1273	1916.6	643***
Urban	1341	3007.5	1667***
Diff(rural-urban)	-68	-1090***	
Average diagnostic expenditure	786	1082.2	296***
Rural	746	878	131**
Urban	874	1517.1	642***
Diff(rural-urban)	-128**	-639***	

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Now we explore the summary statistics in Tables 15 and 16 and check whether they hold after we control for various other explanatory factors. The broad findings were that the expenses per in-patient case have risen over time but the expenses per out-patient case have remained unchanged overall. So we study the changes in OOP from in-patient and out-patient expenditures per case. We estimate an equation of the following form:

$$y_{it} = \alpha + \beta_1 \times year_t + \beta X_{it} + \varepsilon_{it}$$

Where y_{it} is the total real in-patient (and out-patient) expenditure for case i in the year t, $year_t$ a time dummy variable and X_{it} is a vector of control variables which includes gender, household size, whether the household has insurance coverage, whether they are eligible for JSY support, rural/urban, and monthly per capita consumption expenditures. The specification also includes state fixed effects to pick out any systematic variation that could occur to the OOP expenditures from in-patient and out-patient care.

The changes in expenditures per medical case for a household is reported in Table 17 below. When we control for various observable explanatory factors, we find weak evidence to show that in-patient expenditures per case have increased by ₹417 over 10 years. This result, however, is only significant at the 90 per cent significance level due to high standard error. Given that the real total in-patient expenditure per case was ₹6,552 in 2004 (Table 16), this increase amounts to an increase of approximately 6 per cent. However, it is important to note that this result is not statistically too strong. The results for out-patient expenses, as reported in column 2, shows that there has not been a change in real out-patient expenses per case over the last 10 years.

The results also show that women spend less per in-patient case then men. And this result is largely due to the JSY as indicated by the strong results in Table 9. Now, a seemingly puzzling result is that people with insurance are spending significantly less on out-patient per case, but are not different when it comes to in-patient spending, whereas nearly all insurance schemes cover in-patient expenses. One rationale could be that insurance is leading to higher hospitalisation (Table 10) and possibly higher health seeking for similar ailments but since payments are cashless, it is not reflected as lower health burden for in-patient cases. The lower out-patient expense per case could be if there are complementarities between in-patient and out-patient. So if people are getting more hospitalised, they may seek less out-patient care (Bergkvist et al., 2013).

Consistent with the earlier result for SC/ST individuals, we note that they are spending significantly lesser for in-patient cases than others. This could be due to the targeting strategy of public insurance schemes which cover poor and SC/ST households. As Tables 8 and 10 show, SC/ST have a significantly higher probability of hospitalisation than the general population, and SC/ST with insurance have even higher probability of public hospitalisation. Given that public hospitals are cheaper, it contributes to SC/ST spending less than others for an average case of hospitalisation.

Table 17: Real In-patient and Out-patient expenditure per case

	(1) In-patient expenditure Per case	(2) Out-patient Expenditure Per case
Post (Time Dummy) = 1 for 2014	417.66*	2.32
	(222.30)	(12.64)
Insurance	-179.07	-52.25***
	(392.15)	(16.76)
Female	-2251.77***	-26.63**
	(327.41)	(11.73)
SC/ST	-1183.53***	-52.10*
	(262.31)	(26.85)
Age	63.97***	1.64***
	(4.47)	(0.27)
Rural	-809.05**	-25.71*
	(364.54)	(13.56)
MPCE	5.62***	0.11***
	(0.53)	(0.01)
JSY eligibility	-871.05***	30.72
	(336.85)	(28.35)
Constant	1258.20	328.08***
	(787.12)	(48.00)
State FE	Yes	Yes
Religion FE	Yes	Yes
Observations	88126	59639
R^2	0.076	0.023

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

So now, given these results in Table 17, we know that *there has not been a big change in expenditure per case of out-patient or in-patient, or for individual episodes of healthcare seeking for households.* Yet, we know from the regression results in Table 14 that overall health spending by households has increased, triggered by greater spending on in-patient cases. So are these increases due to greater health seeking by households or by greater incidence of morbidity (ailments) in India? It is difficult to disentangle this from the NSSO data because we do not have a panel data but are limited by only two waves or round of household surveys. But what we can do is compare the number of in-patient and out-patient medical cases reported by households in each year and see if there is a significant difference.

The results are in Table 18 below, which shows that the number of cases per household has risen for both in-patient and out-patient care in the 10 years. The increase is much larger in the number of in-patient cases per household. The data shows that while the number of in-patient cases per household has risen by 35 per cent, the number of out-patient cases has risen by merely 8.8 per cent. This is most likely a level effect where in-patient cases are fewer per household at the baseline year (2004) compared to out-patient cases, which are higher at 0.42 in the same year.

Table 18: Number of medical cases reported per household

	2004	**2014**	**Diff**
Average number of Hospitalisation (in-patient) cases reported	0.17	0.23	0.06***
Average number of out-patient cases reported	0.42	0.45	0.037***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

So from Table 18 we know that *Indian households are seeking more healthcare over the 10 years. This is for both in-patient and out-patient care. So the overall rise in total OOP for households is triggered by larger spending on in-patient and this is largely due to greater number of in-patient cases per household rather than higher spending per in-patient case, which has not changed significantly over time.*

5.3.   Changes in catastrophic expenditures

We will now measure the health burden for the population by studying the catastrophic health expenditure which is defined as the health expenditure of a household being above a certain percentage of the usual consumption expenditure over a period. The results are shown in Table 19. First, we note that the fraction of households decreases as we raise the threshold level of catastrophic expenses. This is expected because fewer households will have health expenditures which are larger share of their regular consumption expenditures. The data shows that in 2014, 24 per cent of Indian households were faced by catastrophic health expenses which were higher than 10 per cent of their regular consumption expenditures. There were 13 per cent Indian households that saw health expenses higher than 25 per cent of their regular consumption expenditures; and nearly 8.5 per cent households had health expenses which were higher than 40 per cent of their regular consumption expenditures.

Over time, we find that households with such catastrophic health expenditures have risen significantly for all the three threshold levels and across both rural and urban areas in the country. Consistent with earlier results, the increase in households with catastrophic expenses was *much larger for urban India than for rural India*, in each of the three threshold categories. Worryingly again, the largest increase of 20 per cent (1.4 percentage points) was in the fraction of households that faced catastrophic expenses of over 40 per cent. Even here, it was the urban households that saw the maximum rise of 44 per cent compared to the rural households that saw an increase of 14 per cent

in catastrophic health expenses.

Table 19: Catastrophic health expenditure

	2004	2014	Diff
Percentage of households with health expenditure above a certain percentage of usual household expenditure			
10% threshold	20.7	24.0	3.3***
Rural	21.1	24.0	2.8***
Urban	19.4	24.0	4.5***
25% threshold	11.3	13.0	1.6***
Rural	12.1	13.2	1.1***
Urban	9.3	12.4	3.1***
40% threshold	7.0	8.5	1.4***
Rural	7.6	8.8	1.1***
Urban	5.5	7.8	2.4***

$^{*} p < 0.10,\ ^{**} p < 0.05,\ ^{***} p < 0.01$

To explore the source for the catastrophic health expenses, we now disaggregate the data into in-patient and out-patient expenditures. Table 20 reports the data for whether households having catastrophic expenditure report in-patient or out-patient expenditures. For all threshold levels of catastrophic health expenses, we find that the majority of households report out-patient expenditures. To explain this point further, let us consider the 20.7 per cent households that spent more than 10 per cent of their usual consumption expenditure on health in 2004 (Table 19).

Table 20 implies that of these 20.7 per cent households, 38.6 per cent reported in-patient expenditures while a significant 84.8 per cent reported out-patient expenditures. We don't show in the table, but 23.4 per cent of this group reported both in-patient and out-patient expenses in 2004.

The data also shows that over time, *the fraction of households reporting catastrophic in-patient expenses is rising significantly while those reporting catastrophic out-patient expenses is falling*. This is consistent with results in Tables 14 and 15 which show that average out-patient expenses have not changed significantly in 10 years while average in-patient expenses have risen dramatically, especially for urban population in India.

It is important to caution here that care should be taken in interpreting these numbers. There is a difference in the recall period for out-patient (last 15 days) and in-patient (last one year) expense data, which means that we have to scale them both to a common time period. This may not give us the most accurate measure for 'catastrophic' health expenses. To illustrate, consider a household with a usual monthly consumption of ₹1,000. At the 10 per cent level, an in-patient expenditure of ₹1,200 and an out-patient expenditure of ₹50 would both show up as catastrophic expenditure. Mathematically these are equivalent, but they hold significantly different implications for the health burden that they impose on the household in the form of catastrophic expenditures.

Table 20: Sources of catastrophic health expenditure

	2004	2014	Diff
Percentage of catastrophically affected households reporting out-patient/in-patient expenditure			
10% threshold			
In-patient expenditure	38.6	45.1	6.5***
Out-patient expenditure	84.8	81.2	-3.6***
25% threshold			
In-patient expenditure	41.6	48.8	7.2***
Out-patient expenditure	87.4	84.2	-3.2***
40% threshold			
In-patient expenditure	43.8	50.2	6.4***
Out-patient expenditure	88.7	85.7	-3***

[*] $p < 0.10$, [**] $p < 0.05$, [***] $p < 0.01$

5.4. Changes in impoverishment due to health expenses

Another way to measure the health burden of households is the impoverishment due to OOP health expenditures. To calculate impoverishment, we use the temporally nearest Tendulkar committee poverty lines. We establish the percentage of rural and urban population in each state which falls under the state-specific poverty line, and then use that percentage to set the poverty line against which the consumption expenditures can be evaluated. Table 21 shows the results for impoverishment due to health expenditures.

Based on the Tendulkar poverty line estimation methodology, we find that the percentage of population in India that lie below the poverty line has fallen significantly in the 10 years from 2004-14. It used to be 38.5 per cent in 2004 and fell to 23.3 per cent in 2014. If we now incorporate the health expenses incurred by households, we see that 46 per cent households were poor (fell below poverty line) in 2004, and 30.8 per cent households were poor in 2014. So overall, *the percentage of Indian households that fell below the poverty line due to out-of-pocket health expenditures has remained largely unchanged at approximately 7 per cent over the last 10 years*.

Table 21: Impoverishment from health

	2004		2014	
	Percentage of population below the poverty line	Percentage of population below the poverty line after deducting health expenditures from consumption	Percentage of population below the poverty line	Percentage of population below the poverty line after deducting health expenditures from consumption
India	38.5	45.9	23.3	30.8
Rural	42.2	49.9	26.5	34.1
Urban	27.8	33.9	15.8	23.2

Now moving to the most unique aspect of the 60th and 71st rounds of the NSSO data which is the detailed information on ailments faced by households in India. Using this information, we analyse the disease burden of various ailments and their share in the out-of-pocket in-patient spending. We focus our attention to the in-patient data because the out-patient data for ailments is likely to be noisy as it is less likely to be backed by a diagnosis by a medical practitioner. The ailment data, which arises out of an in-patient case is likely to be more accurate.

Table 22 below outlines the top 15 ailments (out of 60 ailments covered in the survey) by in-patient spending in 2014 and 2004. As the table shows the two rounds of the NSSO survey have different descriptions for an ailment category. So while in 2004, childbirth was a simple classification, in 2014 this covered childbirth from caesarean, normal or any other. Similarly, heart disease in 2014 included chest pain and breathlessness. So our attempt to group these into simpler classification is not completely accurate. With that caveat, it is interesting to note that TB and Diabetes are not in the top 15 ailments in 2014; while they were in 2004.

The data shows that *the top 15 ailments in 2014 made up almost 75 per cent of total out-of-pocket spending in in-patient care. This share was much higher 10 years back when the top 15 ailments accounted for 87 per cent of total out-of-pocket expenses*. It is important to know that the NSSO questionnaire had fewer ailment codes in 2004, and many more in the 2014 round. So it is difficult to strictly compare the data between the two rounds. However, for broadly defined categories of ailments, we can look at the spending data over the 10 years.

Table 22: Top 15 ailments by in-patient spending in 2014 and 2004

2014		2004	
Ailment	**% share**	**Ailment**	**% share**
Childbirth – Caesarean/ normal/ any other	13.6	Childbirth	8.3
Heart disease: Chest pain, breathlessness	11.4	Heart disease	11.9
Accidental injury, road traffic accidents and falls	11.1	Accidents/Injuries/Burns/ Fractures/Poisoning	12.0
Cancers (known or suspected by a physician) and occurrence of any growing painless lump in the body	6.2	Cancer and other tumours	6.9
Pain in abdomen: Gastric and peptic ulcers/ acid reflux/ acute abdomen	5.9	Gastritis/gastric or peptic ulcer	3.3
Fevers other than with loss of consciousness, rash/lesions, diphtheria, whooping cough (Includes malaria, typhoid and fevers of unknown origin, all specific fevers that do not have a confirmed diagnosis)	5.6	Fever of unknown origin	2.8
Any difficulty or abnormality in urination	4.2	Diseases of kidney/urinary system	6.1
Joint or bone disease/ pain or swelling in any of the joints, or swelling or pus from the bones	4.1	Disorders of joints and bones	3.1
Stroke/ hemiplegia/ sudden onset weakness or loss of speech in half of body	3.3		
Lump or fluid in abdomen or scrotum	2.4		
Change/irregularity in menstrual cycle or excessive bleeding/pain during menstruation and any other gynaecological and andrological disorders incl. male/female infertility	2.0	Gynaecological disorders	5.2
Bronchial asthma/ recurrent episode of wheezing and breathlessness with or without cough over long periods or known asthma)	2.0	Bronchial asthma	1.8
Hypertension	1.9		
Pain the pelvic region/reproductive tract infection/ Pain in male genital area	1.6		
Jaundice	1.5		
		Respiratory including ear/nose/throat ailments	1.8
		Diabetes mellitus	1.8
		Tuberculosis	2.4
		Neurological disorders	4.9
		Other diagnosed ailments	14.3
Total share of in-patient spending	**73.7**	**Total**	**86.6**

6. Sources of financing

In this section we explore healthcare financing in India and the way in which this has changed in the 10 years. Households' sources of healthcare financing were measured differently in 2004 and

2014. In 2014, households were asked for the major source of financing for each episode of hospitalisation, whereas in 2004, households were asked to report the amounts obtained from different sources, from which we regard the source with the largest share as the major source of financing. In 2014, therefore, household listed multiple major sources of financing for different cases of hospitalisation, and we regard each of these as major sources of financing.

We start by looking at the simple descriptive statistics in Table 23. There are four major sources of healthcare financing available to Indian households. These are drawing on household savings (or income), borrowing, contribution from friends and relatives and others which includes sale of physical assets. From the statistics in Table 23, *we see that household's reliance on borrowing, contributions from friends and relatives and all other sources have come down over the 10-year period. Instead, households are now overwhelming relying on own income and drawing down savings to finance their healthcare expenses. This holds for both rural and urban households.*

Table 23: Sources of Finance reported as major sources for in-patient health expenses

	2004	2014
Household income/savings (%)	55.3	77
Rural	50.1	75.6
Urban	67.1	80.7
Borrowings (%)	33.9	20
Rural	38.7	21.9
Urban	23.4	16.8
Contributions from friends/relatives (%)	9.6	4.2
Rural	10.1	4.2
Urban	8.9	4.1
Other (incl. sale of physical assets) (%)	3.3	1.4
Rural	3.9	1.5
Urban	1.9	1.4

While the above changes, which are away from other sources of financing towards own savings and income, are significant, our main interest is in understanding the role of health insurance. This is because one of the major policy changes in Indian healthcare sector has been the expansion of health insurance—both private and public—since 2004. Table 24 shows the health insurance coverage in India. The first thing to note is that merely one per cent of the Indian population, as represented by NSSO, had any form of health insurance coverage in 2004. These were most likely people covered by CGHS and ESIS. This number rose dramatically in the next 10 years with the overall insurance coverage increasing to over 15 per cent of the Indian population. The disaggregate shows that it is mostly government health insurance which has spread during this time.

Table 24: Insurance coverage

	2004	2014
Population insured (%)*	1.0	15.2
Govt. insurance (%)		12.8
Rural		13.1
Urban		11.9
Male		12.5
Female		13.1
Employer supported (other than govt.) (%)		1.2
Rural		0.6
Urban		2.4
Male		1.2
Female		1.1
Arranged by household (%)		1.2
Rural		0.2
Urban		3.5
Male		1.3
Female		1.2

*Includes coverage under CGHS, ESIS

It is important to note the discrepancy between these NSSO statistics on health insurance outreach and statistics reported by World Bank (La Forgia and Nagpal, 2012) which showed that over 25 per cent of Indian population was covered by some formal health insurance by 2011. The World Bank study used government data reports to calculate the health insurance coverage numbers, while the NSSO is based on household surveys. The implications of this gap in the estimates could be that people don't know that they have health insurance coverage or that the government health coverage data included fraudulent cases. Either way, the gap between the two statistics is significant and need to be rationalised through further research and scrutiny.

Table 25: Insurance coverage by consumption quintiles (2014)

	All insurance		Public insurance	
Consumption Quintile group	Rural	Urban	Rural	Urban
1st quintile	11.5%	9.7%	10.8%	8.6%
2nd quintile	11.4%	12.5%	10.8%	10.6%
3rd quintile	12.3%	18.6%	11.6%	13.9%
4th quintile	17.4%	23.1%	16.6%	14.1%
5th quintile	19.8%	36.4%	17.7%	15.1%

A disaggregate by per capita monthly consumption quintile groups in Table 25 shows the difference between overall insurance and government insurance coverage, and between urban and rural population. If we study overall health insurance coverage, we note that in urban population, the richer quintiles have much higher health insurance coverage than the poorer ones. This is most likely due to the expansion of private health insurance coverage among the rich urban population in India.

Much more surprisingly, *the public insurance coverage also shows an increasing trend as we go higher up the consumption quintile groups.* The data shows that coverage among the bottom three quintiles in the rural group is close to 11 per cent and is around 17 per cent for the top two quintiles. Similarly, in the urban group too, the lower quintiles have significantly lower coverage. The fact that most government health insurance schemes are targeted towards households living below the poverty line in India makes this intriguing. This is capturing the problem with targeting of public schemes in India. In terms of health insurance, there have been documented cases of mis-targeting in states like Andhra Pradesh (united) where the Rajiv Aarogyasri covered nearly 70 per cent of the population.

As a next step in this analysis, we are interested in seeing if there have been any significant changes in the OOP health burden of households covered by health insurance in India.

6.1.   Public health insurance and out-of-pocket health expenditure

To capture whether government health insurance is associated with lower OOP for Indian households, we estimate an equation of the form

$$y_{it} = \alpha + \beta_1 \times public\_insurance_{it} + \beta X_{it} + \varepsilon_{it}$$

Where y_{it} is the real out-of-pocket expenditure for household i in the year t, $public\_insurance_i$ is a dummy variable that takes the value 1 if anyone in the household is covered by a public insurance scheme, and X_{it} includes a vector of control variables such as monthly consumption, whether household is SC/ST and whether household is rural or urban. In this analysis we run two specifications, one with state fixed effects and one without.

The results are reported in Table 26 below and as the robust specification in column 2 shows, *having any form of public health insurance has no significant relation with the household's total OOP on health.* We capture if higher coverage of greater than ₹30, 000 made any difference, and find that there is no difference between households with higher coverage and the others.

One again, SC/ST households are seeing a significant reduction of total OOP, and as previous results showed, due to out-patient expenses. If we look at the interaction term between insurance and SC/ST, we note that SC/ST households with insurance coverage are no different in OOP spending than those without insurance. Since insurance predominantly covers in-patient expenses and SC/ST households with insurance coverage have a much higher probability of hospitalisation (Table 8) it is possible that cashless hospitalisation is the reason why we don't see any difference in OOP for this group.

Table 26: Public insurance and OOP of households

	(1) Household total OOP (without Fixed Effects)	(2) Household total OOP (with Fixed Effects)
Public Insurance	788.47***	-66.43
	(293.68)	(387.28)
Public insurance above 30k	-774.83*	792.24
	(416.71)	(506.63)
SC/ST	-1321.80***	-1192.35***
	(138.11)	(156.12)
Rural	-180.84	-390.24*
	(235.05)	(232.36)
MPCE	2.63***	2.58***
	(0.30)	(0.31)
SC/ST*Insurance		146.67
		(375.62)
Constant	2840.23***	2152.16***
	(366.86)	(595.40)
State FE	No	Yes
Religion FE	No	Yes
Year FE	No	Yes
Observations	137814	137811
R^2	0.014	0.020

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.2.   Public health insurance and catastrophic health expenditures

In order to understand the association between public health insurance and probability of catastrophic expenditures, we fit a probit model of the form

$$\Pr(y_{it} = 1 \,|\, public\_insurance_{it}) = \ \Phi(\alpha + \beta_1 \times public\_insurance_{it} + \beta X_{it})$$

Where y_{it} is the dummy variable for catastrophic expenditure for household i in the year t, $public\_insurance_i$ a dummy variable that takes the value 1 if anyone in the household is covered by public insurance, and X_{it} controls for asset index, state fixed effects etc. Φ represents the CDF of the standard normal function. The three specifications for the probit are for the three threshold levels of catastrophic health expenditures – 10, 25 and 40 per cent of regular monthly per capita consumption expenditure for the household.

The results in Table 27 show that having public health insurance coverage is not associated with any change in probability of catastrophic health expenditures at 25 and 40 per cent threshold levels. There is, however, an increase in probability of 7 per cent at the 10 per cent threshold level. *So households with public health insurance coverage have a 7 per cent higher probability of experiencing a catastrophic health expenditure of magnitude higher than 10 per cent of their regular consumption expenditure.*

It is important to note that the nature of this analysis is unable to establish a causal link between having insurance cover and the probability of catastrophic health expenses. It is equally likely that the public insurance schemes are well targeted towards those who experience catastrophic expenses, or that households which have public insurance coverage are now seeking more healthcare. Our previous results have established that insurance is strongly correlated with greater hospitalisation.

Table 27: Probability of catastrophic expenditure

	(1) 10 per cent threshold	(2) 25 per cent threshold	(3) 40 per cent threshold
Public Insurance	0.07^{**}	0.03	0.06^{*}
	(0.03)	(0.03)	(0.04)
SC/ST	-0.12^{***}	-0.14^{***}	-0.15^{***}
	(0.02)	(0.02)	(0.02)
Rural	0.12^{***}	0.15^{***}	0.13^{***}
	(0.02)	(0.02)	(0.03)
Asset Index	0.05^{***}	0.04^{***}	0.01
	(0.01)	(0.01)	(0.01)
Constant	-0.91^{***}	-1.32^{***}	-1.62^{***}
	(0.06)	(0.07)	(0.08)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Religion FE	Yes	Yes	Yes
Observations	139725	139725	139725

Standard errors in parentheses, $^{*}\,p < 0.10$, $^{**}\,p < 0.05$, $^{***}\,p < 0.01$

6.3. Public health insurance and impoverishment due to poor health

Next we study the association between government health insurance and impoverishment due to health expenditures. We fit a probit model of the form:

$$\Pr(y_{it} = 1 \,|\, public\_insurance_{it}) = \Phi(\alpha + \beta_1 \times public\_insurance_{it} + \beta X_{it})$$

Where y_{it} is the dummy for impoverishment for household i in the year t, $public\_insurance_i$ a dummy variable that takes the value 1 if anyone in the household is covered by public insurance, and X_{it} is the vector of control variables for asset index, state fixed effects etc. Φ represents the CDF of the standard normal function, since we are fitting a probability model.

The results are reported in Table 28 and the three columns report the results from the three specifications. The first column reports results from a parsimonious regression. We add several control variables in the second column and in the third we include all controls and the state fixed effects to capture any systematic variation in impoverishment across states. The results show that if we do not add state fixed effects, we would mis-report the association of impoverishment with public insurance cover. The most robust specification (last column) shows that public insurance is not associated with probability of impoverishment. This means that public insurance cover is unrelated with impoverishment that households faced due to health expenditures in the 10 years from 2004 to 2014.

Table 28: Impoverishment due to health expenditure

	(1) Impoverished	(2) Impoverished	(3) Impoverished
Public Insurance	0.08**	0.07**	0.04
	(0.03)	(0.03)	(0.04)
SC/ST		-0.16***	-0.15***
		(0.02)	(0.02)
Rural		0.19***	0.21***
		(0.03)	(0.03)
Asset Index		0.08***	0.05***
		(0.01)	(0.01)
Constant	-1.49***	-1.59***	-1.69***
	(0.01)	(0.02)	(0.08)
State FE	No	No	Yes
Year FE	No	No	Yes
Religion FE	No	No	Yes
Observations	139800	139727	137347

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

So overall, the regression analysis show that having public health insurance coverage in India has not been associated with lower out-of-pocket expenditure on healthcare, probability of facing catastrophic health expenditures or impoverishment caused by health expenditures.

7. State-wise analysis

Beyond the changes in healthcare outcomes for households in India, there is some interest in studying the variations in outcomes over states. The NSSO data gives us representative samples of households at the state level, but there are too many variations in health policies and delivery capacities across the Indian states. So any significant difference in health outcomes between states is difficult to comprehend given these numerous confounding factors.

In the table 29 below, we report some of the outcomes of interest for the largest 18 states in India for 2014. The average numbers for all India is reported in the last row of the table. The states are listed in increasing OOP spending as percentage of total health spending. Consistent with our disaggregated tables in the study, these results shows that private out-of-pocket accounts for over 74 per cent of the total health spending in India. Measured in this way, Indian households have one of the highest health burdens globally. As pointed out in the text before, this is significantly higher than several countries of Latin America and sub-Saharan Africa. The data also shows that 13 per cent of Indian households have experienced catastrophic health expenditures that are over 25 per cent of their regular consumption expenditures. In terms of access to health insurance, the survey data shows that only 15 per cent of Indians have any insurance cover. For out-patient care, we see that 3 out of 4 Indian households rely exclusively on private healthcare providers. This dependence is lower for hospitalisation, where 56 per cent of in-patient cases were in private care. Our analysis has shown that this dependence on private care for in-patient care has reduced significantly since 2004, largely due to the JSY scheme of government of India, which incentivises institutional child deliveries. In terms of per capita government spending, the data shows that India spends ₹725 per person on healthcare. This is lower than neighbouring countries like Sri Lanka but efficiency of spending matters more than the amount as is reflected by the Bangladesh experience over the last decade. [8]

Looking across states, we see that there is considerable variation. Kerala, which is generally regarded as one of the most 'progressive' states in India, has the highest proportion of private out-of-pocket health expenditure at approximately 84 per cent. When viewed together with the fact that the state spending on health is also one of the highest in Kerala at ₹1,070 per capita, we note that people in Kerala spend more on healthcare than any other state in India. Despite high state spending, people depend greatly on private healthcare, particularly for IPD care. The insurance coverage is also relatively high in the state, at approximately 40 per cent of the population. There is no evidence to suggest that the morbidity from ailments is higher in Kerala relative to other Indian states. Yet, more than 20 per cent of the population reported catastrophic healthcare

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[8] S. Ravi and R. Ahluwalia (2015)

expenditures above 25 per cent of household consumption expenditures in 2014, which is the highest in the country. So these statistics, probably capture the uniqueness of health-seeking behaviour of the people of Kerala.

Bihar has the lowest state spending on healthcare at ₹348 per capita. With extremely low health insurance coverage of only 6 per cent, this state also reports the highest dependence on private healthcare services for OPD care. With very low state spending and predominance of private healthcare sector, the household OOP spending is nearly 80 per cent of all health spending in the state.

In contrast with Bihar, the government of Himachal Pradesh spends the maximum per capita on healthcare at ₹1,830. And despite low insurance coverage at 9.3 per cent, the private OOP spending for households is only 55 per cent of overall health spending in the state. Higher state spending also means that the dependence on private healthcare sector for OPD and IPD are also among lowest in the country.

Andhra Pradesh has the highest health insurance coverage of 63 per cent, largely due to the efforts of consecutive state governments in rolling out Aarogyashri since 2007. Yet, more than 16 per cent of the population report catastrophic health expenditures of more than 25 per cent, and the dependence on private healthcare services is among the highest in the country, for both IPD and OPD care.

Table 29: State-wise analysis

State	OOP as % of (state exp + OOP*	% households with Catastrophic exp (25% threshold)	Insurance coverage % pop	% of exclusively private out-patient cases	% of private in-patient cases	State health spending per capita
Assam	54.2	5.8	2.6	43.1	12.6	823.30
HP	55.7	13.1	9.3	57.8	22.9	1830.64
Uttaranchal	56.5	12.6	0.3	59.3	39.6	1230.42
Chhattisgarh	63.2	6.6	39.3	80.4	46.6	740.18
Gujarat	63.7	6.8	14.2	84.9	73.8	811.05
Rajasthan	66.8	10.0	22.6	66.3	36.4	737.46
Haryana	71.3	12.2	6.9	90.9	66.5	847.99
Jharkhand	72.7	8.2	3.8	85.1	45.7	428.15
AP	73.9	16.4	62.8	87.4	73.8	1022.11
Karnataka	74.3	14.1	10.5	80.2	67.8	791.17
MP	74.8	11.5	1.7	75.7	38.3	527.88
Maharashtra	76.4	11.3	7.2	83.8	74.1	674.49
TN	77.6	12.7	21.8	68.7	61.1	849.17
Punjab	78.0	18.5	5.6	82.7	65.5	999.98
Bihar	79.4	11.1	6.2	91.5	44.6	348.45
UP	80.3	13.9	4.2	87.5	59.3	488.46
Orissa	80.9	18.2	20.7	40.9	19.9	517.57
WB	81.6	17.9	16.8	84.4	29.6	607.19
Kerala	83.7	20.4	39.5	69.0	66.1	1070.80
India	74.4	13.0	15.20	74.5	56.6	724.84

*Does not include central expenditure

8. Conclusion

The decade from 2004 to 2014 was a time when the country brought in sweeping policy initiatives into its healthcare sector. This study systematically analyses health and morbidity in India during this time period. The NSSO data from round 60 (2004) and round 71 (2014) make it possible for us to compare healthcare in India over the 10 years. In particular, we analyse changes in health-seeking behaviour of Indian households, changes in their out-of-pocket health expenditures and changes in their major sources of healthcare financing, over time. We are able to map some of the major healthcare initiatives of the government to these changes in outcomes of health-seeking, out-of-pocket expenditure and health financing.

In this study, we use National Sample Survey (NSS) 60th and 71st rounds which included questions focused on morbidity and the consumption of healthcare for all individuals within the surveyed households. Over the 10 years, the similarity of information collected in the two rounds of the surveys, gives us an opportunity to make scientific comparisons to understand the big changes in health and morbidity outcomes for Indian households.

Our main results for health-seeking behaviour shows that households still overwhelmingly depend on private providers for healthcare services. This dependence, however, is declining and more significantly for in-patient care. Most of these increases are driven by rural women seeking more public healthcare, over last 10 years. More precisely, our analysis of the data shows that the Janani Suraksha Yojana led to significant increase in institutional childbirth in India with a commensurate decline in deliveries at home. Given that the fundamental objective of the JSY was to raise institutional deliveries, the NSSO data shows that the scheme performed well over the 10 years.

The results also point to a significant association of health insurance coverage and hospitalisation in India. We note that having insurance coverage is highly correlated with being hospitalised. In terms of the out-of-pocket health expenditure, a common measure of health burden, we note that the overall OOP spending has risen significantly, and mostly from a rise in in-patient spending and not from out-patient spending of households. Over time, we find that households with catastrophic health expenditures have risen significantly and across both rural and urban India. Once again, this increase was much larger for urban households than for rural households. In terms of impoverishment caused due to poor health, we estimate that overall the percentage of Indian households that fell below the poverty line due to OOP health expenditures has remained unchanged at approximately 7 per cent of the population, over the 10 years.

In terms of sources of financing healthcare expenditures, the data shows that households are increasingly relying on their own income and drawing down their own savings to finance their healthcare expenses. Reliance on borrowing, contributions from friends and relatives and all other major sources have come down steadily over the 10-year period. This holds for both rural and urban households in India.

From the healthcare financing perspective, the overall analysis show that having public health insurance coverage in India has not been associated with lower health burden as measured by total OOP expenditure, probability of catastrophic health expenditures or impoverishment caused by health expenditures. So on the whole, it appears that the public health insurance programmes have been ineffective in lowering the healthcare expenditures of Indian households on average but have improved access to IPD care on average.

On the whole, while the NSSO is a good source of quantitative data to assess changes in healthcare and morbidity in India, it lacks any information on the quality of care. We are, therefore, unable to assess the quality of healthcare services in the country, with this dataset. Quality is important, however, and we must take care while interpreting the results. This is because an improvement in access to healthcare services will mean little if the quality of those services are poor. It is an important policy issue to focus on quality of care in the country, within both the private and public healthcare sectors. We need more and better data on quality of services to scientifically investigate whether improvements in access to healthcare in India is leading to a more efficient healthcare sector and a healthier population.

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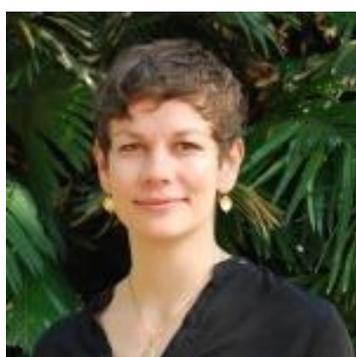
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