

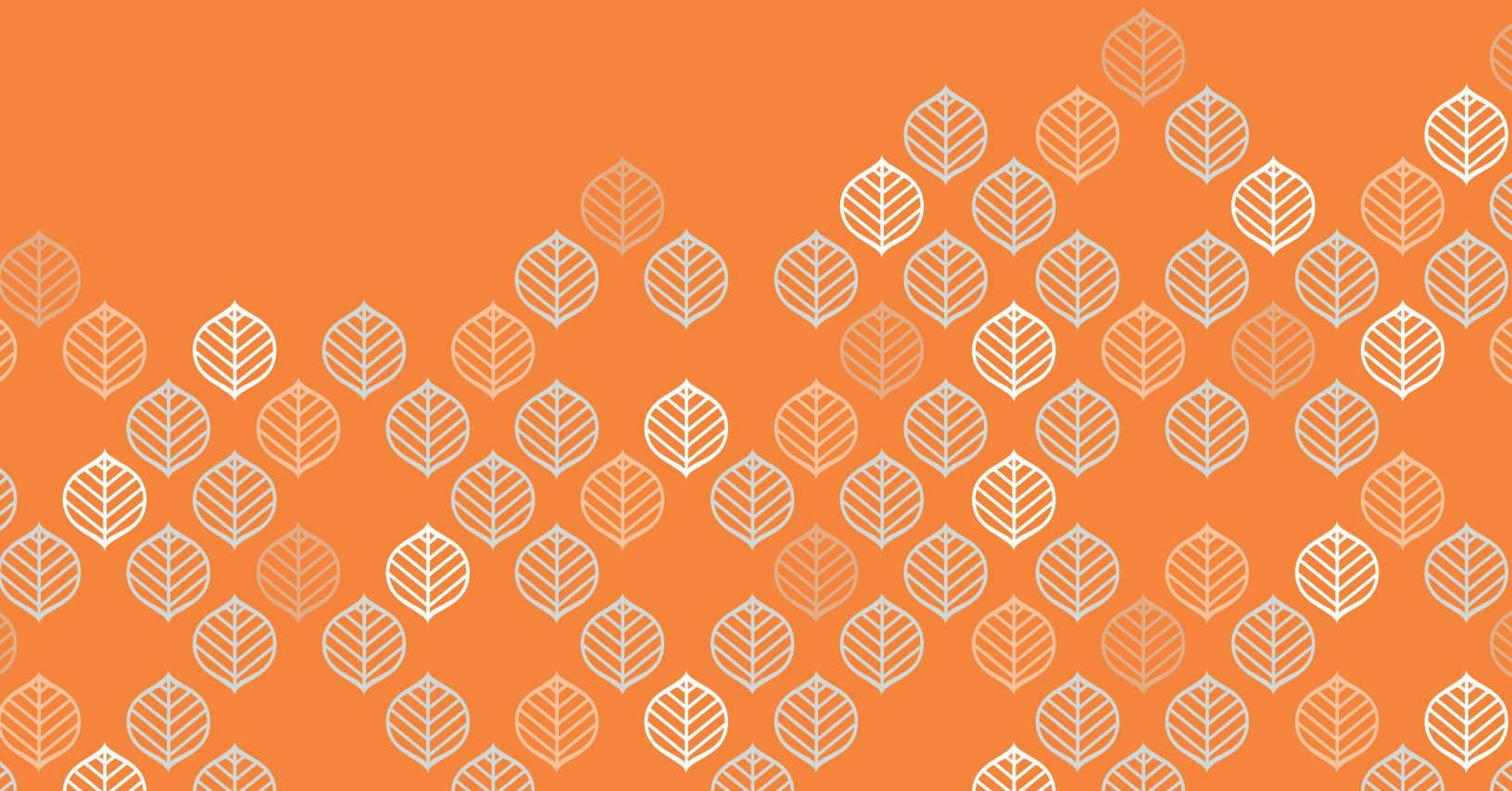
The Role of Government in the Indian Hospital System

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About the Woodrow Wilson School Workshop

Second-year Master in Public Affairs candidates at Princeton University's Woodrow Wilson School of Public and International Affairs participate in policy workshops led by professors with significant experience as practitioners. Professor Jeffrey Hammer, the Charles and Marie Robertson Visiting Professor in Economic Development at Princeton and the previous head of the World Bank's New Delhi office, taught a workshop on Hospital Care in India in the fall of 2016. Eight students researched India's hospital system and spent ten days in Delhi, Bihar (Patna), and Jaipur (Rajasthan) visiting hospitals and interviewing healthcare providers, government officials, and experts at international and non-governmental organizations. This report describes the challenges of hospital care in India and makes recommendations for its improvement.

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Executive Summary

Hospital care in India represents a large portion of many people's consumption expenses, but it has received much less attention from the government, non-profits, and international organizations than primary healthcare. This is the first major report to explain how market failures impede the provision of high-quality, affordable care throughout the Indian hospital system and to assess the impact of insurance in facilitating access to hospital care. Using National Sample Survey data from 1995 through 2014, the report presents new descriptive and econometric analyses of the disparate impacts of out-of-pocket health expenditures across the patient income distribution and of the possibility for greater competition in hospital care to drive quality improvements while lowering costs. The report features four main empirical findings:

Demand and supply: Over the past decade, Indians' demand for hospital care has increased, yet government spending on hospital care and the availability of insurance has not kept pace with demand. In fiscal year 2013-2014, only 12.78 percent of Indians had some type of government insurance, and only 2.47 percent had private insurance, though the total rate of insurance coverage did increase 15-fold compared to ten years earlier. Still, government health expenditures accounted for only 28.6 percent of total health expenditure in 2013-2014, below the average of 36.2 percent in lower middle-income countries. As a result, households remained the main source of healthcare financing at 67.7 percent of total health expenditure, down only slightly from 71.1 percent ten years earlier.

Catastrophic expenses: We define a catastrophic health expenditure as a health expenditure of at least 25 or 40 percent of a household's annual consumption expenditure (ACE). The distribution of catastrophic health expenditures across ACE quintiles has *worsened* over time: in 2014, a majority of households facing catastrophic health expenditures were in the two poorest ACE quintiles, which was not the case 20 years earlier.

Competition: A one-standard-deviation increase in the perceived quality of *public* hospitals (from 50 to 38 percent reports of low quality) in states with the mean ratio of public hospital beds to population is associated with a decrease of 21 percent in the out-of-pocket cost of *private* hospitalization. Therefore, it appears that high-quality public hospitals are able to put competitive pressure on private hospitals to maintain care standards while reducing prices.

Insurance: In 2014, privately insured patients paid 26 percent more per private hospitalization and 27 percent more in daily out-of-pocket expenses for private hospitalization than uninsured patients. The gap in out-of-pocket expenses was largest for Indians with monthly consumer expenditures over Rs 10,000, suggesting that adverse selection and moral hazard may be driving up hospital care prices, especially if insured patients get reimbursed through their insurance plans.

To address the market failures undermining access to high-quality, affordable hospital care, the report calls for better data collection, including more consistent adoption of performance-based indicators of hospital care outcomes; the use of incentive contracts by government and insurers as well as social accountability mechanisms to circumvent principal-agent problems inherent in healthcare systems; various lower-cost interventions, including "nudges" based on behavioral economics, for improving hospital care; greater emphasis on ethics in India's medical education system; and, lastly, increased government spending to raise the quality of public hospitals to put increased competitive pressure on private hospitals to maintain quality while lowering prices.

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This report could not have been completed without the guidance and assistance of several people and organizations. First and foremost, our team would like to thank our workshop instructor Dr. Jeffrey Hammer. Professor Hammer introduced us to many of the economic models we use in the report, connected us to many of the organizations and contacts in India who provided helpful data and input for our research, and led us on a productive (and very fun!) ten-day trip to India, a country none of us had previously visited. We also wish to thank the Graduate Program Office of the Woodrow Wilson School and especially Gilbert Collins, the former Director of Graduate Student Life, for their help in making this workshop and report possible.

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Introduction

Since the introduction of the Millennium Development Goals nearly twenty years ago, India has embarked on major health reforms,¹ most of which have focused on primary healthcare. In 2005, the government established the National Rural Health Mission to improve maternal and child health in poor states and union territories.² In 2010, a government commission recommended instituting universal health coverage to provide a basic healthcare package financed by taxes and insurance supplements.³

Although primary healthcare remains a major challenge in India,⁴ this report starts from the premise that hospital care has received comparatively less attention from the government, non-profits, and international organizations. Hospital care is important because all people—rich and poor—suffer from illnesses and accidents requiring advanced care. Moreover, because India has an underdeveloped insurance system, the costs of hospital care can overwhelm the modest financial resources of most Indian households. Therefore, finding ways to improve care while lowering costs is essential to India's overall health indicators and development.

This report is the first publication of which we are aware that addresses the Indian hospital system as a whole; market failures that impede the provision of high-quality, affordable hospital care; and the impact of insurance in facilitating access to hospital care. Using National Sample Survey data from 1995 through 2014, the report presents new descriptive and econometric analyses of the disparate impacts of out-of-pocket health expenditures across the patient income distribution and of the possibility for greater competition in hospital care to drive quality improvements while lowering costs.

Our research has revealed four major findings:

First, over the past decade, Indians' demand for hospital care has increased, yet government spending on hospital care and the availability of insurance has not kept pace with demand. In fiscal year 2013-2014, only 12.78 percent of Indians had some type of government insurance, and only 2.47 percent had private insurance, though the total rate of insurance coverage did increase 15-fold compared to ten years earlier. Still, government health expenditures accounted for only 28.6 percent of total health expenditure in 2013-2014, below the average of 36.2 percent of lower-middle-income countries. As a result, households remained the main source of healthcare financing at 67.7 percent of total health expenditure, down only slightly from 71.1 percent ten years earlier.

Second, as households spend a greater proportion of their total consumption on health, a growing number of households face catastrophic hospital care bills. In 2014, of households that incurred health expenditures amounting to at least 25 percent of their annual consumption expenditure (ACE), nearly 28 percent were in the bottom ACE quintile, while only about 12 percent were in the top ACE quintile. Of households that incurred health expenditures amounting to at least 40 percent of their ACE, about 30 percent were in the bottom ACE quintile, while only about 12 percent were in the top ACE quintile. And the distribution of catastrophic health expenditures across ACE quintiles has *worsened* over time, with a majority of households facing catastrophic health expenditures falling into the two poorest quintiles, which was not the case 20 years earlier.

Third, the availability of high-quality public hospitals is associated with lower out-of-pocket expenditures by patients who seek care at *private* hospitals, suggesting that high-quality public hospitals are able to put competitive pressure on private hospitals to maintain care standards while reducing prices. For example, a one-standard-deviation increase in the perceived quality of public hospitals in certain states is associated with a decrease of 21 percent in the out-of-pocket cost of private hospitalization.

Fourth and finally, access to insurance is associated with *higher* out-of-pocket expenditures by patients at private hospitals. In 2014, privately insured patients paid 26 percent more per private hospitalization and 27 percent more in daily out-of-pocket expenses for private hospitalization than uninsured patients. The gap in out-of-pocket expenses was largest for Indians with monthly consumer expenditures over Rs 10,000, suggesting that adverse selection and moral hazard may be driving up hospital care prices, especially if insured patients get reimbursed through their insurance plans.

Our economic analysis and empirical findings of India's market failures in hospital care shape our recommendations. We call for:

- better data collection, including more consistent adoption of performance-based indicators of hospital care outcomes;
- use of incentive contracts by government and insurers as well as social accountability mechanisms to circumvent principal-agent problems inherent in healthcare systems;
- various lower-cost interventions, including “nudges” based on behavioral economics, for improving hospital care;
- greater emphasis on ethics in India's medical education system; and
- increased government spending to raise the number and quality of public hospitals to put competitive pressure on private hospitals to maintain quality while lowering prices.

Part I of the report overviews the structure of the Indian health care system, including low government expenditures on health compared to other lower-middle-income countries, the low penetration of insurance coverage, the increasing demand for hospital care, problems in medical education that undermine the supply of high-quality hospital care, and the rising costs of care. Part II applies economic theory to the functioning of India's hospital system, explaining how information asymmetries inherent in healthcare, known in economics literature as a “credence good,” may lead to hospital administrators and medical professionals trying to maximize their profits at the expense of patient care. This Part also contains regression analyses of the impact of the availability of public hospitals and of insurance on patients' out-of-pocket expenditures at private hospitals. Part III provides recommendations for improving hospital care in India. A conclusion and annexes containing some technical models follow.

I. Structure of the Indian Healthcare System

In India, healthcare is delivered at private and government clinics, community health centers (CHCs), Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH) clinics, and hospitals. According to the classification set forth in the Ministry of Health's National Health Accounts, which measures the flow of expenditures in the health sector, the Indian hospital system comprises general hospitals and specialized hospitals in the public and private sectors, as well as mental hospitals in the public sector. Public general hospitals include medical college hospitals, district hospitals, sub-district hospitals and CHCs. Private general hospitals include all private hospitals and nursing homes. Specialized hospitals provide care for specific illnesses, e.g., tuberculosis, cancer, and lung disease, or in specific practice areas, e.g., neurology, nephrology, and cardiology.⁵ Specialized hospitals also include AYUSH clinics and those providing maternal and child health care. This report does not discuss mental hospitals.

Out-of-pocket expenditures by patients remain the main source of financing. Several public and private insurance plans have emerged at the federal and state level. Funding also comes directly from the government in the form of public facilities. Care at public facilities is supposed to be free, but it is widely known that patients are often expected to purchase medical supplies and drugs out of pocket.⁶

This section overviews government health expenditures, insurance penetration, descriptive statistics on Indians' demand for hospital care, the role of the Indian medical education system in the supply of hospital care, and the growing financial vulnerability of Indian households as hospital care costs rise.

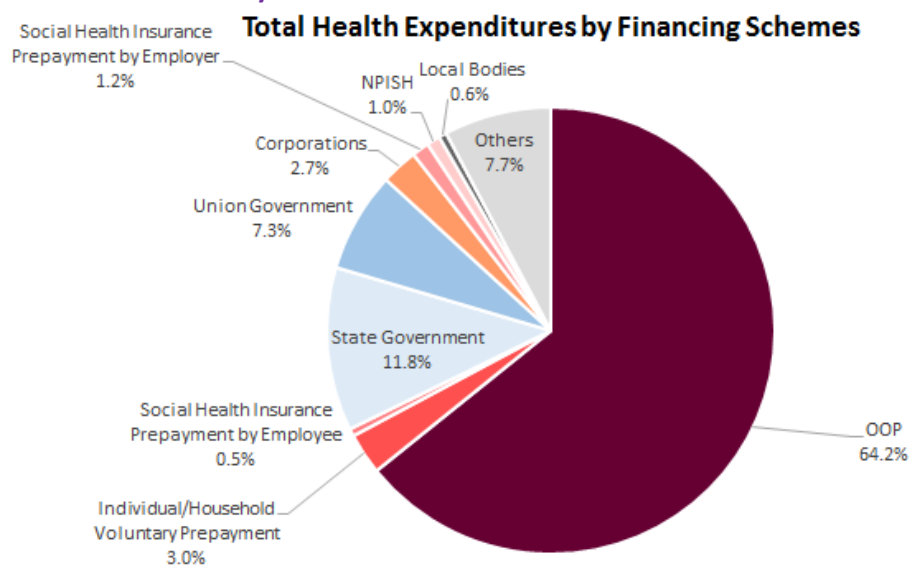
A. Low government expenditures on health

According to the National Health Accounts, total health expenditure (THE) in fiscal year 2013-2014 was 4.02 percent of GDP (Rs 4.5 trillion),⁸ well below the global average of 9.9 percent.⁹ Government health expenditures accounted for 28.6 percent of THE (1.15 percent of GDP; 3.8 percent of General Government Expenditure),¹⁰ which is again well below the global average of 60.1 percent of THE.¹¹ However, when compared to other lower-middle-income countries, Indian public health spending is only slightly below the average of 36.2 percent of THE.¹²

Government expenditure on health increased between fiscal years 2004-2005 and 2013-2014, from 22.5 percent of THE to 28.6 percent of THE (also an absolute increase).¹³ Nevertheless, households remained the main source

of healthcare financing at 67.7 percent of THE in 2013-2014, down only slightly from 71.1 percent of THE in 2004-2005.¹⁴ According to the National Health Accounts, household health expenditures include patient out-

Figure 1: Distribution of Total Health Expenditures, by Source of Revenue for 2013-2014⁷



of-pocket expenditures (e.g., health-related transportation expenditures, immunization, family-planning devices, and over-the-counter drugs),¹⁵ prepayment by employees for social health insurance schemes, and prepayment by individuals or households in opt-in insurance plans.¹⁶ And patient out-of-pocket (OOP) expenditures swallowed most of the household expenditure share, since patient OOP expenditures constituted 64.2 percent of THE in 2013-2014, down only slightly from 69.4 percent of THE in 2004-2005.¹⁷ This was despite intensified government efforts to provide insurance.¹⁸ Private health insurance gained only a small foothold: 3.4 percent of THE in 2013-2014 up from 1.6 percent of THE in 2004-2005.¹⁹ In short, households still bear the largest burden of health financing in India.

Without a mature insurance sector, Indian households lack options to pay actuarially fair premiums, leaving them vulnerable to low-probability, yet still costly health episodes, indicating a need for a better financing mechanism. This could mean increasing government-provided insurance or expanding the private health insurance market. Reducing healthcare costs would alleviate some of the burden that households face when rare but expensive health events occur.

Figure 2: Distribution of Total Health Expenditures, by Provider for 2013-2014²⁰
Distribution of Total Health Expenditures by Provider

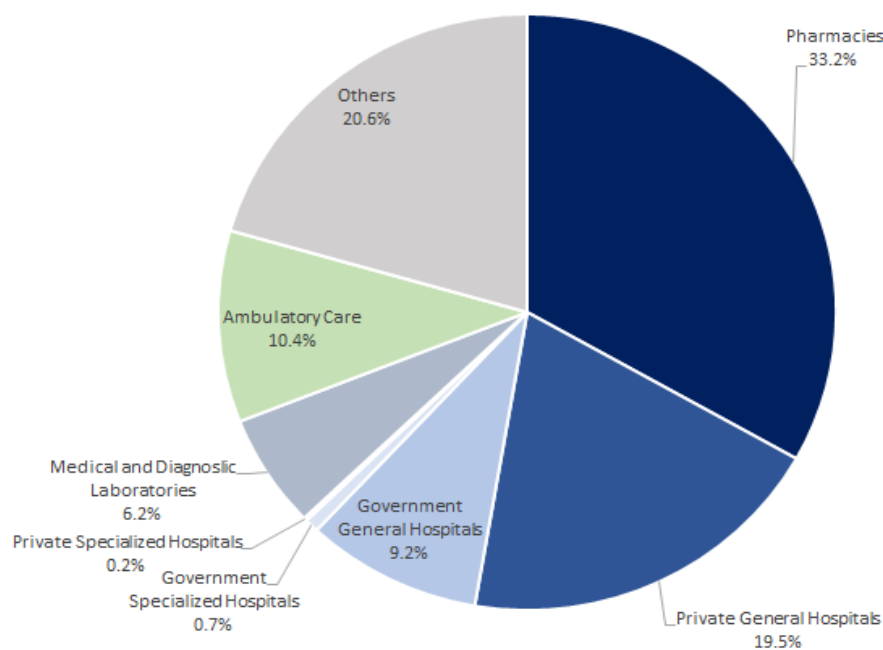


Figure 1 and Figure 2 show the expenditure shares of different actors in the Indian health system. Pharmacies and hospitals each account for nearly one-third of THE. Furthermore, private hospitals account for almost two-thirds of all hospital expenditures.

We undertook this study based on the above findings: Indian patients' out-of-pocket spending comprises 64.2 percent of THE, while government health spending comprises only 28.6 percent of THE. Meanwhile, pharmacies

and hospitals together consume two-thirds of THE, and private hospitals receive most of the expenditure. Federal and state insurance schemes have not led to efficient outcomes in terms of patients receiving quality care, and no more care than necessary, at prices determined by a competitive hospital market. India has a lot of progress yet to make when it comes to providing high-quality, reasonably priced hospital care and developing a well-functioning health insurance market.

B. Insurance coverage

Although the penetration rate for government insurance plans increased nearly thirteen-fold between 2004-2005 and 2013-2014, from less than one percent to 12.78 percent,²¹ coverage under public insurance plans is

well below where it must be for most Indians to access affordable hospital care. Private insurance remains out of reach for all but the wealthiest Indians. And although an estimated 364 million Indians are eligible for insurance via the RSBY scheme for below-poverty-line households, not all eligible households are enrolled, so the program currently covers at most 206.5 million individuals.²²

1. Increased public financing of health insurance

In India, most public health insurance “schemes,” the government’s word for plans or programs, provide for inpatient secondary or tertiary care. Therefore, this section treats these schemes as proxies for health insurance coverage for hospitalization. Part I.B.2 examines the growing role of the national program *Rashtriya Swasthya Bima Yojana* (RSBY) that is supposed to provide insurance coverage for impoverished Indians. Part I.B.3 describes the penetration of private insurance.

Public health insurance schemes in India fall into two categories. One type is social health insurance schemes, which cover federal and state government employees, e.g., the Central Government Health Scheme (CGHS) and the Employee State Insurance Scheme (ESIS). The other type is also administered by the federal or state governments, but it requires enrollees to voluntarily opt in to gain coverage. In exchange for prepayment of the premium by the government, employers, or patients, public health insurance schemes provide coverage for a limited pre-defined set of healthcare-related expenses. An example of these opt-in health insurance schemes is RSBY, which provides opt-in coverage for those below the poverty line (BPL). Other opt-in public schemes include those administered by Arunachal Pradesh, Tamil Nadu, Maharashtra, Kerala, and Karnataka states.

National Health Accounts data indicate that expenditures on social health insurance have increased from 4.2 to 6.0 percent of THE in the decade from 2004-2005 to 2013-2014.²³ Enrollment has also increased: based on NSS 2014 data, 12.78 percent of Indians reported being covered by some type of government insurance, whereas less than one percent were covered a decade before. And the enrollment gains are distributed across income groups, as shown in Table 1. The upper quintiles may have obtained greater coverage as a result of CGHS, which covers civil servants, or because they live in richer states that are more likely to provide state health insurance. Another possibility is that higher-income persons may have managed to enroll in government health insurance schemes intended for the poor by circumventing eligibility criteria.

Table 1: Government Medical Insurance Coverage (%), by Consumer Expenditure Quintile

	2004	2014
Total	0.67%	12.78%
5 th Quintile (richest)	2.40%	15.46%
4 th Quintile	0.60%	16.22%
3 rd Quintile	0.23%	11.95%
2 nd Quintile	0.10%	10.71%
1 st Quintile (poorest)	0.05%	10.37%

2. Rashtriya Swasthya Bima Yojana (RSBY)

In 2008, the government launched RSBY to provide hospital care coverage to BPL Indians. RSBY covers up to two visits per family, capped at a total of Rs 30,000 per year. Beneficiaries seek cashless care at public and private hospitals “empaneled” by the insurer.²⁴ (If a patient is covered by a “cashless” insurance plan, it means the plan pays the hospital directly for all medical expenses, so the expected out-of-pocket cost is Rs 0.) Beneficiaries pay a premium of Rs 30 per household per year. Only five members per family can enroll in RSBY, which is commensurate with the size of the average Indian household.²⁵ As of early 2016, 41.3 million BPL families were enrolled in RSBY. If every household designated as BPL enrolled the maximum of five members, RSBY would cover 206.5 million individuals. If all 72.8 million BPL-eligible families enrolled, an estimated 364.0 million Indians would be covered.²⁶

A public or private insurer selected via a competitive bidding process administers RSBY in each district. Insurers accept reimbursement from the government after the insurers pay healthcare providers for services

rendered on per-package charges determined by the government. Insurers are incentivized to seek out BPL citizens, as their premium repayment by the state depends on the number of enrollees.

In its current form, RSBY has struggled to design proper incentives for insurance companies to assist beneficiaries in demanding the right quality and quantity of care. Once a household is enrolled with the insurer selected by the state government for the district in which they live, the insurer receives a premium payment from the government—75 percent of the payment comes from the central government, while 25 percent comes from the state government.²⁷ The timing of this payment before healthcare services are provided, combined with the fact that the insurer must pay for any healthcare benefit the enrollees consume under the plan, removes any incentive for the insurer to educate enrollees on the benefits they are entitled to under the plan.²⁸

3. Private health insurance coverage for higher-income households

Private health insurance coverage has increased from 0.36 percent in 2004 to 2.47 percent of individuals in 2014, but it continues to represent a very small fraction of financing (Table 2). The 2014 NSS data show that only the richest quintile is able to pay for private health insurance, and fewer than ten percent of these consumers elect private insurance plans.

Table 2: Private Medical Insurance Coverage (%), by Consumer Expenditure Quintile

	2004	2014
Total	0.36%	2.47%
5 th Quintile (richest)	1.41%	9.02%
4 th Quintile	0.18%	1.41%
3 rd Quintile	0.07%	0.88%
2 nd Quintile	0.02%	0.67%
1 st Quintile (poorest)	0.12%	0.76%

C. Demand for hospital care

This section examines the demand side of hospital care in India. We look at how the probability of hospitalization has changed over time, how income (proxied by per capita consumption expenditures) affects private versus public hospitalizations, and the possible roles of insurance and government intervention. Overall, health spending and rates of hospitalization have increased since 1994 across all income quintiles. While rates of hospitalization in public hospitals have decreased, hospitalization in private hospitals has increased.

1. A note on the National Sample Survey

For this section and other empirical work in this report (Parts I.E and II.C), we use micro data from the annual National Sample Survey (NSS). The NSS began in 1950 and comprises topics such as consumer expenditure, employment, and social consumption. We use unit- and household-level data from the last three decennial NSS social consumption surveys related to health, from 1995-1996 (52nd round: 120,942 households from a total of 629,888 persons), 2004 (60th round: 73,868 households from a total of 383,338 persons), and 2014 (71st round: 65,932 households from a total of 333,104 persons). We follow a standard weighting procedure to ensure our analysis is nationally representative.

2. Descriptive statistics

Table 3 shows general descriptive statistics about households and individuals in the three NSS surveys. The size of the average household decreases over time to about 4.5 in 2014. Notably, over two-thirds of households still live in rural areas. Largely due to the advent of government insurance, the proportion of individuals with insurance coverage increased from 1.02 percent in 2004 to 15.25 percent in 2014.

The NSS's primary metric of economic well-being is regular household consumption expenditures. Therefore, we use regular per capita consumption expenditure as a proxy for income, where "regular" refers to the

amount a household reports typically spending in a given year divided by the number of members in the household.

The data have drawbacks. As with all surveys, responses may not be completely accurate. Also, consumption may not reflect socio-economic status, particularly if an individual faces a health emergency where

Table 3: Demographics

	NSS 1995	NSS 2004	NSS 2014
Households			
Household size	4.92	4.80	4.51
% Rural	73.97%	71.36%	67.44%
% Urban	26.03%	28.64%	32.56%
Households surveyed	120,942	73,868	65,932
Individuals			
Male	51.57%	51.14%	51.47%
Female	48.43%	48.86%	48.53%
Age	25.04	26.19	28.48
% with health insurance	-	1.02%	15.25%
<i>Government program</i>		0.67%	12.78%
<i>Non-Government insurance</i>		0.36%	2.47%
Number of individuals	629,888	383,338	333,104

expenditures far exceed an individual's income or wealth, since the individual may attempt to borrow to cover the gap. However, given the limitations of the NSS data, consumption expenditures are the best way to gauge economic well-being.

Ascertaining the price of medical treatment is similarly challenging. The NSS provides data on healthcare expenditures as reported by households, but these data do not indicate the true prices of medical treatments. To some extent, then, it is difficult to determine conclusively if prices have risen such that hospital care has become a source of financial vulnerability for Indian households.

versus individuals. An additional point worth highlighting is that in some instances only those who incurred medical expenditures were used for analysis, while in others all individuals or households were considered. Again, we take care to note these differences as we present our analysis below.

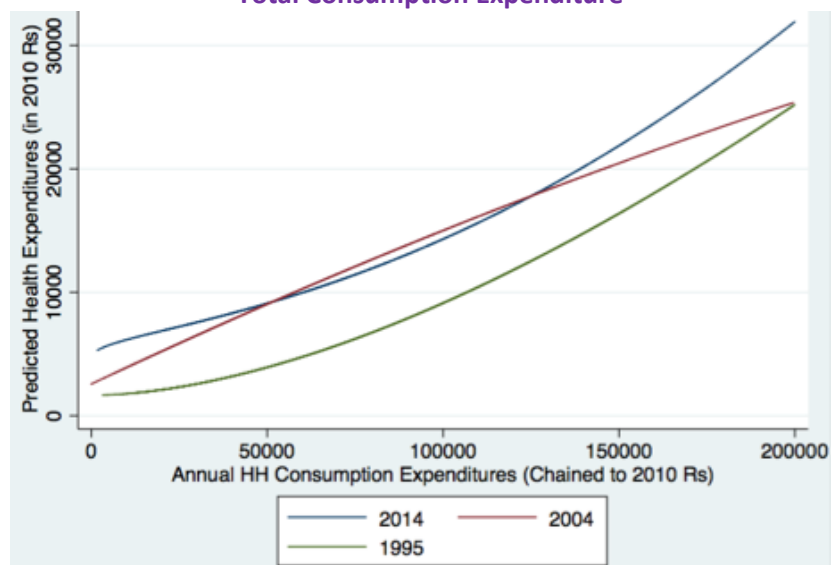
In our examination of the NSS data, we will specify when we are looking at households

3. Hospital usage

Figure 3 plots household health expenditures as a function of household consumption expenditures across time. Over time, health expenditures have increased at all levels of household consumption.

Next, we look at the probability of hospitalization for an individual to see if hospitalizations contribute to this overall trend. Figure 4, Figure 5, and Figure 6 examine the probability of hospitalization and the usage of public versus private hospitals as a function of per capita annual consumption expenditures (ACE) at the

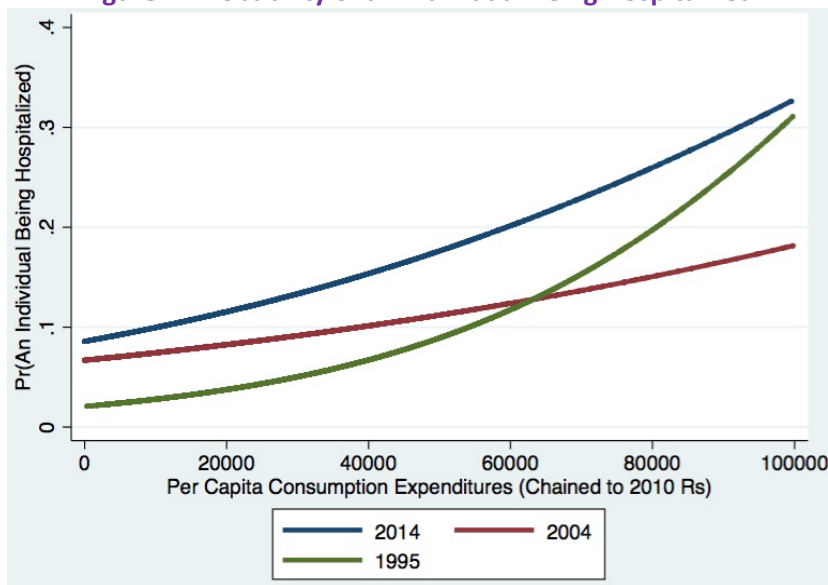
Figure 3: Health Spending as a Function of Total Consumption Expenditure



individual level. In Figure 4, all individuals—not just those hospitalized—are used to calculate the probabilities. In Figure 5 and Figure 6, the probabilities are conditional on being hospitalized.

Over time, the probability of an individual being hospitalized at nearly all consumption expenditure levels increases (Figure 4). Interestingly, though, the probability of hospitalization was much higher in 1995 relative to 2004 for those with per capita annual consumption expenditures above 60,000 rupees. As Indians have become wealthier over time, they may have become more willing to go to hospitals, and the expansion of insurance schemes may have encouraged more individuals to seek hospital care.

Figure 4: Probability of an Individual Being Hospitalized



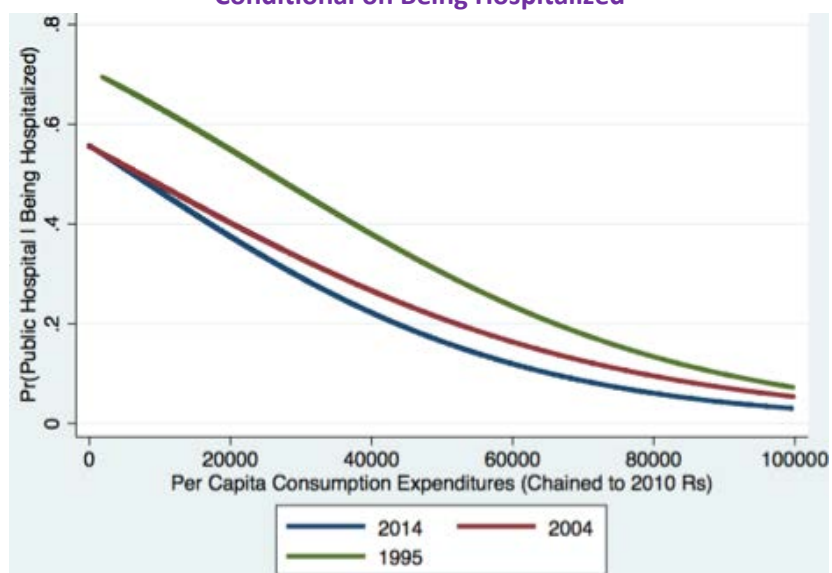
An individual's probability of hospitalization increases as regular annual consumption expenditures increase. If annual consumption expenditure is an appropriate proxy for socioeconomic status, then we can conclude that the probability of hospitalization increases as income or wealth increases.

Figure 5 shows that the probability of an individual being hospitalized in a public hospital at all levels of per capita consumption expenditure was higher in 1995 than in 2004 and 2014. This

might be because there were fewer alternatives to public hospitals in 1995 or because the perceived difference in the quality of public versus private hospitals may have been smaller in 1995. Higher levels of public hospitalization in 1995 are not, however, attributable to low levels of insurance coverage, since insurance coverage did not expand to more than 1.02 percent of the population until after 2004, when the shift toward private hospitalization had already occurred.

Notably, the probability of an individual with per capita consumption expenditures below about 10,000 rupees being hospitalized at a public hospital remains nearly the same from 2004 to 2014. This is surprising given the expansion of insurance

Figure 5: Probability of Going to a Public Hospital Conditional on Being Hospitalized



schemes like RSBY, which specifically targets BPL Indians. Moreover, the probability of public hospitalization fell in 2014 relative to 2004 for all other levels of consumption expenditures. For each survey year, the data suggest that higher socioeconomic status is associated with lower probabilities of public hospitalization.

These trends and explanations work in the opposite direction for the probability of private hospitalization. Higher socioeconomic levels in Figure 6 are associated with higher probabilities of private hospitalization in each of the three survey years.

Consistent with these trends is the fact that public hospitalizations are much more common in India's poorer northern states than in its wealthier southern states, as Figure 7 shows using 2014 NSS data.

Figure 6: Probability of Going to a Private Hospital Conditional on Being Hospitalized

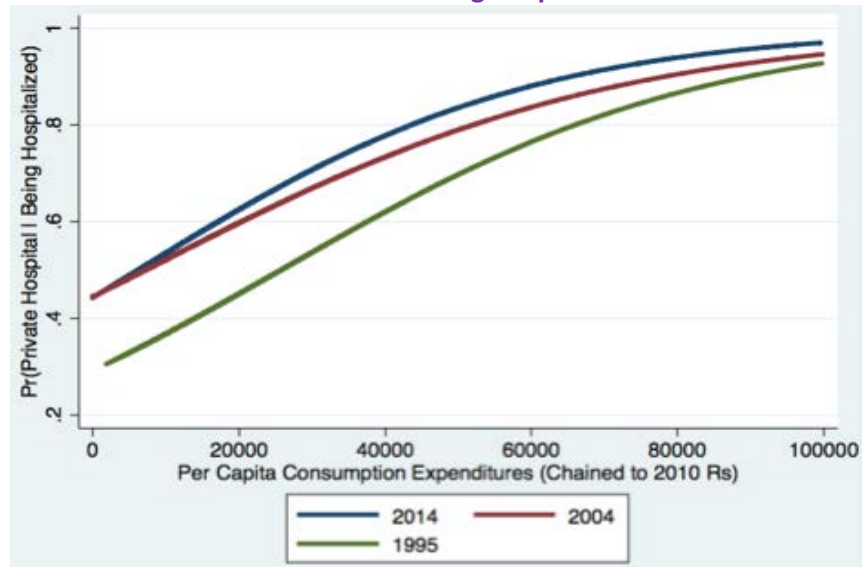


Figure 7: Geographic Incidence of Public Hospitalization

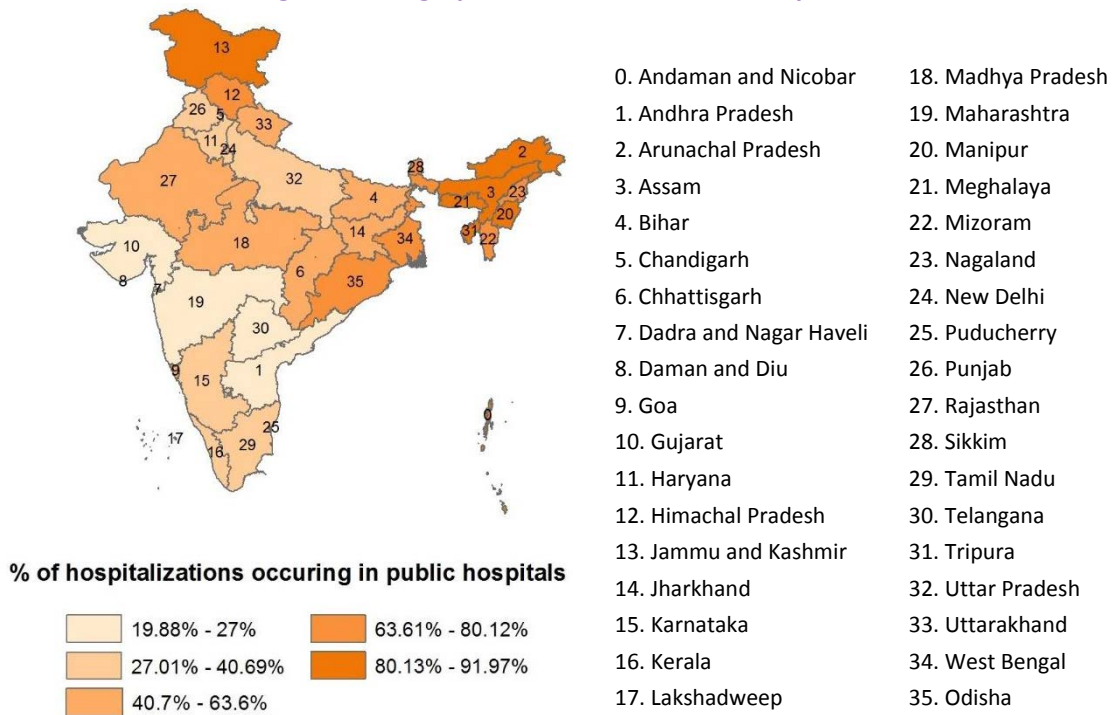


Table 4 shows the most common reasons patients were hospitalized in each round of the NSS. The survey did not list childbirth as a reason until 2014, so it is excluded from the table. While non-communicable diseases

like ulcers and heart disease are becoming more common, infectious diseases continue to be a significant factor causing hospitalizations in India. The most frequent cause of hospitalization has remained fevers—including malaria and typhoid—across time.

Table 4: Five Most Common Reasons for Hospitalization (Excluding Childbirth), By Year

2014		2004		1994	
Ailment	Frequency	Ailment	Frequency	Ailment	Frequency
All other fevers – includes malaria, typhoid, and fevers of unknown origin	6,388 (11.12%)	Other diagnosed ailments	5,282 (16.21%)	Other diagnosed ailment (< 30 days)	3,236 (12.20%)
Accidental injury, road traffic accidents, and falls	4,055 (7.06%)	Accidents, injuries, burns, fractures, poisoning	3,119 (9.57%)	Fevers of short duration	2,737 (10.32%)
Pain in abdomen, gastric and peptic ulcers, acid reflux, acute abdomen	3,467 (6.03%)	Diarrhea, dysentery	2,665 (8.15%)	Diarrhea, dysentery, cholera	2,472 (9.32%)
Heart disease, chest pain, breathlessness	2,689 (4.68%)	Fever of unknown origin	2,163 (6.64%)	Other diagnosed diseases (> 30 days)	2,287 8.62%
Diarrhea, dysentery, increased frequency of stools with or without blood and mucus in stools	1,776 (3.09%)	Gynecological disorders	1,819 (5.58%)	Injury due to accident or violence	1,975 (7.45%)

D. Supply of hospital care: The role of medical education

As we demonstrate below in Part II.C.3, the greater the availability of high-quality public hospitals, the less patients report spending out-of-pocket at private hospitals. This suggests that one way to put downward pressure on prices charged by private hospitals is to improve the availability and quality of public hospitals. To do this, India will need to improve its struggling medical education system. A March 2016 report by the Parliamentary Standing Committee on Health and Family Welfare on the Medical Council of India, which regulates medical colleges, castigated the state of Indian medical education, writing that the “[q]uality of medical education is at its lowest ebb” and that “medical graduates lack competence in performing basic health care tasks like conducting normal deliveries.”²⁹

Given the enormous challenge of producing enough medical graduates in a country of over one billion people to reach the WHO’s recommended doctor-to-population ratio, we do not call for greater spending to produce more Indian doctors. Allocating funding to increase the number of medical graduates or to entice doctors to serve in poorer cities would likely reduce funding for other important public health goals. We focus instead on medical ethics because improvements in hospital providers’ adherence to ethical standards would help ensure that patients receive adequate and necessary treatment at the right price. We intuit that improving ethics education is cheaper than other possible medical education reforms to increase the number of doctors and equalize their geographic distribution.

1. By the numbers: Growth in medical college graduates

Currently, India has one doctor for every 1,674 people, falling well short of the WHO guideline of one doctor per 1,000 people.³⁰ Compared to countries with a similar GDP were capita, however, India is keeping pace.³¹

The number of medical college students graduating with the Bachelor of Medicine and Bachelor of Surgery (MBBS) degree reaches 55,000 and the number of doctors graduating with postgraduate degrees reaches 25,000 annually.³² In 1951, there was one public medical college seat per every 71,000 Indians; as of 2013, there was one public medical college seat per every 55,000 Indians.³³ Adding in private medical colleges, there is one MBBS seat for every 26,000 Indians.³⁴ As a rough comparison, the United States graduates one doctor every year per 17,000 Americans.³⁵ Given the disparity in GDP per capita between the United States and India, India is making solid improvements in producing medical graduates. Nevertheless, to reach the WHO-recommended standard of one doctor per 1,000 people, India would have to establish one hundred medical colleges every year for the next five years, and then only by 2029 would there be enough MBBS graduates.³⁶

And still, the shortage of doctors and other medical staff is particularly acute in rural India and poorer cities. The southern states of Tamil Nadu, Kerala, Karnataka, and Andhra Pradesh and the union territory Puducherry comprise only 21 percent of the country's population, yet they host 44.3 percent of India's medical college seats.³⁷ Meanwhile, ten states and two union territories in the north and east, which comprise 45.3 percent of the population, host only a quarter of the country's medical college seats.³⁸ The disparity extends to where doctors choose to practice: in 2005, the Task Force on Medical Education for the National Rural Health Mission found that 74 percent of doctors lived in urban areas, where 28 percent of the population lived.³⁹ Of course, the problem of doctor shortages in rural areas is not unique to India; rather, it is a universal problem. In the United States, for example, there were 263 specialists per 100,000 population in large metropolitan areas but only 30 specialists per 100,000 population in rural counties with fewer than 10,000 people.⁴⁰

Community health centers (CHCs), the tier between primary health centers (PHCs) and district hospitals, are supposed to be staffed by a surgeon, physician, gynecologist, pediatrician, and 21 paramedic and other staff.⁴¹ Yet 83 percent of CHCs lack a surgeon, 83 percent lack a physician, 76 percent lack a gynecologist, and 82 percent lack a pediatrician.⁴² Several factors help explain why. First, working conditions in rural areas suffer from poor infrastructure, e.g., lack of electricity and paved roads, and lack of basic medical equipment—a major impediment to practicing effectively.⁴³ Second, security concerns have also been raised.⁴⁴ Third, in the public health sector, professional development and accountability for performance lose out to a workforce hiring and promotion policy based on seniority.⁴⁵ Fourth, most states reportedly have not issued policies making clear that doctors should be rotated between rural and urban posts, generating anxiety that an initial posting in a village is a lifelong sentence to rural service.⁴⁶ Poorer states also run into bureaucratic barriers to providing “hardship pay” to attract doctors to serve in their hospitals. Fifth, medical college curricula emphasize specialized care over primary healthcare and family care, according to Chandrakant S. Pandav, head of community medicine at AIIMS-New Delhi.⁴⁷ If the infrastructure and equipment for specialized care is largely unavailable in rural areas or poorer cities, this dissuades doctors from wanting to practice in those places.⁴⁸ Last but not least, class and culture undoubtedly play a role, since doctors from wealthier backgrounds who have grown up in cities are reluctant to serve in underdeveloped rural areas with low incidences of electricity and paved roads.⁴⁹

2. Ethics in medical education

With the increase in private medical colleges and the growth of the private hospital sector, the influence of money has led to greater concern over corruption and ethical lapses in medical care.⁵⁰ Ethical violations include kickbacks to doctors who refer patients to large hospitals (known as “cut practice”) and the administration of unnecessary tests and procedures to garner fee-for-service payments.⁵¹ Anonymously, one doctor reported that a patient diagnosed with a hernia came to a hospital, and a surgeon had him put under anesthesia and sewed stitches into his skin but did not actually perform any surgery because he did not actually have a hernia. But the patient was charged a large surgery bill, and the doctor who referred the

patient to the hospital probably got a cut of that bill.⁵² Pharmaceutical and medical device companies are also known to offer remuneration to doctors who recommend their products.⁵³ Some have expressed concern about corporate hospitals paying for professional marketing services, including advertisements in newspapers and movie theaters and on the Internet.⁵⁴ One study reports that most medical colleges do not teach undergraduate-level healthcare ethics.⁵⁵

Attitudes among providers regarding ethics also present cause for alarm. A 2011 survey of 405 doctors and nurses at three medical colleges in northern India found that a majority of both doctors (61.6%) and nurses (70.3%) disagreed that a “[p]atient should be always informed of wrongdoing by anyone involved in his/her treatment.”⁵⁶ Fewer than half (47.8%) of doctors disagreed that “[e]thical conduct is important only to avoid legal action.”⁵⁷ Perhaps indicating that doctors try to cover for each other but nurses do not try to cover for doctors, an overwhelming majority (80.2%) of doctors disagreed that “doctors are receiving income from referring patients for medical tests,” but the majority of nurses (71.4%) thought doctors were making such referrals.⁵⁸ A similar split was found regarding the influence of the pharmaceutical industry: whereas a majority (69.6%) of doctors disagreed that “doctors are influenced by drug company inducements, including gifts,” nearly the same majority (70.1%) of nurses thought doctors were so influenced.⁵⁹ Fewer than half (40.1%) of doctors agreed they had an “interest in learning healthcare ethics,” while a majority (59.7%) of nurses did agree they had an interest in learning ethics.⁶⁰ Lastly, a majority (63.%) of doctors disagreed that “doctors/nurses must serve in hard to reach areas and underserved population[s],” but a large majority (81.0%) of nurses did think doctors and nurses had an obligation to serve in rural areas.⁶¹

3. Regulation of medical education

Though normally greater regulation would help to tamp down on fraud and malpractice, the Medical Council of India (MCI), the government body in charge of prescribing and enforcing the code of professional conduct,⁶² regulating medical education, and regulating registration of doctors, has come under fire in recent years for various corruption scandals.⁶³ At least as of now, all medical colleges must receive accreditation from MCI to operate, but MCI appears to rely mostly on self-reported statistics on infrastructure and staff availability and not on outcome assessments.⁶⁴ Fewer than ten percent of medical colleges have achieved accreditation from the National Assessment and Accreditation Council, which completes more thorough assessments.⁶⁵ The March 2016 Parliamentary Standing Committee Report on MCI lambasted the regulatory body for having “repeatedly been found short of fulfilling its mandated responsibilities” and for having failed to “spearhead any serious reforms in medical education” to address the many deficits.⁶⁶ The central government is looking to replace MCI, which is run by doctors nominated by their colleagues, with a 20-member National Medical Council, comprising 15 medical professionals and five members comprising some mix of accountants, lawyers, consumer protection advocates, and others.⁶⁷

One policy that has been proposed to increase the supply of healthcare providers in poorer areas is to train community health practitioners to provide basic care without having to complete the MBBS degree. However, MCI and the Indian Medical Association, which lobbies on behalf of doctors, oppose this program, at least in part because Indian law prohibits non-doctors from prescribing medicine.⁶⁸ Although the Delhi High Court ordered the government and MCI in September 2015 to establish a bachelor’s of science (BSc) in community health within six months or face contempt charges,⁶⁹ it is not clear what MCI has done since the decision was released. The Court proposed that the Indian Medical Council Act be amended so that BSc graduates could practice some forms of medicine.⁷⁰

E. Rising costs

Another major concern is that hospital charges continue to rise even as insurance coverage remains scarce. Outpatient care costs have remained flat over time, but inpatient care costs have risen by about a third since 1995. Even higher-income Indians with better access to insurance coverage are exposed to the risks of catastrophic health expenditures from acute or chronic conditions.

**Table 5: Inpatient Variables
(Averages chained to 2010 Rs)**

	1995	2004	2014
Age	-	37.05	36.19
Doctor's Fee	-	957.13	1940.62
Medicines	-	1944.50	2593.98
Diagnostic Tests	-	446.99	1040.28
Bed Charges	-	478.96	1109.23
Other Expenses	-	6489.47	4144.89
Total Cost of Stay	8318.66	10315.05	10829.01
Transport	450.41	454.44	425.49
Other Expenses Outside	364.16	366.20	876.00
Total Cost	9134.54	11136.03	12130.50
Population	14,031,014	34,348,836	57,228,676

In contrast, outpatient care charges have not increased by the same magnitude as inpatient care. Table 6 does show that doctors' fees, medicine, and diagnostic tests have increased in cost, largely due to diagnostic services such as x-rays, MRIs, and ultrasounds. However, the overall cost of outpatient care has remained unchanged.

Table 7 dives deeper into catastrophic health expenditures by examining the distribution across rich and poor households of incurring health expenditures of at least 25 or 40 percent of their regular annual consumption expenditures. These thresholds can be thought of as markers for catastrophic health expenditures.⁷¹ Each household's annual medical expenditures amount is defined as a percentage of its regular annual consumption expenditure (ACE):

In this section, we break down hospital charges by type and by inpatient versus outpatient care (in both public and private hospitals). A person is considered to have received inpatient care if they have used any medical services as indoor patients in any medical institution and outpatient care if they have used any medical services or received procedures without being admitted to an inpatient unit.

Table 5 displays inpatient hospital care charges by type. The numbers are inflation-adjusted average charges across all people in the NSS survey year. The overall cost of inpatient care has increased by about one-third since 1995 (9134.54 Rs to 12130.50 Rs). Doctors' fees, medicines, diagnostic tests, and bed charges all increased in cost from 2004 to 2014. The largest increase was in the cost of treatment, which includes surgical procedures and drugs that are not free at most public and private hospitals. Other expenses incurred outside of the hospital but still related to inpatient care have also increased.

**Table 6: Outpatient Variables
(Averages chained to 2010 Rs)**

	1995	2004	2014
Age	-	35.70	39.57
Doctor's Fee	-	40.05	55.47
Medicines	-	253.12	279.82
Diagnostic Tests	-	22.96	44.34
Other Expenses	-	97.98	15.45
Medical Expenditure	424.53	414.10	395.08
Transport	32.65	31.61	33.79
Other Expenses Outside	13.30	6.98	23.82
Total Cost	470.48	452.69	452.68
Population	40,034,716	93,321,216	109,770,816

$$\text{health expenditure share} = \frac{\text{total annual medical expenditure (AME)}}{\text{regular annual consumption expenditure (ACE)}} * 100$$

Table 7: Catastrophic Health Expenditures by Consumption Quintiles, Conditioned on Incurring Health Expenditures at Least 25 or 40 Percent of ACE

	1995	2004	2014
% of households that incur annual medical expenditures ≥ 25% of ACE			
Total	4.11%	10.35%	13.08%
5 th Quintile (richest)	14.29%	13.66%	12.35%
4 th Quintile	19.52%	19.18%	17.13%
3 rd Quintile	20.42%	20.55%	17.62%
2 nd Quintile	22.72%	23.05%	25.15%
1 st Quintile (poorest)	23.05%	23.55%	27.74%
% of households that incur annual medical expenditures ≥ 40% of ACE			
<i>Total</i>	2.30%	6.33%	8.56%
5 th Quintile (richest)	12.95%	12.61%	11.50%
4 th Quintile	17.89%	18.13%	15.98%
3 rd Quintile	21.19%	21.26%	15.96%
2 nd Quintile	22.25%	22.49%	26.17%
1 st Quintile (poorest)	25.72%	25.50%	30.40%
Total Pop.	14,031,014	34,348,836	57,228,676

Specifically, Table 7 shows what fraction of households incurring catastrophic health expenditures (i.e., health expenditures at least 25 or 40 percent of their ACE) falls into each ACE quintile. For example, of households that incur health expenditures amounting to at least 25 percent of their ACE, nearly 28 percent are in the bottom ACE quintile, while only about 12 percent are in the top ACE quintile. Of households that incur health expenditures amounting to at least 40 percent of their ACE, about 30 percent are in the bottom ACE quintile, while only about 12 percent are in the top ACE quintile. At both the 25- and 40-percent thresholds, a majority of households incurring catastrophic health expenditures are in the bottom two ACE quintiles.

The problem has **worsened** over time. In 1995, the incidence of catastrophic health expenditures was more evenly distributed across ACE quintiles. As of 2014, the incidence of catastrophic health expenditures had shifted toward the bottom and away from the top quintiles. This shift suggests that public insurance schemes intended to help the poorest households have not shielded these households from catastrophic healthcare

expenditures or reduced inequality when it comes to what type of household faces these high expenditures.

II. Challenges in Market-Making in the Hospital Marketplace

A. A model on quality determination in provider markets

A theoretical model helps explain different ways in which interactions between hospitals affect provider quality, prices, treatment decisions, and insurance premiums, which in turn affect patient welfare. In particular, understanding the match between consumers (demand) and providers (supply) can help us address the following three questions: 1) Are consumers who need particular provider characteristics matched to providers with those characteristics? 2) How does competition between hospitals affect their investments in their quality? 3) How does competition over quality determine the kinds of providers available to consumers and the prices they charge?

We are especially interested in modeling how policy interventions such as public investment in direct hospital provision, price regulation, and quality standards would alter the provision of hospital care.⁷²

To keep the model simple, we assume hospitals directly choose their quality of service, even though, as an empirical matter, hospitals may not explicitly choose a level of care that maximizes profits or some other objective, but instead choose an overall effort based on the incentives they face. The quality of care for a given patient may be determined stochastically by the individual clinician's effort. In other words, the model assumes that the relationship between the quality of service and mortality is randomly determined because of the following reasons: 1) A patient's outcome cannot be predicted with certainty based on a given quality of care even with patient and hospital observables. 2) Nevertheless, a given service level generates an expected level of mortality, and this is why it is irrelevant for the model if hospitals choose service quality or expected mortality. 3) Hospitals choose a general level of effort for the hospital as a whole, which affects quality of service, and thus mortality. 4) Hospitals do not compete for all kinds of cases, particularly patients in urgent situations who do not choose their hospital (e.g. patients suffering from heart attacks).⁷³ The next two subsections develop two cases for determining the quality of care: administered prices and market-determined prices.⁷⁴

1. Administered prices

In most public hospitals in India, prices are set administratively by regulators, rather than being determined by the market. Competition between firms therefore takes the form of competition over quality at a given price level, or through other non-price variables. For this model to be successful, regulators must be able to observe the quality of hospital care. When successful, the model's standard result is that (non-price) competition over quality gets tougher as the number of hospitals increases, as long as the regulated price is set above marginal cost. Hospitals facing tougher competition will improve their quality to attract and retain patients.⁷⁵ Even when assuming that some hospitals may have objectives other than maximizing profit or that some patients who cannot exercise choice (e.g. emergency cases), the result remains that competition forces improvements in the quality of care.⁷⁶

For this model to be successful, regulators must be able to observe the quality of hospital care. Anecdotal evidence as well as the NSS data suggest that the quality of public hospital care is below what is desired. However, systematic data on hospital quality and patient outcomes are non-existent.

Although improved quality can benefit consumers, it does not necessarily increase consumer welfare. With costs to enter the market, if hospitals ignore effects from taking each other's patients, excessive entry may occur. In equilibrium, hospitals capture less demand than anticipated due to this business stealing. For example, it is possible that in India *too many* hospital buildings and CAT scan machines are built and installed,

leading to wasteful underutilization. If hospitals are built without regard to the business that they will take from other hospitals, the costs of business stealing may surpass the benefits of improved quality generated by greater competition.

2. Market-determined prices

The second option for determining the quality of care is to use prices strategically chosen by hospitals competing in a market, which is how most private sector hospitals in India set their price schedules. However, without more information about the market, economic theory cannot provide determinate answers to what happens to the quality of care when competition between hospitals forces them to make choices regarding both quality and price. The outcome would depend on various factors, such as the relative elasticities of demand with respect to quality and price for different consumers and the nature of competition between hospitals.⁷⁷ For competition to occur, consumers, i.e., patients, must be able to observe information on the quality of care and choose hospital providers accordingly. Nevertheless, if we assume that patients' choices are not generally responsive to price because of insurance coverage, free provision of healthcare, or an emergency situation, then greater competition will push hospitals to optimally increase the quality of care they provide.⁷⁸

B. Market failures

This part considers two market failures inherent in the supply of hospital care—the fact that hospital care is a “credence good” and the existence of principal-agent dilemmas—and the challenges when it comes to deploying government to address these market failures.

1. Two problems inherent in the supply of hospital care

According to economic theory, at least two market failures characterize the provision of hospital care. The first is the problem of “credence goods.” The second is the problem of principals' ability to monitor agents' delivery of care, where principals are hospital directors and agents are the hospital staff, or principals are the public or civil servants and agents are the hospital directors. Regulation aims to address these two market failures.

Credence goods: Healthcare is what economists refer to as a “credence good.”⁷⁹ When consumers “can observe the utility they derive from the good ex post” but “cannot judge” ex ante “whether the type or quality of the good they have received” is the one they needed, the good is a credence good.⁸⁰ Because the “expert seller” of a credence good “is able to identify the type or quality that fits a consumer's needs,” the seller can either “provide the right quality and charge for it,” or the seller “can exploit the information asymmetry by defrauding the consumer.”⁸¹ Sometimes, a consumer may not even be able to know ex post the quality or type of service received.⁸²

Healthcare is a credence good because of the information asymmetry that arises in the doctor-patient relationship, where patients are the consumers and doctors are the sellers.⁸³ When patients feel sick, they do not usually know ex ante the correct diagnosis or the amount or type of medical services they need. The doctor determines all of these variables, and, ex post, even after service is provided, the patient often cannot accurately assess whether she received the appropriate care. This physician-patient relationship, in which the expert doctor provides diagnosis and treatment to the inexpert patient, leaves doctors with an incentive to maximize their profits at the expense of patient care. Examples include situations in which health workers perform more procedures than medically necessary, bill more than the procedure costs, prescribe brand name drugs when cheaper generic drugs will have the same effect, or charge for services not actually executed.⁸⁴

Principal-agent dilemmas: Two principal-agent problems are apparent in the Indian hospital care system. One concerns the difficulties hospital directors face in managing their teams of health care workers (doctors, nurses, and other staff) to deliver high-quality service. We assume that hospital directors, as principals, aim to deliver hospital care to the highest quality standards. To do this, they must monitor the care delivered by agents, i.e., doctors, nurses, and other hospital staff. When principals and agents face different incentives and principals cannot monitor agents' behavior perfectly, agents may fail—intentionally or not—to fulfill the principals' objectives.

The other problem concerns the relationship between citizens and government officials on the one hand and hospital managers on the other. Politicians are elected and bureaucrats are hired under the expectation that they will improve service delivery, including public health. But hospital managers might have incentives to disobey the public's and policymakers' expectations. As we note above in Part I.D.2 and below in Part 3 of this section, fraud and ethical lapses in the delivery of hospital care are widespread.

2. Governance mechanisms in hospital care

The extent to which the credence good and principal-agent problems affect the quality of hospital care depends on whether government can manage incentives to shape suppliers' behaviors. For our purposes, "governance" refers to the mechanisms governments use to implement public policies. Regarding hospital care in India, the government uses regulation, funding, and ownership to generate and sustain service delivery.⁸⁵ The government's ability to collect taxes, gather and manage information, issue and enforce regulations, and detect and eliminate corruption and fraud shapes its effectiveness.

Regulations: Regardless of whether it provides or finances the services, government can establish and enforce rules and other regimes governing healthcare, including protocols, recommended guidelines, public-private partnerships, and price controls.

Funding: By providing funds, government can finance service delivery for those who cannot pay the private sector fees, seeking to equate aggregate demand with a socially optimum supply. Government-financed subsidies, grants, loans, concessions, public insurance, and other tools help to ensure that hospital care is available to all, including segments of the population that would not be able to pay the market-determined price in the absence of public provision of healthcare.

Public ownership: Government directly provides health services through publicly owned facilities, e.g., hospitals, clinics, and labs managed and staffed by civil servants. In India, state government agencies rather than hospitals or clinic managers usually hire civil servants. The central and state governments can pool funding to support public facilities, which are supposed to follow government regulations.

3. Challenges of regulating against fraud in Indian hospital care

Regulating against fraud is difficult in India, where the government body overseeing doctors is weak and employment contracts fail to provide doctors proper incentives to deliver the best-quality care at the right price. Later, in Part III.B, we suggest two ways the government and insurers might rein in fraud.

In many developed countries, large parts of medical practice are self-governed. Doctors chosen by their peers supervise medical training, issue and revoke medical licenses, and set standards for diagnosing and delivering care. The Medical Council of India (MCI) is supposed to perform these functions,⁸⁶ but corruption scandals have hampered its effectiveness.⁸⁷ This may help explain why MCI's website provides no precise data on how frequently MCI investigates doctors or revokes their licenses. Despite the lack of official data, other published

sources and our conversations with Indian medical providers make clear that fraud is widespread in India and, even when reported, goes unpunished by MCI.⁸⁸

One problem concerns “quacks,” i.e., people posing as medical professionals who in fact lack the requisite education and licenses.⁸⁹ The World Health Organization has estimated that nearly a third of people claiming to be allopathic doctors in India have only a secondary-school education.⁹⁰

Another problem is how employment contracts shape doctors’ incentives in different ways in the private versus the public sector. Private sector doctors’ income usually depends on how many patients they attract. Therefore, private sector doctors are more attuned to their reputations, especially in repeated interactions with the same patients, than are public sector doctors. When it comes to credence goods like healthcare, the longer the period during which the patient can have contact with the doctor, the better the patient is able to gauge the quality of care, and the more likely the patient is to return to the same doctor in the future.⁹¹

In contrast, public sector doctors in India receive a salary and enjoy civil service benefits, including public pension rules and promotions based on seniority. Contrary to most of the developed world, where doctors bill based on the services provided to the specific patient, “money does not follow the patient” in the Indian system, and so public sector doctors may not retain the proper incentive to order the requisite testing or treatment.⁹² This does not mean that private sector doctors do not also perform medically unnecessary procedures, overcharge patients, or deliver low-quality services. Being paid according to a salary schedule, however, does mean that public sector doctors might have one fewer incentive to devote effort to patient care.

Finally, civil service rules and practices likely undermine effective hospital management in India. Although we found no rigorous studies on the impact of civil service rules on hospital management and efficiency, doctors and public hospital managers reported to us difficulties recruiting doctors and nurses, implementing disciplinary sanctions, and reducing absenteeism. When asked how easy it would be to fire a consistently absent surgeon, one hospital director said: “Very hard, very hard. We would possibly transfer him to another hospital and request another one.”

4. Challenges of regulating principal-agent relationships in Indian hospital management

Managing principal-agent relationships between government and hospital care providers requires a strong state apparatus to create, monitor, and enforce regulations. In particular, according to the World Bank, governments must choose the best provider for each type of care (e.g., public servants, private contractors, autonomous agencies, etc.), clarify responsibilities among providers throughout the supply chain, and gather information on providers’ performance.⁹³ Principal-agent relationships in the Indian hospital care system pertain to centrally funded grants, vertical programs funded and overseen by the central government, and direct provision of care by state governments.

Grants: The central government provides grants to state and local governments for specific purposes, including interstate projects. State and local governments are supposed to report back to the central government on the projects’ progress.

Vertical Programs: In India, these have taken the form of disease-specific schemes (e.g., the National Initiative Against Tuberculosis) or other national programs such as RSBY. Like grants, these programs are funded by the central government, but in addition, the central government has a designated office to oversee implementation in coordination with corresponding offices in the state governments. States

sometimes supplement the centrally provided budget, as is the case with RSBY. States are also supposed to report to the central government on the programs' implementation.

Direct Execution: States own public hospitals, supplemented by central government funding, that provide predominantly free services. In addition to hospitals, states operate other health programs.

Ensuring accountability in grants, vertical programs, and publicly owned hospitals requires timely and accurate information flows. This is where India falls short: state governments struggle to supervise public and private hospitals, the central government struggles to supervise state governments, and the public struggles to glean information sufficient to hold the central government accountable for the programs financed with taxpayer money. Part III.B provides some recommendations for how India's central and state governments might better manage principal-agent relationships in hospital care.

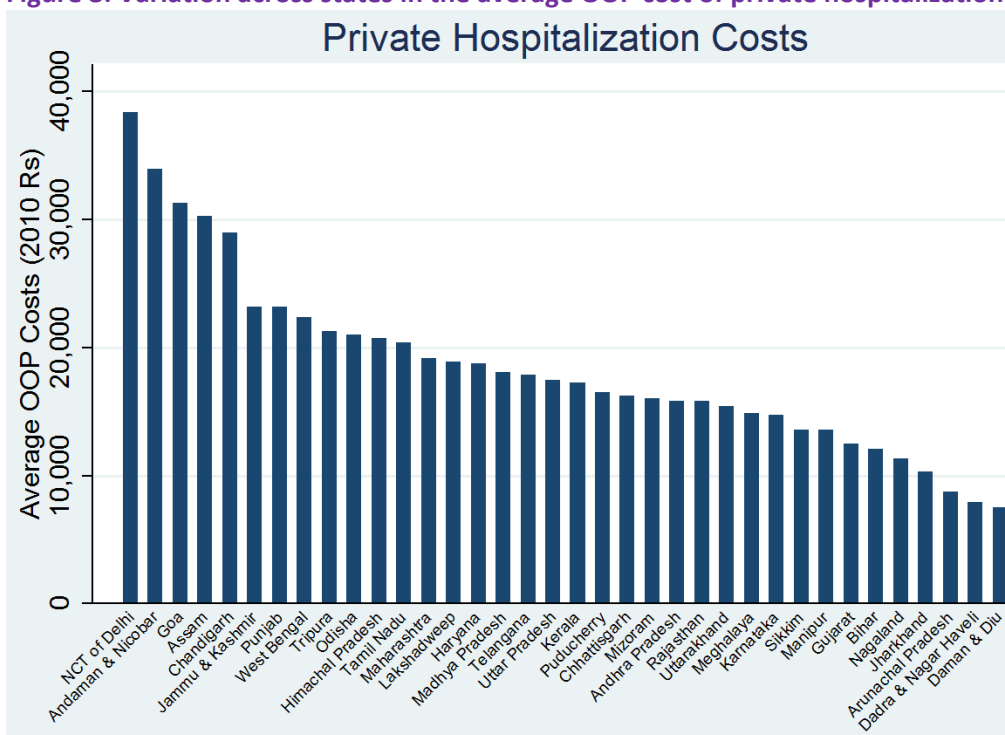
C. Determinants of out-of-pocket costs of private and public hospitalization

1. The roles of public provision and private insurance

Out-of-pocket (OOP) costs for a private hospital stay are wildly variable and can be very high. According to the 2014 NSS, the average OOP cost of a stay in a private hospital was Rs 16,340 (in 2010 rupees), as can be seen in Figure 8. Costs ranged from Rs 0 to Rs 2,131,439, with a standard deviation of Rs 33,458. Among states and the Union Territories, the average OOP cost of private hospitalization ranged from under Rs 7,500 in Daman and Diu to over Rs 38,000 in Delhi, with a standard deviation of Rs 7,159. Much of the variation stems from patients' physical conditions and economic circumstances. Intuitively, wealthier patients and patients with more complicated medical conditions would be expected to pay more. There is also a theoretical basis

for believing that some key factors over which policymakers have some degree of control may be at play. As proposed in Parts 3 and 4 of this section, the availability of public hospitals perceived to be of high quality and the penetration of insurance coverage may also influence how much patients pay for private hospitalizations.

Figure 8: Variation across states in the average OOP cost of private hospitalization



2. Methods

Using data from the 2014 NSS and publicly available administrative data from the Ministry of Health and Family Welfare, we performed multivariate regression to assess the direction and magnitude of the effects of the availability of high-quality public hospitals and insurance coverage on patients' OOP expenditures at private hospitals. Our dependent variable is the OOP cost of private hospitalization. The two explanatory variables we look at are 1) the availability and perceived quality of public hospitals as well as 2) enrollment in an insurance plan.

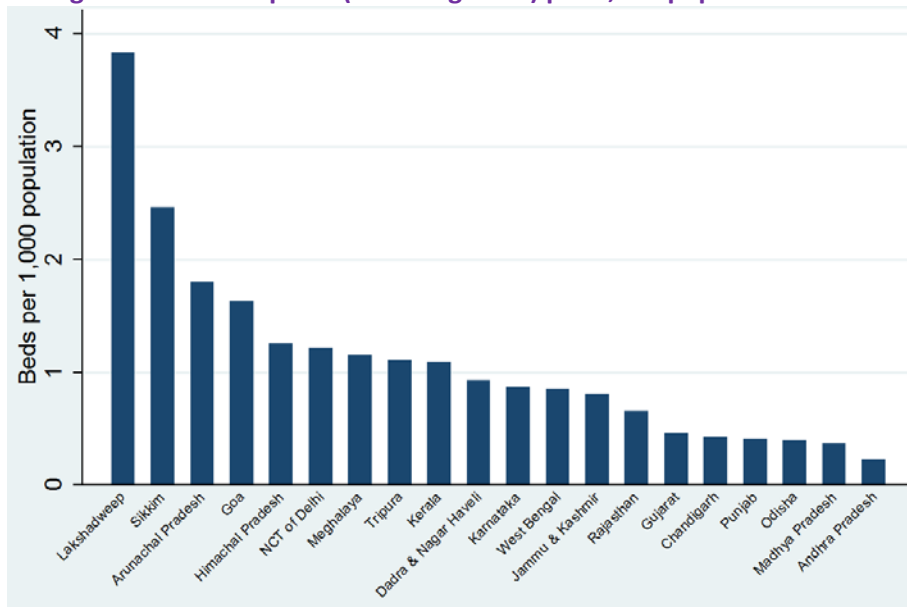
It is important to note that the data available are limited and unavoidably suffer from endogeneity. Individuals' decisions to enroll in insurance programs are inextricably linked to the quantity and quality of nearby public hospitalization facilities, which in turn depend on the state government's wealth and functional capacity. While some key covariates, e.g., a patient's usual monthly per capita consumer expenditure (UMPCE), can be observed and controlled for statistically, others, e.g., state capacity, cannot. It is therefore impossible to determine using this dataset the causal effect of an exogenous change in the number or quality of public hospitals or of an exogenous change in insurance coverage on patients' OOP costs. However, in reality, such changes are rarely if ever exogenous, and drawing quantitative comparisons across hospitalizations in different states and territories strengthens our theoretical understanding of policy-relevant factors shaping India's complex hospital system.

Dependent variable: Treating an instance of hospitalization as the unit of analysis, we study covariates specific to hospitalization (e.g., the ailment treated), patient-level variables (e.g., insurance coverage, UMPCE, age, and gender), and characteristics of the patients' geographic residence (e.g., prevalence and quality of public hospitalization facilities). **The outcome of interest is the OOP cost of private hospitalization.** The NSS refers to this as "total medical expenditure." It includes all medically relevant costs, including package charges, doctors' fees, medicines, diagnostic tests, bed charges, attendant charges, physical therapy, personal medical appliances, blood products and other medical materials and equipment for which the patient's family was charged. It does not include non-medical expenses like food, non-ambulance transportation, and lodging for family members. This OOP cost is the cost incurred by the patient's family before reimbursement through insurance. For example, if a patient is covered by a "cashless" insurance program that pays the hospital directly for all medical expenses, the OOP cost of hospitalization is Rs 0. If the patient is covered by a reimbursement-based insurance program, then the OOP cost is non-zero, even if the insurer eventually reimburses 100 percent of medical expenses. OOP cost does not include insurance premiums. In this analysis, OOP costs (as well as patient UMPCE) are chained to 2010 rupees and log-transformed in regression models to reduce heteroscedasticity.

Explanatory variables: We represent the degree of public ownership in the hospital system by the **number of public hospital beds (including those in CHCs) per 1,000 population served in the patient's state of residence, one of our explanatory variables.** We assume the Ministry of Health and Family Welfare's 2014 data are fairly accurate, although they are available only for 20 states and union territories. Among these states and territories, the number of public hospital beds per 1,000 population varied substantially from 0.23 in Andhra Pradesh to 3.83 in Lakshadweep, with a standard deviation of 0.19 (Figure 9).

Public hospital quality is a harder metric to quantify. Perceived quality, or how good patients believe government services are relative to private services, is highly relevant. The NSS offers a rough measurement of the **perceived quality of government hospitals, another one of our explanatory variables,** by asking individuals who were treated for ailments in private facilities in the past 15 days why they did not avail themselves of a public facility. The proportion of these respondents in a state who cited low quality in public facilities (shown across states in Figure 10) can be interpreted as a rough metric of the perceived quality of

Figure 9: Variation across states in the number of beds in government hospitals (including CHCs) per 1,000 population served

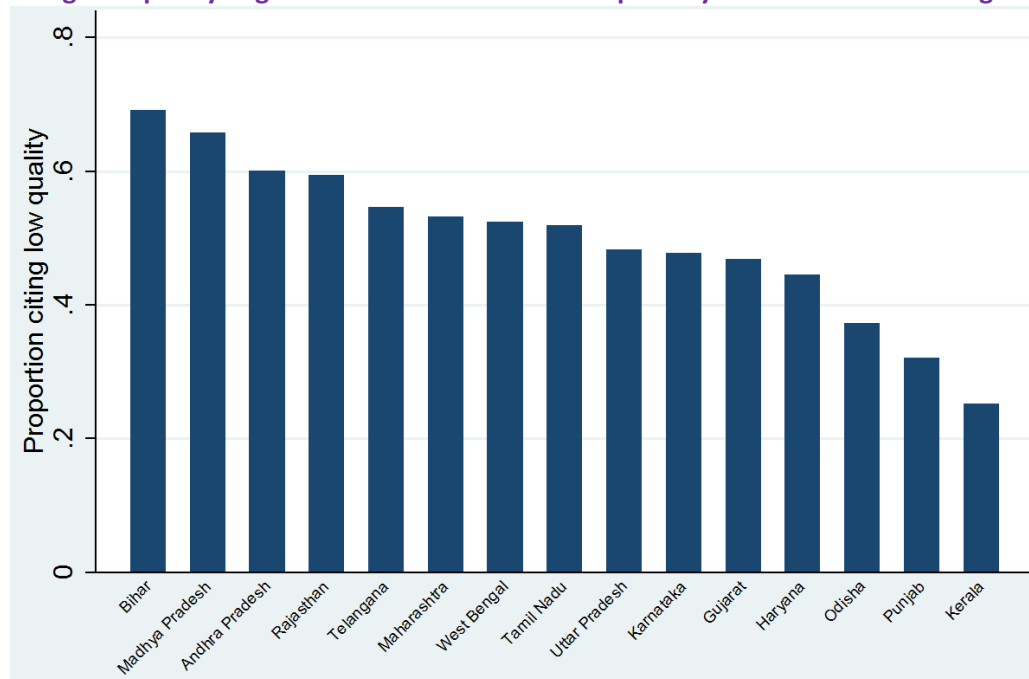


public hospitals in that state. Because this analysis focuses on the cost of inpatient (as opposed to outpatient) care in private hospitals, we consider only the responses of those who received inpatient care. Since this question was asked only of those suffering ailments in the last 15 days, and here we consider only the responses of those who ultimately received inpatient care, sample sizes for some smaller states and territories are quite low. Here, we

consider this perceived quality metric for only the 15 states and territories with more than 50 respondents. Reports of low quality in public facilities ranged from 25 percent in Kerala to 69 percent in Bihar, with a standard deviation of 12 percentage points.

This perceived quality metric correlates with 2014 state-level administrative data from the Ministry of Health and Family Welfare and a 2014 NSS measure of states' economic statuses. Private-hospital patients were less likely to cite

Figure 10: Variation in the proportion of patients hospitalized in private facilities citing low quality in government facilities as their primary reason for not availing them



low quality in public facilities in states with more doctors in public hospitals per population (70 percent correlation) and in wealthier states (62 percent correlation with state-averaged UMPCE).

We also examine **insurance at the patient level as an explanatory variable**, taking the hospitalizations of uninsured patients as the base group and comparing the OOP costs for the hospitalizations of patients with either private or public insurance coverage using two separate dummy variables. The 2014 NSS groups together all types of public insurance, including RSBY, CGHS, and ESIS. We consider private insurance to include insurance provided through a non-government employer, insurance arranged between the household and a private insurance company, and any other nongovernmental scheme for health expenditure support. In 2014, 12.78 percent of Indians were covered under government insurance schemes (Table 1) and 2.47 percent were covered under private insurance (Table 2).

Our analysis controls for the hospitalized patient's UMPCE to minimize variation in the OOP cost of private hospitalization due to variation in the economic status of patients. Our model also includes covariates for the gender and age of the patients hospitalized, as well as dummy variables for the sixty-one ailment categories defined by the 2014 NSS.

Because the 2014 NSS did not collect insurance information for household members who died in the previous year, this analysis considers only the hospitalizations of people who were alive at the time of the survey. It also excludes records for which the stated reimbursement amount exceeds OOP costs. The sample used here consists of 28,224 hospitalization across 36 states and territories. Each hospitalization is weighted with the NSS-provided survey weight. When the ratio of public beds to population is considered, the sample drops down to 13,793 hospitalizations for which data are available (Andhra Pradesh, Madhya Pradesh, Odisha, Punjab, Chandigarh, Gujarat, Rajasthan, Jammu & Kashmir, West Bengal, Karnataka, Dadra & Nagar Haveli, Kerala, Tripura, Meghalaya, NCT of Delhi, Himachal Pradesh, Goa, Arunachal Pradesh, Sikkim, and Lakshadweep). When both the ratio of public beds to population and the perceived quality of public facilities are considered, the sample is reduced to 12,472 private hospitalizations in nine states (Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Odisha, Punjab, Rajasthan, and West Bengal). Although this sample size is large, the lack of data from certain states and territories and from patients who died in the last year are potential sources of bias. We hope that these models can be improved upon in the future with the inclusion of more data on the availability of public hospital services, the quality of those services, and the insurance coverage of patients.

Hypotheses: Our first hypothesis is that the OOP cost of private hospitalization is lower in states with more high-quality hospital beds. Our second hypothesis is that hospital patients with private insurance are charged more for private hospitalizations (before reimbursement from insurance) than comparable uninsured patients being treated for similar ailments.

3. Examining the first explanatory variable: Availability and quality of public hospitalization services

Our analysis of the 2014 NSS demonstrates the interplay between public hospital capacity and quality and highlights the importance of public hospital quality as a potential factor influencing the cost of private hospitalization. The coverage of government beds alone does not exhibit a significant effect on the OOP cost of private hospital stays. Without considering the quality of public hospital facilities, Model 1a yields no statistically significant relationship between the number of government beds per 1,000 population and the total stay OOP cost of private hospitalization (Table 8). Allowing for a level effect of perceived low quality of public hospitals similarly yields no statistical significance (model not shown).

However, when an interaction term between the low-perceived-quality metric and the number of public hospital beds per population is introduced (Equation 1), the coefficient on the prevalence of public beds becomes negative and significant at the 10-percent level, while the interaction between the prevalence of public beds and low perceived quality becomes positive and significant at the 5-percent level (Table 8, Model

1b). The significance of this interaction term suggests that the relationship between the prevalence of public hospital beds and the total stay OOP cost of private hospitalization hinges on the perceived quality of those hospital beds. Similarly, the relationship between public hospital quality and the OOP cost of private hospitalization depends on the availability of public hospital beds.

Equation 1: The functional form of Model 1b (Table 8)

$$\ln(C_{h,i,s}) = \alpha + \beta_1 G_s + \beta_2 L_s + \beta_3 G_s L_s + \beta_4 \ln(U_i) + \beta_5 F_i + \beta_6 A_i + \beta_7 A_i^2 + \sum_{n=1}^{60} \beta_n M_h + \varepsilon_{h,i,s}$$

Key:

$C_{h,i,s}$ = OOP cost in 2010 Rs of hospitalization h of patient i in state s

G_s = number of public hospital beds per 1,000 population in state s

L_s = proportion of privately hospitalized patients citing low quality in public facilities in state s

U_i = UMPCE of patient i

F_i = Gender of patient i , equals 1 if female

A_i = Age of patient i

M_h = Ailment dummies for hospitalization h

Table 8: Log-transformed OOP Cost of Private Hospitalization Stay

Variables	Total Cost of Private Hospital Stay		
	Model 1a	Model 1b	Model 1c
Gov't Beds	-0.0634 (0.188)	-1.186* (0.567)	
Low Quality		-1.260 (1.074)	
Gov. Beds x Low Quality		2.756** (0.995)	
State Dummies			x
Private Insurance	0.177* (0.102)	0.123 (0.106)	0.262*** (0.0338)
Gov't Insurance	-0.310*** (0.0740)	-0.230** (0.0738)	-0.113*** (0.0211)
Log Patient UMPCE	0.439*** (0.0382)	0.500*** (0.0501)	0.435*** (0.0125)
Female	-0.214*** (0.0475)	-0.208*** (0.0500)	-0.165*** (0.0158)
Age	0.00548 (0.00410)	0.00366 (0.00445)	0.00709*** (0.00125)
Age ²	-4.64e-05 (4.12e-05)	-2.36e-05 (4.56e-05)	-6.18e-05*** (1.53e-05)
Ailment Dummies	x	x	x
Constant	5.107*** (0.379)	5.206*** (0.766)	5.735*** (0.229)
Observations	13,793	12,472	28,224
R-squared	0.178	0.189	0.174
r2_a	0.174	0.185	0.171

State-clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

improved quality to the level of Kerala, we would expect this change to be associated with a 30-percent decrease in the OOP cost of private hospitalization.

For states with more than 0.81 public hospital beds per 1,000 population, Model 1b predicts that improving hospital quality would be associated with a reduction in private OOP costs significant at the 5-percent level. Given that the mean number of public hospital beds per 1,000 population was 1.10, Model 1b predicts that for the average state, increasing the quality of public hospitals (i.e. decreasing the proportion of private hospital patients citing low quality in public facilities) would be associated with lower OOP costs for private hospitalization. **The model predicts that a one-standard-deviation increase in the perceived quality of public hospitals (from 50 to 38 percent reports of low quality) in states with the mean ratio of public hospital beds to population would be associated with a decrease of 21 percent in the OOP cost of private hospitalization.** For example, if Karnataka, where 48 percent of NSS respondents reported low quality of public hospitals and which has 0.87 public hospital beds per 1,000 population, improved quality to the level of Kerala (where 25 percent of respondents reported low quality), we would expect this change to be associated with a 25-percent decrease in the OOP cost of private hospitalization. If West Bengal, where 52 percent of NSS respondents reported low quality of public hospitals and which has 0.85 public hospital beds per 1,000 population,

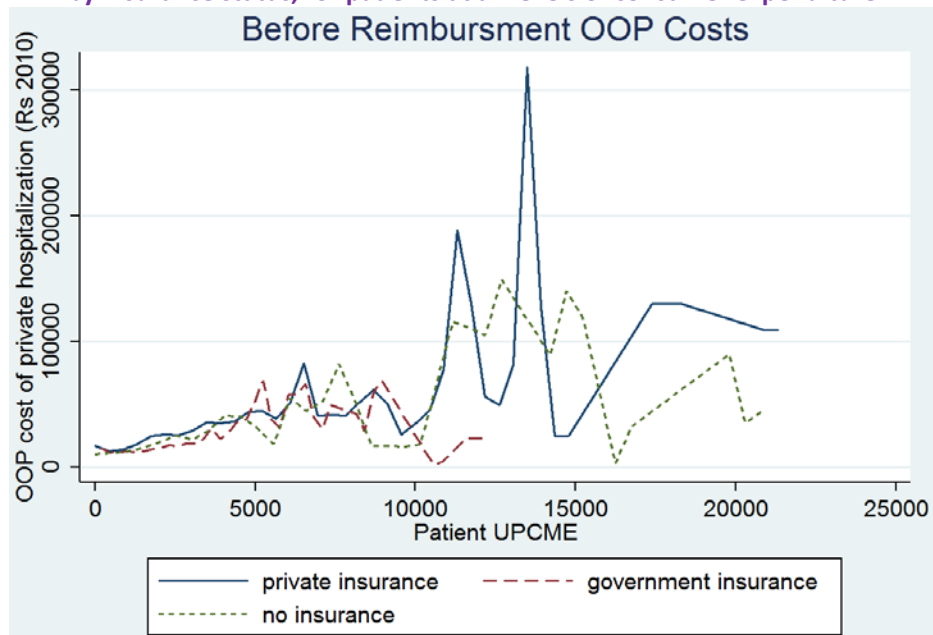
The effect of increasing the number of public hospital beds, without increasing quality, is unclear. At the average level of perceived quality (50 percent reports of low quality), the relationship between the prevalence of public beds and the OOP cost of private hospitalization is not significant. The prevalence of public beds is predicted to have a significant relationship with lower private OOP costs only when private OOP costs are treated in per-day terms, and only for states with the highest perceived quality (fewer than 44 percent reports of low quality), such as Kerala, Odisha, and Punjab (Annex 3, Table 9, Model 2b).

The significant interaction between the presence of public beds and their perceived quality in the prediction of total stay (Model 1b) and daily private OOP costs (Annex 3, Table 9, Model 2b) underscores the importance of public hospital quality. As the quality of medical care in the private market improves, it is intuitive that the care provided in public institutions must improve as well if governments hope to be able to influence the OOP cost of private hospital care by competing directly with private providers.

4. Examining the second explanatory variable: Insurance coverage

In 2014, patients with private insurance paid on average Rs 12,046 more per private hospitalization than uninsured patients. Much of this difference is attributable to the greater affluence of privately insured patients and the states where they live, but an important component is not. Controlling for state of residence, UMPCE, age, and gender, **privately insured patients paid 26 percent more per private hospitalization and 27 percent more in daily OOP expenses for private hospitalization than uninsured patients.** This difference was significant at the 1-percent level (Table 8, Model 1c). These results support our hypothesis that insured patients pay more in pre-reimbursement OOP costs for private hospitalizations than comparable uninsured patients.

Figure 11: Total stay OOP cost data for private hospitalizations in 2014, including BEFORE-reimbursement costs of insured patients, by insurance status, for patients at all levels of consumer expenditure



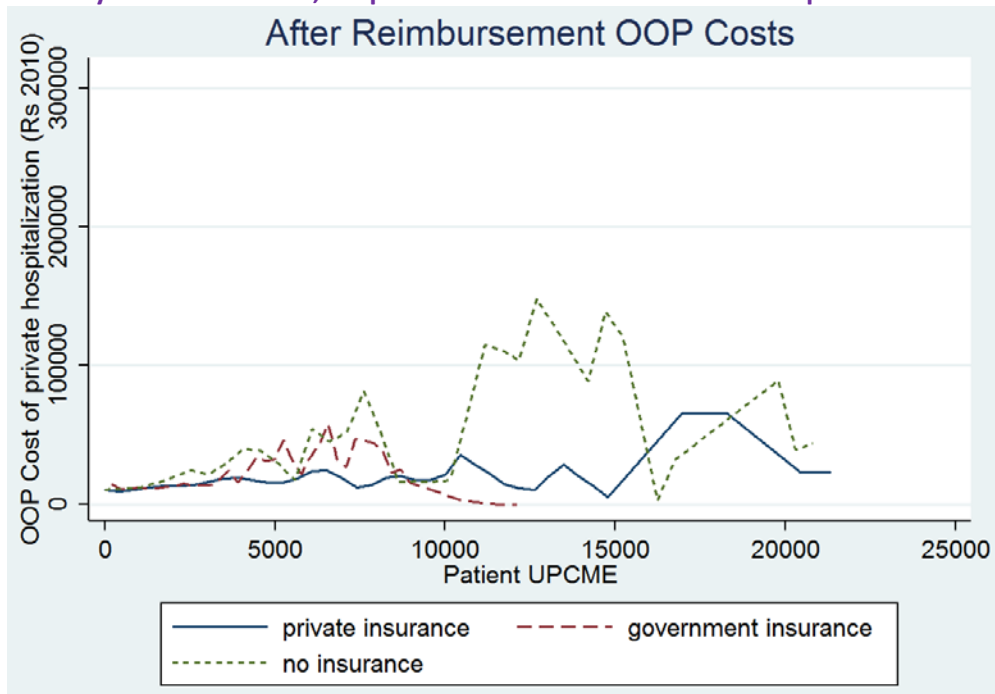
Optimistically, these higher OOP costs could indicate that privately insured patients are paying for medically necessary procedures that they would have forgone in the absence of insurance. Although the NSS does not reveal the medical necessity of the treatments corresponding to OOP expenditure data, the consumption levels of the patients are telling. If the higher OOP costs of private hospitalizations for privately insured patients were a result of reduced financial barriers to obtain necessary services, we might

expect to see a larger OOP cost gap between privately insured and uninsured patients at lower or middle consumption levels. However, the gap is largest for Indians with a usual per capita monthly consumer expenditure (UMPCE) of over Rs 10,000 (Figure 11). Though the gap is sizeable for this demographic, it is

important to note that individuals with a UMPCE over Rs 10,000 account for only 0.47 percent of private hospitalizations and fewer than 0.1 percent of the general population.

Although it is counterintuitive that insured patients pay more at private hospitals than uninsured patients, recall that the NSS considers OOP costs and reimbursements separately. Looking at after-reimbursement costs in Figure 12 reveals that much of these additional OOP costs paid by wealthy, privately insured patients are ultimately reimbursed through their

Figure 12: Total stay OOP cost data for private hospitalizations in 2014, including AFTER-reimbursement costs of insured patients, by insurance status, for patients at all levels of consumer expenditure



insurers. One possible explanation for why wealthier Indians appear to be reaping the greatest benefits from their insurance is that they could be purchasing better insurance plans, in which case some of these savings could be offset by insurance premiums. It is difficult to know from the NSS data whether patients with public insurance are similarly incurring greater costs than their uninsured peers, because many public insurance programs are “cashless.” In cases where an insurer pays the provider directly, such payment is not reflected in the NSS.

The significantly higher hospitalization costs paid by privately insured patients suggest the possibility of adverse selection and moral hazard. In terms of adverse selection, it is possible that people opting to buy private insurance are particularly risky, with known health problems or risk factors. This could drive up the cost of insurance, making it difficult for lower-risk individuals to buy actuarially fair coverage. In terms of moral hazard, patients may be willing to pay higher prices or buy services they would otherwise deem unnecessary because they know they will be reimbursed.⁹⁴ On the supply side, hospital providers could charge more or suggest additional services or medications to insured patients, knowing their patients will be less averse to incurring reimbursable costs. As insurance becomes increasingly common, knowing that some patients would be willing to pay higher OOP costs because they are insured could lead hospitals to increase the list prices of their services, which could affect uninsured patients as well.

Ethical ambiguities pervade moral hazard. One doctor at a private hospital told us that much of the decision on which package to suggest to patients turns on the patient’s ability to pay. This practice may sound exploitative, but an Indian medical college graduate doing a rotation at a U.S. hospital explained that determining whether a treatment is necessary is highly subjective. A patient’s family or a physician acting in good faith may want a patient to have any procedure that could be even marginally beneficial.

III. Recommendations

A. Collect more data and adopt performance and inputs indicators that provide better information on the quality of care

Measuring healthcare quality in India is a difficult task due to the challenges of collecting reliable data.⁹⁵ Directly observing performance is not possible for all illnesses or issues, and is even harder to do in hospitals as opposed to primary care contexts.⁹⁶ Direct observation of providers and exit interviews with patients could bias findings if providers knew they were being observed (i.e., the Hawthorne effect).⁹⁷ The gold standard is to send conspirator patients trained to present a standardized narrative of a fake ailment and record the clinicians' responses, but this can be used only for certain medical conditions and only in certain settings to avoid exposing the patient as a conspirator in a research project.⁹⁸

A study of insurance claims data for RSBY over a five-month period in the Puri District of Odisha state helps illustrate the challenges of data collection in India and how it might be improved.⁹⁹ The authors compared RSBY data forms to the U.S. Medicare system's form CMS-1450.¹⁰⁰ Whereas the Medicare form collects multiple primary and secondary diagnoses using standardized codes, RSBY has a single free-text field for the user to populate.¹⁰¹ Medicare requires information on admission time (e.g., elective or emergency), the identity of the providers, and the services the patient received (e.g., procedures, tests, and prescriptions), some of which require up to seven digits of code.¹⁰² Researchers could not verify whether providers had correctly selected options for system-generated data for the RSBY form, such as dates and codes for packages ("a discrete hospital-based treatment or procedure with an initiation and termination date").¹⁰³ The free-text fields for patient status at admission and discharge, final diagnosis, and mortality summary were not filled out according to any standardized language or codes; the most common entry in the mortality summary was "patient is dead."¹⁰⁴

Without collecting as many details as Medicare, RSBY could still look to Medicare for how to improve its data collection.¹⁰⁵ To address the problem of unstructured entries in free-text fields, RSBY should implement "prepopulated lists of categories, mandatory fields, and software checks—for example, flags for likely mismatches between diagnosis and procedure codes"—and require more detail, e.g., multiple principal diagnoses and more detail on procedures beyond just the package code, type of admission (e.g., elective or emergency), treatment, and prescriptions.¹⁰⁶ Readmissions data could also be tracked.¹⁰⁷ Training hospital clerks will be necessary to implement these changes.¹⁰⁸

Regarding the types of performance indicators Indian hospitals and government offices should collect, the World Bank¹⁰⁹ and Niti Aayog¹¹⁰ (the National Institution for Transforming India, a government think-tank) have developed metrics for the health sector, many of which apply to the hospital sub-sector. Some of these are more aspirational than others given the cost of monitoring:

- Caseload, e.g., outpatient visits per day¹¹¹
- Absenteeism, i.e., proportion of X number of randomly chosen hospital staff present during an unannounced visit¹¹²
- Diagnostic accuracy, e.g., ratio of cases accurately diagnosed to number of cases diagnosed at all.¹¹³ The correctness of a diagnosis can be measured by "comparison with a protocol or by using a team of medical experts."¹¹⁴ It is important to note that this is a money-, time-, and labor-intensive indicator because it usually relies on survey administrators presenting "clinical vignettes" to clinicians and recording whether the clinician provides a diagnosis that matches the "tracer condition," i.e., the disease whose symptoms the administrator is verbally presenting using a standardized script.¹¹⁵

- Adherence to clinical guidelines, i.e., how closely providers follow guidelines distributed by reputable organizations such as the World Health Organization.¹¹⁶ As with diagnostic accuracy, this is difficult to measure without significant resources. Another way to increase adherence to clinical guidelines is to ensure that the supervisors who work in hospitals are reliable in training and assessing their staff on adherence to clinical standards. To ensure that reliable supervisors are hired, see the recommendations below for how principals can induce compliance from agents in the healthcare context.
- Health outcomes of interest, e.g., mortality rates and treatment success rates¹¹⁷
- Out-of-pocket expenditures on drugs and diagnostics.¹¹⁸ This could also be an inputs indicator.
- Measurement of data integrity, e.g., registration of procedure according to proper format in required health records system.¹¹⁹ This could also be an inputs indicator.
- Proportion of hospitals in geographically defined area with accreditation certificate from reputable program¹²⁰ such as the Joint Commission International or India’s National Accreditation Board for Hospitals and Healthcare Providers¹²¹

The World Bank’s indicators for inputs to the health sector cluster around the following:

- Drug availability, i.e., “number of drugs of which a facility has one or more available”¹²²
- Availability of minimum equipment expected or required at the facility¹²³
- Availability of water, hygiene facilities, and electricity¹²⁴

B. Use incentive contracts and social accountability methods to induce better performance from hospitals

Indian hospitals have not received the same level of attention from researchers as PHCs. Therefore, it would be prudent to first check that problems similar to those that undermine healthcare delivery at the primary care level also appear in hospital care. Because India’s public primary healthcare system is riddled with absenteeism¹²⁵ and lack of effort¹²⁶ on the part of medical providers, among many other problems, it is important that the government and insurers have mechanisms to motivate healthcare providers to provide high-quality care according to evidence-based practices.

1. Outcomes- and inputs-based contracts to induce greater effort by healthcare providers

Implementing contracts based on outcomes or inputs can help address the problem of providers failing—intentionally or not—to deliver the best possible care within their means. In general, linking contract rewards to outcomes or performance is preferred to linking rewards to inputs, for two reasons. First, provider effort may be lacking,¹²⁷ and linking incentives to inputs may result in providers putting effort only into inputs for which they are rewarded, even if these inputs are insufficient to generate positive health outcomes. Second, when incentives are linked to outcomes, healthcare providers can innovate using their knowledge of the local context to try to reach those outcomes.¹²⁸

Only a few studies have examined the efficacy of “pay-for-performance” contracts on health outcomes in low- and middle-income countries. One study in China found that a combination of interventions—providing information to primary school principals on how to reduce anemia, subsidies for purchasing more red meat for school lunches, and, conditioned on anemia reductions among students, an approximate two-month salary increase—were associated with a statistically significant reduction in anemia rates of between four and five percentage points from the baseline prevalence of 22 percent, over the course of six months.¹²⁹ A

Chandigarh study found that combining supply- and demand-side interventions helps reduce malnutrition among young children.¹³⁰ Changing daycare employees' compensation from a fixed wage to pay based on malnutrition reductions and providing information to mothers about how to prepare nutritious food for their children were, when combined, associated with reductions in the prevalence of underweight children by 4.2 percentage points, down from the baseline prevalence of 60 percent, over the course of three months.¹³¹ And a study under review to be published found that inputs- and outputs-based contracts for doctors in rural Karnataka were each successful in reducing the rate of post-partum hemorrhage by about seven percentage points, down from 35 of percent, over the course of 22 months.¹³² In that study, researchers offered doctors rewards of up to about 15 percent of a specialist doctor's salary based on how successful they were at lowering adverse health outcomes for mothers and newborns (for outcomes contracts) and their adherence to WHO guidelines in delivering care (for inputs contracts).¹³³

Although linking rewards to outcomes is generally preferred to inputs because health outcomes are what ultimately matter, this is not always the best option. For one thing, measuring outcomes is less feasible if the outcomes do not manifest for a long time, such that events could intervene and affect outcomes, or if clinicians have limited control over outcomes. Measuring outcomes may also simply be more expensive than measuring inputs, depending on the health intervention, which might explain why there are so few studies of the impact of pay-for-performance contracts on health outcomes in low- and middle-income countries. In those circumstances, linking rewards to inputs might be a better option.¹³⁴ It is also important to note that other incentives besides money—e.g., professional recognition and opportunities for career advancement—may be just as successful at motivating providers to exert effort and to innovate.¹³⁵ In designing pay-for-performance programs, governments and researchers should be cognizant of the potential for undermining providers' intrinsic motivation to provide high-quality care.¹³⁶

Overall, then, implementing pay-for-performance programs in India will require a great deal of planning and oversight, but doing so could very well be worth the cost if the programs help align clinicians' incentives to work hard with the public's desire for better health outcomes. As for inputs-based contracts, one suggestion is for the Government of India or insurance companies to require greater compliance on the part of private hospitals with the Medical Council of India's Code of Ethics Regulations, which requires doctors at private hospitals to display their diplomas and to "announce [their] fees before rendering service."¹³⁷ In a 2016 survey of 72 private hospitals and nursing homes in Delhi, researchers found that only about 65 percent of for-profit institutions displayed their health providers' diplomas publicly, and only 66.6 percent of non-profit institutions did so.¹³⁸ Only 41.2 percent of for-profit institutions displayed their schedule of rates and charges publicly, and only 44.4 percent of non-profit institutions did so.¹³⁹ This is a very easy input to observe and measure, making it an ideal basis for accountability in an input-based contract with private and non-profit hospitals.

2. Information provision to boost social accountability of health care providers

Another way principals can induce agents to achieve health performance indicators is to focus on demand-side "social accountability" devices.¹⁴⁰ Social accountability refers to the public's scrutiny of healthcare providers' performance to hold them accountable to the community's goals.¹⁴¹ The avenues for social accountability are at least two-fold: 1) information provision to community members about local health outcomes and services; and 2) facilitation of structured conversations between community members and providers so that grievances can be aired and addressed.¹⁴² Social accountability is based on the theory that information provision will improve the transparency of what providers are doing and thereby trigger demand within the community for improved services.¹⁴³

One study in Uttar Pradesh is looking at the effects of information provision and dissemination through broadcast messaging, social networks, and conversations with local leaders.¹⁴⁴ Another study in Uttar Pradesh is looking at information provision and dissemination as well as facilitation of community-provider interactions in the form of Village Health, Sanitation and Nutrition Committees set up with assistance from the state government and the World Bank.¹⁴⁵

C. Embrace low-cost, evidence-based interventions to improve the quality of care

The major challenge in India is how to encourage healthcare providers to exert the effort necessary to provide high-quality care.¹⁴⁶ Secondly, the challenge is to make high-quality healthcare more affordable. Even advanced economies like the United States have struggled with this second challenge and have only recently started moving away from the fee-for-service model toward other models of care. Below we describe two types of interventions that would require some up-front costs to implement but whose marginal cost would be close to zero once the systems were in place: 1) down-shifting tasks to junior medical professionals to reduce labor costs; and 2) adopting findings from behavioral economics studies to change providers' and patients' behaviors with little conscious effort.

1. Down-shifting surgical tasks

Two studies on heart and cataract surgeries in India have found that down-shifting tasks to junior medical professionals helps lower the costs of surgery and increase the number of surgeries hospitals can perform. In Bangalore, the private Narayana Health City Cardiac Hospital performs 2,400 coronary artery bypass graft procedures annually, for which patients pay between \$2,000 and \$3,000 per surgery; in the United States, by contrast, a large hospital usually performs between 600 and 1,800 of these procedures annually, at a price of over \$100,000 per surgery.¹⁴⁷ Junior surgeons are able to perform tasks toward the bottom of the "complexity spectrum," e.g., chest opening and closing and saphenous vein harvesting, without supervision from senior surgeons.¹⁴⁸ This frees up senior surgeons to perform tasks at the higher end of the complexity spectrum, e.g., anastomosis during the main procedure, and attend to more patients.¹⁴⁹ By co-locating senior and junior surgeons in adjacent operating rooms, surgeons can coordinate regarding the progress of their surgeries.¹⁵⁰ The result: the typical surgeon at Narayana Health performs two to four bypass surgeries per day, compared to U.S. surgeons performing four to six bypass surgeries per week.¹⁵¹ The increased number of surgeries enables economies of scale in procurement, administration, and other overhead, and labor costs per surgery have come down due to the smaller number of labor hours put in by higher-salaried senior surgeons.¹⁵² Junior surgeons felt more empowered and motivated.¹⁵³ And, most importantly, researchers found that task-shifting does not lead to worse outcomes in terms of patient mortality or postoperative length of stay.¹⁵⁴

In Madurai, the private Aravind Eye Care System hospital has also relied on task-shifting to lower the cost of cataract surgery. Cataract counselors and mid-level ophthalmic personnel perform most perioperative clinical services, which frees up surgeons to perform six to eight surgeries per hour.¹⁵⁵ The study's authors suggest that endoscopy and hernia repair are other outpatient care procedures to which task-shifting might be applied.¹⁵⁶ Narayana Health's and Aravind's use of task-shifting illustrate how empowering junior medical providers can increase the quantity and quality of patient services.¹⁵⁷

2. Adopting behavioral economics "nudges" to improve health outcomes

Just as advanced economies have begun to introduce "nudges" based on behavioral economics research to improve health outcomes while reducing costs,¹⁵⁸ India should do so as well. Although designing and implementing new systems would require up-front costs, the idea is that once these systems are embedded

in hospitals' standard operating procedures, they will lead to better health outcomes by nudging providers (and patients) toward pro-health behavior with little conscious effort.

Examples of nudges India might adopt to improve providers' behaviors include setting the default for prescription medicines (for hospitals with electronic medical records systems) to the generic drug, as this will make it more likely that the less-expensive generic is prescribed rather than the more-expensive brand-name drug.¹⁵⁹ In designing pay-for-performance and inputs contracts, government and insurers should also consider paying out a series of small incentive payments rather than a lump-sum bonus payment at the end of a long period, since the more-frequent, smaller payments provide more immediate feedback on how well the provider is complying with the contract's goals.¹⁶⁰ Of course, increasing the frequency of payments will require competent monitoring and frequent measurements or testing, which does impose costs.¹⁶¹ Lastly, reminding hospital staff of the importance of their work and making public, or at least making known to their peers, how they are performing, can also induce greater effort.¹⁶² Although medical education's prestige has declined in India,¹⁶³ it is possible that appealing to doctors' and nurses' sense of professional identity as caregivers and lifesavers and disclosing within the hospital how each doctor and nurse has performed would enable administrators to exhort their staff to provide better care without having to resort to rewards or punishments.

D. Improve medical ethics education

We focus here on medical ethics because we believe this would improve the provision of medical care and cost less than drastically increasing the number of medical college seats. The March 2016 report by the Parliamentary Standing Committee on Health and Family Welfare on the Medical Council of India recommended the creation of a new Ethics Committee with non-doctor lay members so that the profession would not be entirely self-regulated.¹⁶⁴ Other scholars and practitioners have suggested greater emphasis on experiential courses for teaching ethics, including medical humanities courses, in both medical colleges and in continuing professional education programs and the establishment of "non-punitive systems for reporting medical errors and incidents."¹⁶⁵

Although research into the impact of medical ethics education is still nascent,¹⁶⁶ studies have found that ethics education leads to changed attitudes and behaviors among medical workers and that greater empathy towards patients improves patient outcomes. In terms of the influence of ethics education on clinicians' attitudes, a Mayo Clinic study found that participation in a human values seminar was associated with decreased willingness among pediatric residents to do emergency-room resuscitation of babies with "progressively fatal diseases."¹⁶⁷ However, the effect of the formal ethics education was limited: of six scales used to identify attitude changes, only one scale showed that the seminar was associated with a change in attitude that was statistically distinct from the control group's attitude.¹⁶⁸

In terms of whether ethical conduct, or, more particularly, empathy toward patients, results in better patient outcomes, the research is both affirmative and has a stronger basis. A study at a Philadelphia hospital found that physicians' higher empathy scores (based on a previously developed scale that measures empathy in patient care) were significantly associated with better hemoglobin and cholesterol readings among diabetic patients.¹⁶⁹ The authors suggest that physician empathy may improve patient outcomes because empathy "enhances mutual understanding and trust between physician and patient, which in turn promotes sharing without concealment, leading to better alignment between patients' needs and treatment plans and thus more accurate diagnosis and greater adherence."¹⁷⁰ Empathy is only one component of ethical conduct toward patients, but the study points to the potential for ethical conduct to improve patient outcomes.

Keeping in mind that even advanced economies like the United States have not systemically determined the best ways to approach medical ethics education and the influence of ethics on patient outcomes, the fact

that several Indian doctors raised the importance of ethics education during our site visits leads us to recommend more ethics education as a way to improve India's overall medical education system.

E. Increase government spending on public hospitals and health insurance

All Indians are entitled to healthcare. Yet the free market alone is insufficient to ensure adequate provision of care due to market failures inherent to healthcare (Part II.B). High-quality, direct government provision, subsidies for purchasing insurance plans, and regulation are necessary to improve access to care. Without government support and intervention, many Indians will continue to face catastrophic hospital expenditures that either force them to forgo care or expose them to financial vulnerability (Table 7).

1. Increased government spending on public hospitals

Currently, government spending on healthcare comprises only 1.15 percent of GDP,¹⁷¹ which is below the average for lower-middle-income countries, 1.6 percent of GDP.¹⁷² Given that the majority of households facing catastrophic health expenditures fall into the two poorest annual consumption expenditure quintiles, the government needs to increase access to hospital care either by directly providing high-quality care or by subsidizing insurance premiums. As we show in Part II.C.3 above, higher public hospital quality is associated with lower patient out-of-pocket expenditures at *private* hospitals, particularly in states with a higher prevalence of public hospitals. This suggests that high-quality, direct government provision has ancillary benefits.

2. Increased government subsidies for health insurance and improved regulation of health insurance markets

In addition to financing public hospitals, the central and state governments should expand subsidies for insurance and improve regulation to address failures in the functioning of insurance markets. Only 12.78 percent of Indians are currently enrolled in a public health insurance plan, and only 2.47 percent are enrolled in a private plan.¹⁷³ The consequences of these low enrollment rates can be catastrophic for households: as discussed in Part I.E, the National Sample Survey indicates that the majority of households whose health expenditures exceed the thresholds of 25 or 40 percent of annual consumption expenditure (ACE) are in the two poorest ACE quintiles.¹⁷⁴ Simply put, hundreds of millions more Indians still need access to health insurance. Only 41.3 of 72.8 million BPL-eligible families are enrolled in the government's RSBY scheme; if all eligible families opted in, the scheme could cover as many as 364.0 million people.¹⁷⁵ That only slightly more than half of eligible households have enrolled in RSBY suggests that the government should consider making RSBY an automatic enrollment program from which enrollees could opt out. Beyond reconfiguring RSBY, the government must subsidize insurance for more Indians to expand access to life-saving care. And even greater coverage will not make a dent in patients' out-of-pocket spending if enrollees are unaware of the benefits to which they are entitled. One study in Gujarat found that nearly a sixth of patients who incurred out-of-pocket expenses despite being covered by RSBY did not know how to use their RSBY card.¹⁷⁶ Information campaigns to educate enrollees on how to use their coverage are therefore also essential.¹⁷⁷

At the same time, the government should be wary that wider coverage will drive up the government's healthcare expenditures. In addition, insurance plans can lead to overuse if the insured party can influence the medical care provided or if the amount of reimbursement is a positive function of medical expenses.¹⁷⁸ Moral hazard not only leads to expenditures on unnecessary care, but also increases costs for everyone else by raising aggregate demand. Instituting small deductibles (co-pays) could help deter overuse and help the government recoup some of the costs of providing coverage. Co-pays could be based on the likelihood of mortality (i.e., higher co-pays for lower likelihoods of mortality) or based on whether the patient was

referred from an approved clinic (i.e., lower co-pays for referred patients, as this provides patients an incentive not to overconsume hospital care).

Moral hazard is a demand-side problem. On the supply side, government and insurers will still have to monitor providers' tendencies to engage in fraud, malpractice, and unnecessary procedures. The monitoring mechanisms outlined in Part III.B could help tamp down on these tendencies.

Conclusion

Hospital care is an understudied yet crucial component of India's healthcare system. In the past 20 years, Indians' demand for hospital care has increased, yet only 12.78 percent of Indians were enrolled in public health insurance and only 2.47 percent had private insurance as of fiscal year 2013-2014 (Part I.B). Even for lower-middle-income countries, government expenditures on health—at 28.6 percent of total health expenditure—remain low. Households remain the main financiers of healthcare, covering 67.7 percent of total health expenditure (Part I). The result can be devastating: in 2014, of households that incurred health expenditures amounting to at least 25 percent of their annual consumption expenditure (ACE), nearly 28 percent were in the bottom ACE quintile; of households that incurred health expenditures amounting to at least 40 percent of their ACE, about 30 percent were in the bottom ACE quintile. The distribution of catastrophic health expenditures across ACE quintiles has *worsened* over time: the majority of households facing catastrophic health expenditures are now in the two poorest quintiles, which was not the case 20 years ago (Table 7).

The good news is that public provision of hospital care can make a difference in lowering patients' out-of-pocket expenditures without sacrificing quality. Our econometric analysis reveals that the availability of high-quality public hospitals is associated with lower out-of-pocket expenditures by patients who seek care at *private* hospitals. For example, a one-standard-deviation increase in the perceived quality of public hospitals (from 50 to 38 percent reports of low quality) in states with the mean ratio of public hospital beds to population is associated with a decrease of 21 percent in a patient's out-of-pocket expenditure on private hospitalization (Part III.C.3).

And yet government must still do more. Only 41.3 of 72.8 million Indian households eligible to enroll in RSBY were enrolled as of early 2016. In addition, private insurance does not seem to have reduced patients' out-of-pocket expenses for private hospitalization, suggesting that adverse selection and moral hazard may be driving up hospital care prices (Part III.C.4).

To address the problem of catastrophic expenditures and lack of access to high-quality hospital care, we recommend better data collection, including more consistent adoption of performance-based indicators of hospital care outcomes; the use of incentive contracts by government and insurers as well as social accountability mechanisms to circumvent principal-agent problems inherent in healthcare systems; various lower-cost interventions, including "nudges" based on behavioral economics, for improving hospital care; greater emphasis on ethics education in India's medical education system; and, lastly, increased government spending to raise the quality of public hospitals, which would put competitive pressure on private hospitals to maintain quality while lowering prices. Undertaking these initiatives is essential to expanding access to life-saving hospital care and to India's overall development.

Annexes

Annex 1: A Model of the Industrial Organization of Healthcare

Industrial organization literature on healthcare markets identifies the following multi-stage model. We focus on the first stage and mention the other stages to give a flavor of what a full model might entail.

1. **Quality determination in provider markets:** Providers (hospitals and physicians) invest in delivering health care. Competition between providers as well as demand-side factors, such as the amount of information regarding quality that is provided to consumers, determine the quality of care.
2. **Price and network determination in provider markets:** Providers and insurers negotiate prices for each service delivered, leading each insurer to develop a market of providers to which its policies apply. Provider markets and insurance reimbursements in turn influence consumer welfare.
3. **Premium determination in insurance markets:** Insurers choose premiums to maximize their objective functions, taking into account their own characteristics and those of competing insurers.
4. **Consumer choice in insurance markets:** Consumers observe each insurer's provider network and other characteristics, including premiums, and enroll in insurance plans accordingly.
5. **Incentives and provider referral decisions/consumer utilization:** When the enrollment process is complete, some consumers get sick and use providers either in their insurer's networks or from outside the network (for which they incur larger out-of-pocket expenses).

Each stage affects the equilibrium outcome and therefore patient welfare. Moreover, the stages are interdependent: optimal choices in one stage are functions of expectations regarding the rest. Due to a lack of data and the complexity of this multi-stage model, the report delves into the first stage on how provider investments in health care service-delivery and demand-side factors influence quality.

Annex 2: Quality Determination in Provider Markets

For modeling purposes, the most commonly used measure of quality is patient mortality. However, mortality is not a measure of quality of service per se, but rather an outcome determined partially by quality of service. Hospitals are not choosing mortality, but instead a quality of service that affects mortality. At the same time, patients are heterogeneous in their responsiveness to treatment.¹⁷⁹

1. Administered prices

The firm's equilibrium is a quality function as the (implicit) solution to firms' profit-maximizing conditions. Firms maximize profits, although this assumption can be relaxed for non-profit maximizing preferences with no qualitative difference in the results. Profits of hospital j are the following:

$$\pi_j = pq_j - c(q_j, z_j) - F \quad (1)$$

where p is the regulated price, q_j is hospital j 's demand, $c(q_j, z_j)$ is the variable cost function, z_j is hospital j 's quality, and F represents fixed costs.

We assume the demand any hospital j faces is a function of the level of market demand D . Firm j faces a demand of:

$$q_j = D(p, z_j, z_{-j}) \quad (2)$$

where q_j is a vector of all other firms' qualities. We assume that hospital j 's market share is increasing in its

own quality and decreasing in the number of firms. The equilibrium quality function is:

$$z_j^e = z(p, c_q, c_z, D) \quad (3)$$

where z_j^e is firm j 's equilibrium quality, p is the regulated price, c_q and c_z the marginal costs of quantity and quality, respectively, and D is market demand.

The firm's level of quality depends on the level of the regulated price, the marginal cost of quantity, the marginal cost of quality, the level of demand, market share, and (implicitly) the quality elasticities of market share and market demand. Quality is increasing in price, the elasticity of demand with respect to quality, and the firm's total demand, and decreasing in the marginal costs of quantity or quality.

Equation (3) could be estimated empirically using econometric specifications but would have to account for the fact that marginal cost, market share, and demand might be endogenous. Exogenous determinants of these factors would be needed, such as cost shifters W , demand shifters X_D , and number of firms N . The reduced form econometric specification with a random error term is:

$$z_j^e = Z(p, W, X_D, N, \varepsilon) \quad (4)$$

This is an example of a Structure-Conduct Performance (SCP) model with quality replacing price as the dependent variable. Most SCP models applied to healthcare focus on the link between market structure and firm conduct and omit industry performance. The industrial organization literature's typical conduct measure is price or price-cost margin; the typical measure of market structure is the Herfindahl-Hirschman Index, a measure of market concentration that accounts for the number and size of firms.

2. Market-determined prices

Although the Dorfman-Steiner condition model is nominally about the choice of price and advertising,¹⁸⁰ we can also interpret it as revealing information about price and quality in the following way:

$$z = \frac{p \varepsilon_z}{d \varepsilon_p} \quad (5)$$

where z is quality, p is price, d is marginal cost of quality, and ε_z and ε_p are elasticities of demand with respect to quality and price, respectively.¹⁸¹ Quality increases if the quality elasticity of demand increases, if the price elasticity of demand declines, or if price increases relative to the marginal cost of quality.

While this model yields no determinate conclusions, it offers the following guidance about competition in health care markets: 1) if price elasticity of demand facing healthcare firms increases due to the entry of alternative providers or consumers facing greater cost sharing, there would be a fall in prices; 2) if quality elasticity of demand increases because of fewer medical errors or quality improvement, quality will increase; 3) if price elasticity remains unchanged and price and quality increase, there will be an increased marginal cost of quantity, with price-cost margins unchanged.

In equilibrium, greater competition will increase quality, which can have varying effects on prices: 1) with positive marginal cost of quality, there will be higher quality that will lead to higher prices; 2) hospitals will have different costs of producing quality; 3) some hospitals will choose higher quality than others and their relative values to an insurer's network will change; in addition, those hospitals with lower marginal costs of quality will have more bargaining power with insurers and will command higher prices, and vice versa; 4) if all hospitals have identical marginal costs of quality, then all hospitals will increase quality by the same amount and will not change their relative attractiveness to insurers and their bargaining positions. In equilibrium, there will be no effect on the distribution of prices.

Annex 3: Effect of availability and quality of public hospitals on daily OOP costs for private hospitalization

Model 2a, which does not consider the perceived quality of government hospitals, exhibits no statistically significant relationship between the density of government beds and private hospitalization OOP costs. In Model 2b, which includes an interaction between the perceived quality and prevalence of public hospital beds, as well as a level effect of perceived quality, the coefficients on government beds, public hospital quality, and their interaction term are all significant at the one-percent level. Model 2b predicts that for states where fewer than 44 percent of survey respondents reported poor public hospital quality, increasing the number of government beds would be associated with significantly lower daily private OOP costs and that, for a state with the average ratio of government beds to population, increasing public hospital quality by one standard deviation would be associated with a decrease of 24 percent in daily private OOP costs.

When the OOP cost of private hospitalization is considered in per day terms (Model 2b) as opposed to total stay cost (Model 1b), the explanatory power of the model increases slightly (R^2 increases from 0.189 in Model 1b to 0.196 in Model 2b). One possible explanation for why government provision appears to have a stronger association with daily OOP costs than with total stay costs is that patients could choose to stay in the hospital longer in states with greater public provision and lower (i.e., more affordable) OOP costs of private hospitalization. The availability and quality of public provision could also be correlated with the seriousness of the ailments treated in private hospitals. Models 1b and 2b control for 61 ailment categories, but there is no measure of the gravity of the ailments. One can imagine that if public facilities are relatively available and perceived to be good, some households would be inclined to send patients to private hospitals only if they have more serious ailments, which are more likely to require longer stays. Therefore, for serious ailments, high-quality public hospitals may be less effective in putting downward pressure on OOP costs of private hospitalization.

Table 9: Log-transformed OOP Cost of Private Hospitalization Stay

Variables	Daily Cost of Private Hospital Stay		
	Model 2a	Model 2b	Model 2c
Gov't Beds	-0.192 (0.217)	-2.055*** (0.246)	
Low Quality		-2.573*** (0.440)	
Gov't Beds x Low Quality		4.208*** (0.649)	
State Dummies			x
Private Insurance	0.203* (0.0989)	0.147 (0.102)	0.270*** (0.0276)
Gov't Insurance	-0.408*** (0.0661)	-0.287*** (0.0629)	-0.181*** (0.0172)
Log Patient UMPCE	0.428*** (0.0419)	0.485*** (0.0426)	0.405*** (0.0102)
Female	-0.131** (0.0471)	-0.120** (0.0480)	-0.0793*** (0.0129)
Age	0.0102*** (0.00317)	0.00772** (0.00312)	0.00773*** (0.00102)
Age ²	-0.000130*** (3.07e-05)	-9.70e-05** (2.92e-05)	-0.000102*** (1.25e-05)
Ailment Dummies	x	x	x
Constant	4.057*** (0.394)	4.875*** (0.225)	4.289*** (0.187)
Observations	13,792	12,471	28,223
R-squared	0.171	0.196	0.178
r2_a	0.167	0.191	0.175

State-clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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- ⁶¹ *Ibid.*
- ⁶² Parliamentary Committee Report, *supra* note 29, at 46.
- ⁶³ See, e.g., Dinesh C. Sharma, "India's medical education system hit by scandals," *The Lancet* 386, no. 9993 (2015): 517-18 (recounting how 600,000 students had to retake the medical college entrance exam after the Supreme Court ruled that widespread cheating had occurred; recounting how MCI has renewed licenses for private medical colleges that hired fake faculty and patients for MCI inspections); Sanjeev Davey et al., "Privatization of medical education in India: A health system dilemma," *International Journal of Medicine and Public Health* 4, no. 1 (2014): 18-19 (noting the dissolution of MCI after its president was arrested on corruption charges; also noting the problem of "paper faculty for the sake of inspection . . . by MCI").

According to the Parliamentary Committee Report, state governments sometimes do “mass transfers of teachers of different specialties from one college to another on a temporary basis at the time of inspection.” Parliamentary Committee Report, *supra* note 29, at 40.

⁶⁴ Balbir Singh Deswal and Vijay K. Singhal, “Problems of medical education in India,” *International Journal of Community Medicine and Public Health* 3, no. 7 (2016): 1906.

⁶⁵ *Ibid.*

⁶⁶ Parliamentary Committee Report, *supra* note 29, at 15.

⁶⁷ Niti Aayog, “A Preliminary Report of the Committee on the Reform of the Indian Medical Council Act, 1956,” Aug. 7, 2016, http://niti.gov.in/writereaddata/files/document_publication/MCI%20Report%20.pdf, at 10.

⁶⁸ Sharma, *supra* note 41, at 2382.

⁶⁹ “Delhi High Court directs Centre, MCI to introduce BSc (Community Health) course,” *India Medical Times*, Sept. 6, 2015, <http://www.indiamedicaltimes.com/2015/09/06/delhi-high-court-directs-centre-mci-to-introduce-bsc-community-health-course>.

⁷⁰ Sharma, *supra* note 41, at 2382.

⁷¹ Shamika Ravi, Rahul Ahluwalia, and Sofi Bergkvist, “Health and Morbidity in India (2004-2014),” Brookings India, at 41 tbl.27, https://www.brookings.edu/wp-content/uploads/2016/12/201612_health-and-morbidity.pdf.

⁷² Annex 1 includes a discussion of the industrial organization of healthcare markets.

⁷³ One study finds that more competitive hospital markets are associated with lower heart attack mortality. Daniel P. Kessler and Mark B. McClellan, “Is Hospital Competition Socially Wasteful?” *Quarterly Journal of Economics* 115, no. 2 (2000): 601-02.

⁷⁴ Please refer to Annex 2 for both models’ derivations.

⁷⁵ Hugh Gravelle, Rita Santos, Luigi Siciliani, and Rosalind Goudie, “Hospital quality competition under fixed prices,” Research Paper 80, Centre for Health Economics, University of York (Nov. 2012), https://www.york.ac.uk/media/che/documents/papers/researchpapers/CHERP80_hospital_quality_competition_fixedprices.pdf.

⁷⁶ Martin Gaynor and Robert J. Town, “Competition in health care markets,” in *Handbook of Health Economics* vol. 2 (2011): 499-637.

⁷⁷ Martin Gaynor. “What do we know about competition and quality in health care markets?” *Foundations and Trends in Microeconomics* 2, no. 6 (2006): 441-508.

⁷⁸ Gaynor and Town, *supra* note 76.

⁷⁹ See, e.g., Uwe Dulleck, Rudolf Kerschbamer, and Matthias Sutter, “The Economics of Credence Goods: An Experiment on the Role of Liability, Verifiability, Reputation, and Competition,” *American Economic Review* 101, no. 2 (2011): 526.

⁸⁰ *Ibid.*

⁸¹ *Ibid.*

⁸² *Ibid.*

⁸³ Uwe Dulleck and Rudolf Kerschbamer, “On Doctors, Mechanics, and Computer Specialists: The Economics of Credence Goods,” *Journal of Economic Literature* 44, no. 1 (2006): 7; see also Kai Sülzle, and Achim Wambach, “Insurance in a Market for Credence Goods,” *Journal of Risk and Insurance* 72, no. 1 (2005): 159; Jeffrey Hammer, Yamini Aiyar, and Salimah Samji, “Understanding Government Failure in Public Health Services,” *Economic and Political Weekly* 42, no. 40 (2007): 4051.

⁸⁴ See generally Amitabh Chandra and Jonathan Skinner, “Technology Growth and Expenditure Growth in Health Care,” *Journal of Economic Literature* 50, no. 3 (2012): 653 (defining “optimal spending on health” as occurring “where p dollars given up for period one consumption should yield equal incremental benefits from an improved chance of surviving to period two”). In a published interview, Dr. Vijay Ajaonkar, a senior diabetologist in Mumbai, reports that doctors put terminally ill septuagenarians and octogenarians on ventilators in intensive-care units despite knowing that the patients have no hope of recovery and that keeping the patients in the hospital only increases their suffering while draining their families’ financial resources. Gadre and Shukla, *supra* note 51, at 5. He also advocates for mandating that doctors prescribe only generic drugs. *Ibid.*, 9. In an anonymous published interview, a general practitioner from a small town said that many general practitioners admit patients with viral fevers into the ICU, even though this is rarely necessary, and charge the patient Rs. 25,000-30,000 for an unnecessary saline drip and an ICU stay. *Ibid.*, 12-13. The same doctor described pathologists convincing concerned parents that their newborns had jaundice by showing them bilirubin charts meant for adults, not newborns. Unsuspecting parents were all too happy to place their newborns in the emergency ward to cure the (nonexistent) jaundice. *Ibid.*, 13. In another anonymous published interview, a gynecologist said that some gynecologists regret having to “tediously spend” several hours helping a pregnant woman go through labor and prefer to perform a “quick caesarean” instead, which is more profitable. *Ibid.*, 17.

⁸⁵ For a general discussion of what governance encompasses, see Derick W. Brinkerhoff and Thomas J. Bossert, “Health Governance: Concepts, Experience, and Programming Options,” U.S. Agency for International Development, Feb. 2008, <https://www.hfgproject.org/health-governance-concepts-experience-programming-options>; Willidam D. Savedoff, “Governance in the Health Sector: A Strategy for Measuring Determinants and Performance,” World Bank, Policy Research Working Paper, May 2011, <http://documents.worldbank.org/curated>

/en/812751468158068363/pdf/WPS5655.pdf.

⁸⁶ Medical Council of India, "Introduction," <http://www.mciindia.org/AboutMCI/Introduction.aspx> (accessed Mar. 11, 2017).

⁸⁷ For examples, see the sources cited in *supra* note 63.

⁸⁸ For example, in Bihar in 2012, doctors removed the uterus of 703 women in an attempt to claim reimbursements through RSBY. As of 2016, MCI had failed to discipline or bring suit against any of the doctors. KumKum Dasgupta, "It's time to pull the plug on Medical Council of India," *Hindustan Times*, Nov. 25, 2016, <http://www.hindustantimes.com/analysis/it-s-time-to-pull-the-plug-on-medical-council-of-india/story-rJMWjAd274V2nrKe8M6BP.html>.

⁸⁹ Samarth Bansal, "WHO report sounds alarm on 'doctors' in India," *The Hindu*, July 18, 2016, <http://www.thehindu.com/data/WHO-report-sounds-alarm-on-%E2%80%98doctors%E2%80%99-in-India/article14495884.ece>.

⁹⁰ Sudhir Anand and Victoria Fan, World Health Organization, "The Health Workforce in India," Human Resources for Health Observer Series No. 16, June 2016, at 9, <http://apps.who.int/iris/bitstream/10665/250369/1/9789241510523-eng.pdf?ua=1>.

⁹¹ See generally Michael R. Darby and Edi Karni, "Free Competition and the Optimal Amount of Fraud," *Journal of Law and Economics* 16, no. 1 (1973): 67-88.

⁹² Jeffrey Hammer, Yamini Aiyar, and Salimah Sanji, "Bottom's up: To the role of Panchayati Raj Institutions in Health and Health services," World Bank, Social Development Papers, South Asia Series, paper no. 98 (June 2006), at 39, <http://documents.worldbank.org/curated/en/108011468042305807/pdf/369641SDP9801web.pdf>. It is important to recognize that in the fee-for-service model used in countries like the United States, unnecessary tests and treatments frequently occur. See, e.g., Atul Gawande, "The Cost Conundrum," *New Yorker*, June 1, 2009, <http://www.newyorker.com/magazine/2009/06/01/the-cost-conundrum>.

⁹³ World Bank, "World Development Report 2004: Making Services Work for Poor People," 2003, at 95, <https://openknowledge.worldbank.org/bitstream/handle/10986/5986/WDR%202004%20-%20English.pdf>.

⁹⁴ For example, an anonymous ophthalmologist said in a published interview that patients with insurance may be told they have a cataract and instructed to obtain cataract removal surgery for Rs. 30,000-40,000. Patients without insurance get a second opinion from this ophthalmologist and learn that they do not have a cataract and do not need insurance; they just need updated eyeglasses! Gadre and Shukla, *supra* note 51, at 19.

⁹⁵ See, e.g., Manoj Mohanan et al., "Quality of Health Care in India: Challenges, Priorities, and the Road Ahead," *Health Affairs* 35, no. 10 (2016): 1754.

⁹⁶ *Ibid.*

⁹⁷ *Ibid.*

⁹⁸ *Ibid.*

⁹⁹ Matthew Morton, "India's Largest Hospital Insurance Program Faces Challenges in Using Claims Data to Measure Quality," *Health Affairs* 35, no. 10 (2016): 1793.

¹⁰⁰ *Ibid.*, 1794.

¹⁰¹ *Ibid.*, 1794-95.

¹⁰² *Ibid.*, 1795.

¹⁰³ *Ibid.*, 1793, 1795.

¹⁰⁴ *Ibid.*, 1795.

¹⁰⁵ *Ibid.*, 1796.

¹⁰⁶ *Ibid.*, 1797.

¹⁰⁷ *Ibid.*

¹⁰⁸ *Ibid.*

¹⁰⁹ Gayle H. Martin and Obert Pimhidzai, "Service Delivery Indicators: Kenya," World Bank, July 2013, <http://siteresources.worldbank.org/AFRICAEXT/Resources/SDI-Report-Kenya.pdf>.

¹¹⁰ Niti Aayog, "Performance on Health Outcomes: A Reference Guidebook," Dec. 2016, http://niti.gov.in/writereaddata/files/document_publication/Guidebook_SHI.pdf.

¹¹¹ Martin and Pimhidzai, *supra* note 109, at 26.

¹¹² *Ibid.*, 27.

¹¹³ *Ibid.*, 31.

¹¹⁴ Jishnu Das et al., "The Quality of Medical Advice in Low-Income Countries," *Journal of Economic Perspectives* 22, no. 2 (2008): 99.

¹¹⁵ Christophe Rockmore, "Health Service Delivery in Togo," World Bank, June 2016, at 21, http://www.sdindicators.org/wp-content/uploads/2013/06/8.-TGO_SDI_Health_Minister-FINAL.pdf (accessed Mar. 12, 2017).

¹¹⁶ Martin and Pimhidzai, *supra* note 109, at 32.

¹¹⁷ Niti Aayog, *supra* note 110, at 9-10.

¹¹⁸ *Ibid.*, 10.

¹¹⁹ *Ibid.*, 10.

¹²⁰ *Ibid.*, 11.

¹²¹ *But see* Anant Phadke, “Regulation of Doctors and Private Hospitals in India,” *Economic & Political Weekly* L1, no. 6 (Feb. 6, 2016): 54 (lamenting that NABH does not require a “patient[-]friendly grievance redressal system” or “mandatory observance of a Standard Charter of Patient’s Rights”). Phadke is associated with the Jan Swasthya Abhiyan, India’s branch of the international People’s Health Movement, which advocates for better and more equitable health care as a human right. “About the People’s Health Movement,” People’s Health Movement, <http://www.phmovement.org/en/about> (accessed Jan. 13, 2017).

¹²² Martin and Pimhidzai, *supra* note 109, at 34.

¹²³ *Ibid.*, 35.

¹²⁴ *Ibid.*, 37.

¹²⁵ *See, e.g.*, Abhijit Banerjee, Rachel Glennerster, and Esther Duflo, “Putting a Band-Aid on a Corpse: Incentives for Nurses in the Indian Public Health Care System,” *Journal of the European Economic Association* 6, nos. 2-3 (2008): 488 (reporting on absenteeism among assistant nurse midwives in the Udaipur District of Rajasthan); *cf.* Michael Kremer et al., “Teacher Absence in India: A Snapshot,” *Journal of the European Economic Association* 3, no. 2-3 (2005): 659-660 & tbl. 2 (finding absenteeism rates for public school teachers ranging from 14.6 to 41.9 percent on any given day in public primary schools, with poorer states featuring higher absenteeism rates).

¹²⁶ *See, e.g.*, Das et al., *supra* note 45, at 4, 26 (explaining that public sector clinics in Madhya Pradesh employ providers who supply lower effort and have high absenteeism, whereas the “unregulated private market . . . , which is mainly staffed by unqualified providers, appears to deliver higher provider effort and comparable quality of care, at a much lower cost per patient”); Jishnu Das et al., “The impact of training informal health care providers in India: A randomized controlled trial,” *Health Economics* 354, no. 6308 (2016): 7 (explaining that public-sector doctors deliver greater quality of care in their private practices than in their public practices); Jishnu Das and Jeffrey Hammer, “Money for nothing: The dire straits of medical practice in Delhi, India,” *Journal of Development Economics* 83 (2007): 28-29 (discussing providers’ lack of effort in the public sector, though noting that doctors’ effort is better at Delhi’s elite public hospitals).

¹²⁷ *See* Das and Hammer, *supra* note 126, at 28-29; G. Miller and K.S. Babiarz, “Pay-for-Performance Incentives in Low- and Middle-Income Country Health Programs,” in *Encyclopedia of Health Economics*, vol. 2, at 457.

¹²⁸ Miller and Babiarz, *supra* note 127, at 457-58.

¹²⁹ Grant Miller et al., “Effectiveness of provider incentives for anaemia reduction in rural China: a cluster randomized trial,” *British Medical Journal* 345, e4809 (2012), at 3-4. The study did not detect statistically significant differences between the three types of interventions. *Ibid.*, 4.

¹³⁰ Prakarsh Singh, “Performance pay and information: Reducing child undernutrition in India,” *Journal of Economic Behavior & Organization* 112 (Apr. 2015): 142-43.

¹³¹ *Ibid.*, 144, 147, 150.

¹³² Manoj Mohanan, “The Costs of Asymmetric Information in Performance Contracts: Experimental Evidence on Input and Output Contracts in Maternal Health Care in India,” Aug. 2016, unpublished paper under review, at 12 n.17, 14, 18, 30 fig.1, <http://cepr.org/sites/default/files/Mohanan,%20Manoj%20paper.pdf>. The study found that inputs and outputs contracts were not associated with statistically significant declines in sepsis and neonatal death, *ibid.*, 18, and found an increase in pre-eclampsia for the inputs contract treatment group, but they believe this is because patients at higher risk for pre-eclampsia became more likely to go to doctors with inputs contracts based on patients’ perception that these doctors had improved their services, *ibid.*, 18, 22-23.

¹³³ *Ibid.*, 10-12. For other studies of pay-for-performance programs, see Diana M. Bowser et al., “A preliminary assessment of financial stability, efficiency, health systems and health outcomes using performance-based contracts in Belize,” *Global Public Health* 8, no. 9 (2013): 1063 (finding that Belize’s National Health Insurance system’s pay-for-performance schemes were associated with a wide variety of improved health outcomes); Elise Huillery and Juliette Seban, “Financial Incentives Are Counterproductive in Non-Profit Sectors: Evidence from a Health Experiment,” JPAL, at 3-5, https://www.povertyactionlab.org/sites/default/files/publications/496_paper_DRC_March2015_1.pdf (finding that performance incentives provided to staff at health facilities in the Democratic Republic of the Congo were associated with reduced fees for certain health services, but this in turn was associated with reduced demand and use of those services—i.e., price elasticity of demand was *positive*—and worse newborn and child health outcomes, suggesting that potential patients interpreted the lower prices as signaling poorer quality).

¹³⁴ *See* Miller and Babiarz, *supra* note 127, at 458-59.

¹³⁵ *Ibid.*, 460-61.

¹³⁶ *Ibid.*, 465. One last consideration is the unintended consequences of increased monitoring by principals, e.g., the government or the public, of agents, i.e., healthcare providers. If intensified monitoring regarding certain functions results in some loss to agents in terms of compensation or leisure time, agents may change their behavior in other health functions to make up for the loss. *See* Iqbal Dhaliwal and Rema Hanna, “Deal with the Devil: The Successes and Limitations of Bureaucratic

Reform in India,” NBER Working Papers, at 5-6, 24-25 <http://www.nber.org/papers/w20482> (finding that increased monitoring of nurses’ attendance at primary health centers was associated with healthcare staff withholding state entitlements to patients for delivering babies at a PHC).

¹³⁷ Rachna Sharma, Shyama Nagarajan, and Smriti Sharma, “Study on Disclosure by Private Hospitals in Delhi: Evidence of Regulatory Failures,” Nov. 1, 2016, manuscript at 5 (copy on file with authors). According to the authors, “Public hospitals are out of the purview of the applicable laws of disclosure reviewed in this study.”

¹³⁸ *Ibid.*, manuscript at 7, 9.

¹³⁹ *Ibid.*, manuscript at 8.

¹⁴⁰ “Social Accountability and Healthcare Delivery,” COHESIVE-India, <http://www.cohesiveindia.org/social-accountability> (accessed Jan. 12, 2017).

¹⁴¹ *Ibid.*

¹⁴² *Ibid.* For an argument in support of public awareness campaigns, see Das and Hammer, *supra* note 126, at 30 (concluding that “public awareness may well be the best, and most politically feasible option” for patients to receive the clinically correct and right amount of treatment, because of the findings that private doctors “do what they are asked to do even when they know better,” and public doctors “do not do anything at all”).

¹⁴³ “Impact of social accountability interventions on healthcare delivery and health outcomes in Uttar Pradesh, India,” World Bank, Oct. 3, 2016, <http://www.worldbank.org/en/programs/sief-trust-fund/brief/impact-of-social-accountability-interventions-on-healthcare-delivery-and-health-outcomes-in-uttar-pradesh-india>.

¹⁴⁴ *Ibid.*

¹⁴⁵ *Ibid.*

¹⁴⁶ For more on the problem of providers’ lack of effort, see the sources cited in *supra* note 126.

¹⁴⁷ Budhaditya Gupta et al., “Task shifting in surgery: Lessons from an Indian Heart Hospital,” *Healthcare* 3 (2015): 245.

¹⁴⁸ *Ibid.*, 246.

¹⁴⁹ *Ibid.*

¹⁵⁰ *Ibid.*

¹⁵¹ *Ibid.*, 247.

¹⁵² *Ibid.*

¹⁵³ *Ibid.*

¹⁵⁴ *Ibid.*, 248-49.

¹⁵⁵ Hong-Gam Le et al., “A Sustainable Model for Delivering High-Quality, Efficient Cataract Surgery in Southern India,” *Health Affairs* 35, no. 10 (2016): 1787. Aravind also allocated at least two operating tables per operating room so that the surgeon could switch to a new patient without changing her gown or gloves. *Ibid.*, 1788. This practice does not conform to U.S. regulations, which require surgeons to exit the OR and change gowns and gloves between surgeries. *Ibid.*

The study also highlights other societal benefits from the increase in cataract surgeries, since cataracts disproportionately affect the poor, and curing cataracts allows more people to earn income. Ophthalmic counselors, nurses, and OR assistants require only two years of training, making it easier for Indians from poor, rural areas to become medical professionals. *Ibid.*

¹⁵⁶ *Ibid.*, 1788.

¹⁵⁷ Note, however, that the Indian Medical Association “is adamantly against any task shifting or what its representatives call the dilatation of medical training.” Jishnu Das and Aakash Mohpal, “Socioeconomic Status and Quality of Care in Rural India: New Evidence from Provider and Household Surveys,” *Health Affairs* 35, no. 10 (2016): 1772.

¹⁵⁸ For the “nudge” metaphor, see Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (New Haven: Yale UP, 2008), 1-14. For the application of behavioral economics research to healthcare in the United States, see, e.g., Atul Gawande, *The Checklist Manifesto: How to Get Things Right* (New York: Metropolitan Books, 2010); Dhruv Khullar et al., “Behavioral Economics and Physician Compensation—Promises and Challenges,” *New England Journal of Medicine* 372, no. 24 (2015): 2281-83; Atul Gawande, “Big Med,” *New Yorker*, Aug. 13, 2012, <http://www.newyorker.com/magazine/2012/08/13/big-med>; Dhruv Khullar, “How Behavioral Economics Can Produce Better Health Care,” *New York Times*, Apr. 13, 2017, <https://www.nytimes.com/2017/04/13/upshot/answer-to-better-health-care-behavioral-economics.html>.

¹⁵⁹ Khullar et al., “Behavioral Economics and Physician Compensation,” *supra* note 158, at 2282.

¹⁶⁰ *Ibid.* Another application of behavioral economics would be to provide incentive payments up front, at the beginning of a new intervention, rather than after measurements are taken. This is because people tend to be more responsive to the prospect of losing money than the prospect of gaining money. *Ibid.* However, one consequence of up-front payments might be that providers pocket the payments and then do not return to work, so this should be implemented with caution.

¹⁶¹ For more on monitoring issues, see *supra* note 136.

¹⁶² Khullar et al., “Behavioral Economics and Physician Compensation,” *supra* note 158, at 2282.

- ¹⁶³ See, e.g., Parliamentary Committee Report, *supra* note 29, at 56 (“[M]edicine is no longer a priority for the brightest among the youth and the disinterest of our brightest to opt for teaching jobs in public sector health institutions is increasing due to various factors, one of which is certainly inadequate remuneration packages.”); Richa Arora, “Becoming a doctor in India: once a cherished dream, no longer cherished though,” *Quantitative Imaging in Medicine and Surgery* 6, no. 2 (2016): 240.
- ¹⁶⁴ Parliamentary Committee Report, *supra* note 29, at 50.
- ¹⁶⁵ Sumit Kane and Michael Calnan, “Erosion of Trust in the Medical Profession in India: Time for Doctors to Act,” *International Journal of Health Policy and Management* 6, no. 1 (2017): 7. Several doctors we met in India emphasized that ethics and social and preventive medicine should receive greater attention in medical college curricula.
- ¹⁶⁶ See Joseph A. Carrese et al., “The Essential Role of Medical Ethics Education in Achieving Professionalism: The Romanell Report,” *Academic Medicine* 90, no. 6 (2015): 1 (“[T]here is no consensus about the specific goals of medical ethics education for future physicians, the essential knowledge and skills learners should acquire, the best methodologies and processes for instruction, and the optimal strategies for assessment.”); *ibid.*, 5 (“[A] more robust evidence base is required to examine the relationships between medical ethics education, physician performance, and—ideally—patient outcomes.”).
- ¹⁶⁷ Carol Lynn Berseth and Roger Durand, “Evaluating the Effect of a Human Values Seminar Series on Ethical Attitudes Toward Resuscitation Among Pediatric Residents,” *Mayo Clinic Proceedings* 65, no. 3 (1990): 337, 339.
- ¹⁶⁸ *Ibid.*, 341. In addition, the sample size in the study was very small (treatment n = 15; control n = 20), and it is possible that the control group (non-pediatricians rotating through the pediatric program) differed from the treatment group (residents in pediatrics) based on whatever underlying characteristics cause a person to choose to become or not to become a pediatrician. See *ibid.*, 338, 339 tbl.1.
- ¹⁶⁹ Mohammadreza Hojat et al., “Physicians’ Empathy and Clinical Outcomes for Diabetic Patients,” *Academic Medicine* 86, no. 3 (2011): 359-61.
- ¹⁷⁰ *Ibid.*, 362.
- ¹⁷¹ World Health Organization, *supra* note 9.
- ¹⁷² World Bank, “Health expenditure, public (% of GDP),” <http://data.worldbank.org/indicator/SH.XPD.PUBL.ZS> (accessed Apr. 19, 2017).
- ¹⁷³ See Table 2 and Table 3.
- ¹⁷⁴ See Table 7.
- ¹⁷⁵ Ministry of Health and Family Welfare, *supra* note 22.
- ¹⁷⁶ Devadasan et al., *supra* note 6, at 3-5. The one-sixth figure comes from the report that of 520 hospitalized patients enrolled in RSBY, 46 patients reported not knowing about the card. *Ibid.*
- ¹⁷⁷ *Ibid.*, 5-6.
- ¹⁷⁸ Richard Zeckhauser, “Medical insurance: A Case Study of the Tradeoff between Risk Spreading and Appropriate Incentives,” *Journal of Economic Theory* 2, no. 1 (1970): 10.
- ¹⁷⁹ Severely ill patients are more likely to die, *ceteris paribus*, than healthier ones.
- ¹⁸⁰ Robert Dorfman and Peter O. Steiner, “Optimal Advertising and Optimal Quality,” *American Economic Review* 44, no. 5 (Dec. 1954): 826-36.
- ¹⁸¹ David Dranove and Mark A. Satterthwaite, “The Industrial Organization of Health Care Markets,” in *Handbook of Health Economics*, vol. 1 pt. B (Amsterdam: Elsevier, 2000), 1108.



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