

Quality and Accountability in Healthcare Delivery: Evidence from an Audit Study of Healthcare Providers in India

Jishnu Das (World Bank and Centre for Policy Research)

Alaka Holla (World Bank)

Aakash Mohpal (Michigan)

Karthik Muralidharan (UCSD)

Workshop on Dysfunctional Organizations, World Bank

Theoretical Background

- Strong theoretical reasons for why unregulated provision of health care by the private sector may be sub-optimal
 - ▣ Medical care has many elements of a ‘credence’ good
 - You don’t know what you need, but observe utility from what you get
 - Widely believed to produce inefficiencies in the market
 - Darby and Karni (1973): Over-treatment
 - Wolinsky (1993): Can’t observe what you bought; treat “low”, charge “high”
 - Gruber and Owens (1996): Caesarian sections
 - Dullek and Kerschbammer (2006): General Theoretical Framework
 - Balfoutas et al. (2013): Greek taxi drivers (over provision, over charging)
 - ▣ $U(\text{government}) \neq U(\text{Consumer})$: Prendergast (2003)
 - Patient satisfaction among narcotic addicted patients not a good measure of how good the doctor is
 - Private sector aggregator of customer feedback

“It is the general social consensus, clearly, that the laissez-faire solution for medicine is intolerable.”
Kenneth J. Arrow (AER 1963)

Policy Narratives

- In global health, connection between economics and policy is (very) weak: Economists are small contributors to the debate in India
- Strong belief that
 - ▣ The average consumer, particularly if they are poor and illiterate cannot make the right decision
 - ▣ Doctors do the best they can for patients subject to their constraints—typically equipment and case-load
 - Incentives play a small role
- Policy predicated on this belief
 - ▣ Building facilities, providing equipment, reducing case load

Policy Narratives: Example

Tweets from @richardhorton: “Economics, second only to ‘management’, may just be the biggest fraud ever perpetrated on the world.”

The case against economics:

- The promise economics offers is seductive: how to allocate scarce resources in society. It's a false promise.
- Economists write as if the economy=society, and societal problems=economic problems. The conflation is false too.
- Once there was political economy = economics, ethics, politics. Economists have stripped morality from economics, leaving an arid science.
- The high points of economic thinking are theories, not data. Reliable experimentally derived data are anathema for most economists.
- Economists see health as an economic good. It is an opportunity cost, with zero intrinsic value.
- Rationality, for the economist, means subjecting every thought/decision to a cost-benefit analysis. A wholly narrow view of humanity.
- The big idea in economics is the market. The assumption is that human beings make cost-benefit decisions based only on self-interest.
- The essence of economics is price. For those in health who argue for access free at point of delivery, we kill the soul of the economist.
- Economists deny the existence of citizens. They see only consumers.¹⁰
- Finally, it's acceptable to worsen the lives of some provided the gains of others compensate. Economists institutionalise inequality.

Healthcare in Low-Income Settings

- Default view: Public clinics that provide free/highly-subsidized care for those who seek it; Similar articulation in India (Bhore Committee, 1954 onwards)
- Widely followed WHO norms (including in India) on facilities and staffing (District hospitals, CHC's, PHC's, Sub-centers)
- Policy discussions: Large emphasis on strengthening this system
- India: National Rural Health Mission (NRHM) significantly increased public health expenditures during last decade
 - ▣ Better infrastructure, more providers in public clinics

This paper

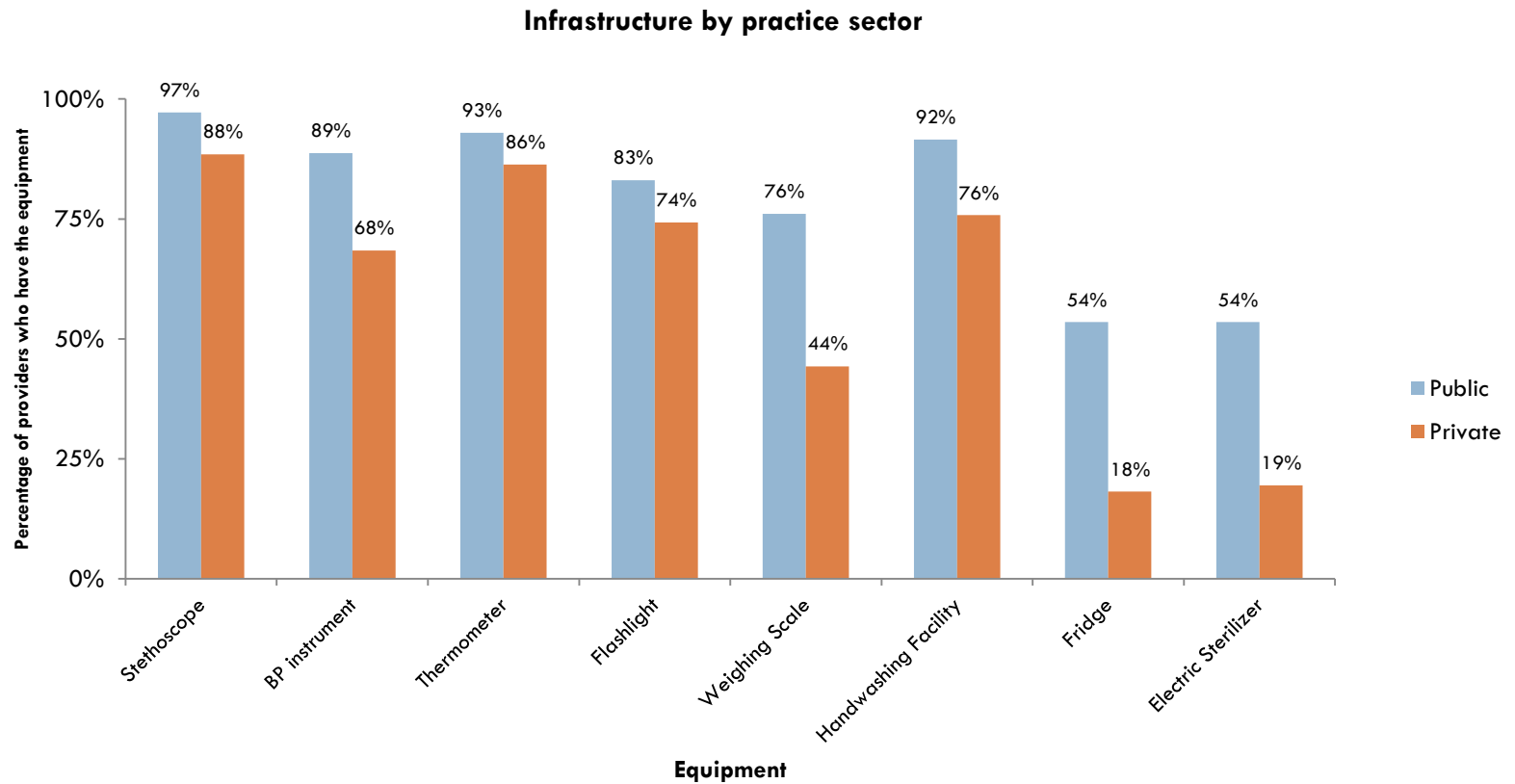
- Direct evidence on quality of healthcare patients receive in the public and private sector in any low-income setting
- *Audit study* to assess quality in public and private sector (in Indian state of Madhya Pradesh)
 - ▣ 22 people recruited from the local community and extensively trained visits multiple providers presenting the same set of symptoms
 - ▣ Providers do not know that this is not a real patient
 - ▣ Largest such study to date (1 105 interactions)
 - ▣ Audit vs. observation based studies of quality (we do both)
- Compare representative samples of public and private providers on:
 - ▣ Adherence to medically required checklists
 - ▣ Correct treatment; Unnecessary treatment
- Isolate incentive effects by comparing the *same doctor* on the *same case* across his/her public and private practices
- Evidence on the correlates of prices charged in the private sector with independent measures of quality of care

Context (1)

- Context we work in (like most of India) is characterized by
 - ▣ Virtually no *de facto* regulation in private sector
 - ▣ No formal insurance beyond tax funded public sector
 - ▣ No subsidies for private sector
 - ▣ Market, rather than administratively determined prices in private sector
 - ▣ Salaried providers in public sector, with salary the only source of revenue in their public sector jobs
- Contrast with OECD countries
 - ▣ Price-quality regressions first glimpse into what is rewarded in health markets of the “Wild East”

Context (3)

- The public sector has better access to infrastructure

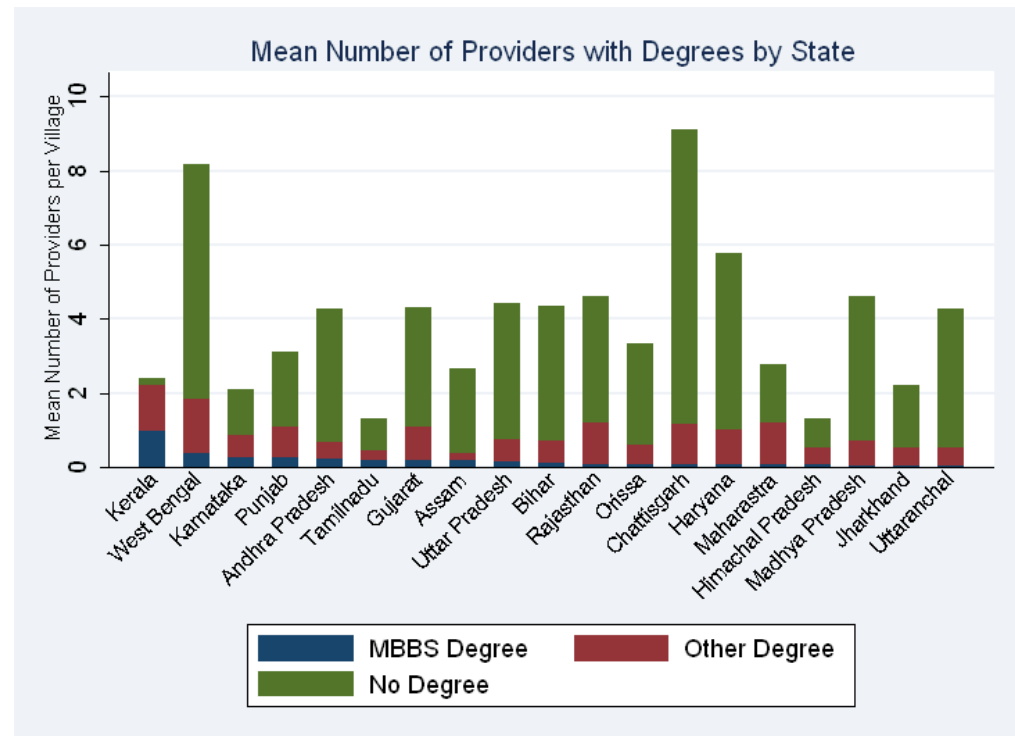


Context (5): Usage data (2009-10)

- 80% of first-contacts (primary care) in India are with the fee-charging private sector
- 77 percent of private providers in rural areas do not have a medical degree
- Public providers are more qualified, and offer free services, but have a ~20% market share

77% of providers have no degree, 18% have some other degree (BAMS, BIMS, BUMS, BHMS), and only 4% have an MBBS degree (roughly equivalent to MD in the U.S.).

Average village in India has 3.36 providers with no degree, 0.80 providers with some degree, and 0.18 providers with an MBBS degree



What is Going On?

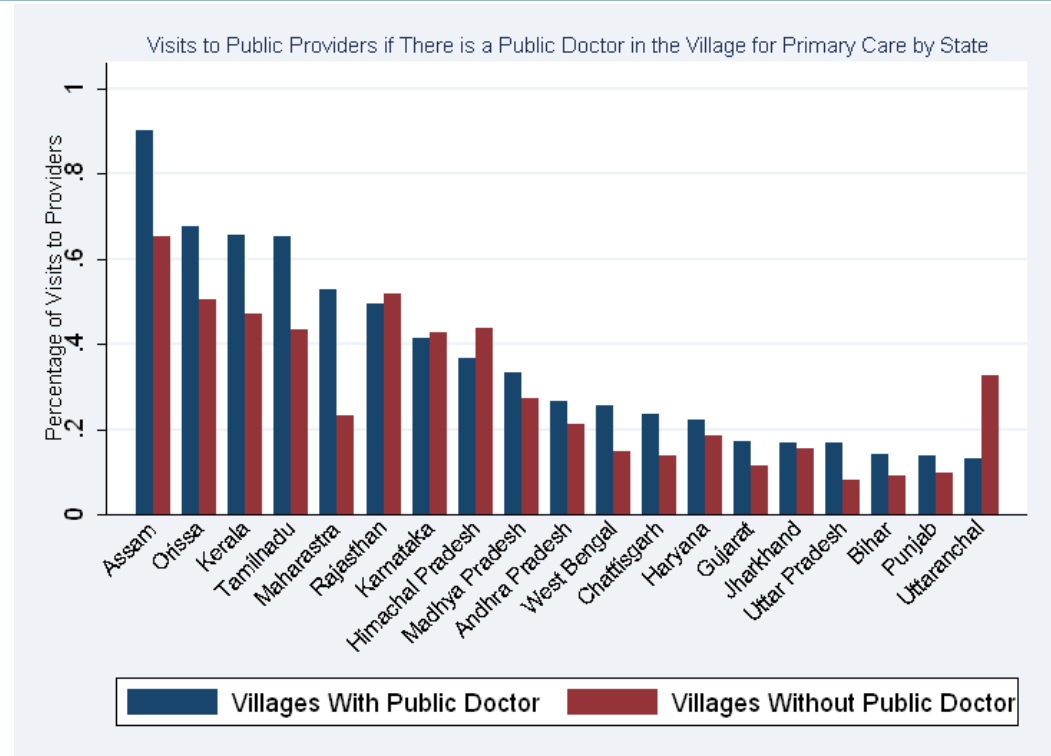
- Hypothesis 1: High private share reflects non-availability of public options (and lack of adequate spending in the publicly-run health sector)
- Hypothesis 2: People do not know what is good for them. Two variants (Dominant Policy View)
 - 'Fooled' by private providers, who are mostly 'quacks' with worthless treatments
 - Offer unnecessary medication that a well-regulated public sector will NOT provide in the patients' best interest
 - Example: Demand for injections/steroids leads to private sector delivering lower (medical) quality for higher cost
- Hypothesis 3 : Usage shares reflect poor incentives and governance in the public sector (Chaudhury and Hammer 2004; Deaton et al. 2004; Chaudhury et. al. 2006; Das and Hammer 2007)

Context (5): Usage Data

Public share increases from 20% to 35% in villages where there is a public healthcare provider

But households still visit private providers in 65% of primary care cases.

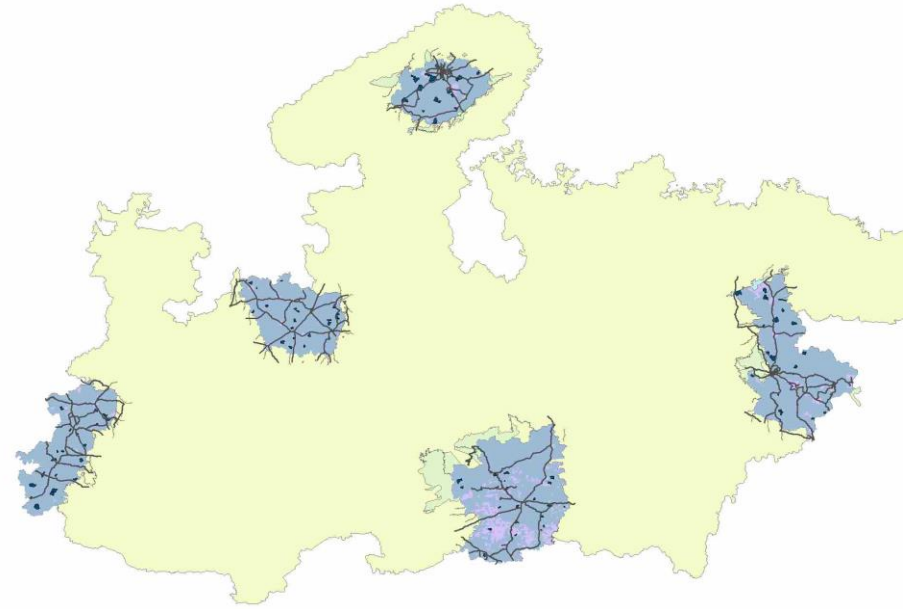
So lack of 'access' to a public facility cannot be the main reason for the high market share of fee-charging private providers (who are typically LESS qualified)



Remainder of talk

- Where we worked (and what does it look like)
- What we did
- What we found
- Ruling out (some) interpretations of the data
 - ▣ Worry in particular about off-equilibrium behavior

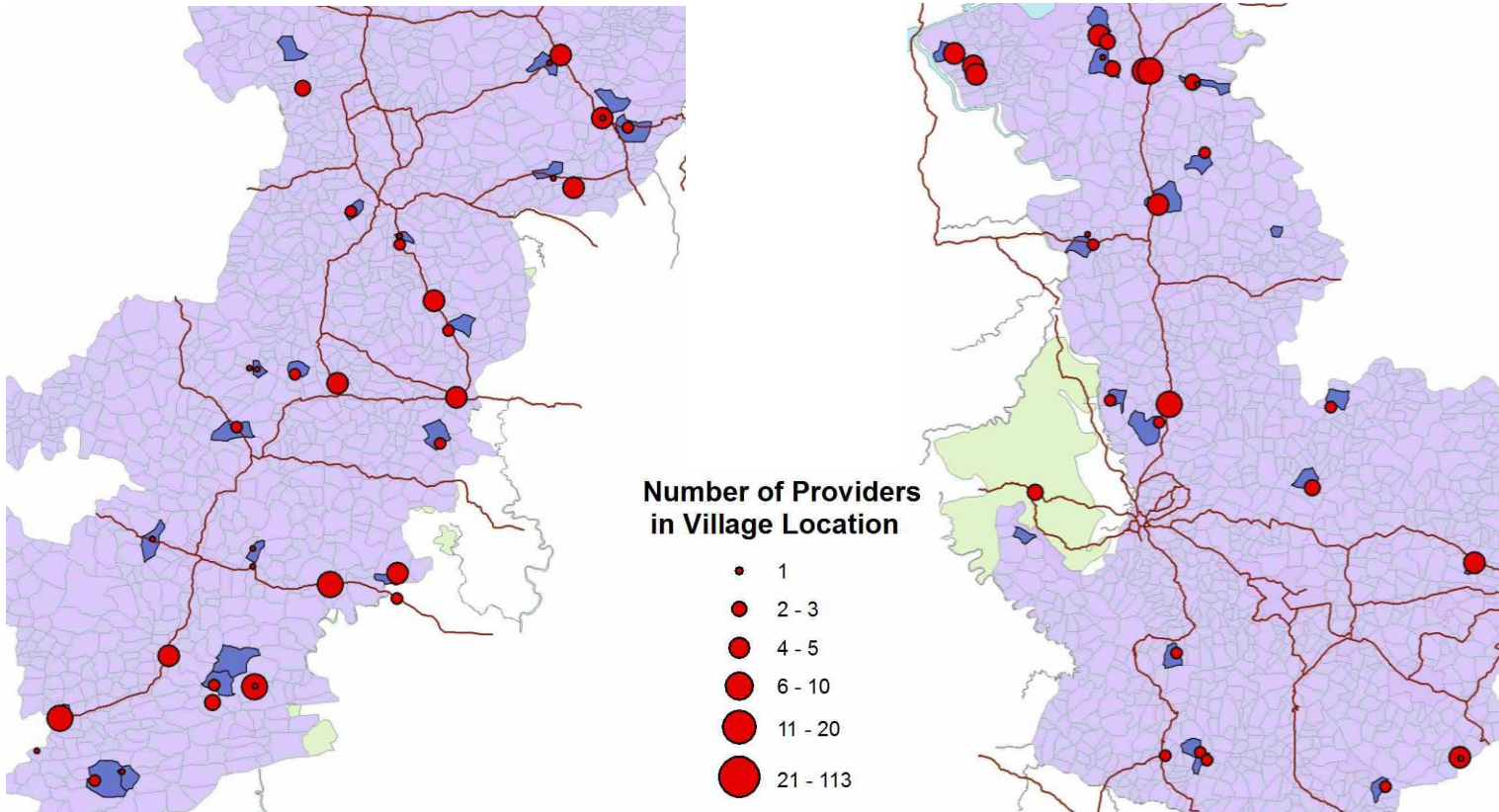
This paper: Where?



- All districts divided into 5 Socio-Cultural Regions (SCRs); one district from each SCR
- 20 randomly chosen villages from each district
- Representative sample of *all* types of providers in 3 districts of Madhya Pradesh (and public providers in 2 more); majority has no medical training

Rural India: MP

- 100 villages in MP, randomly selected in 5 districts — we located >1000 health care providers
- Snapshots of the two remotest districts



Basic sample description

- There are 14 health care providers available to each village in the sample
 - ▣ Of these 8 are private unqualified or with minimal qualifications
- 58% of households have visited a provider in the last month
 - ▣ 96% to private sector, 95% to private sector if public is available, 82% to unqualified private sector providers
- We present results from two different samples
 - ▣ “Representative sample”
 - ▣ “Dual sample”: Same provider in public and private clinics

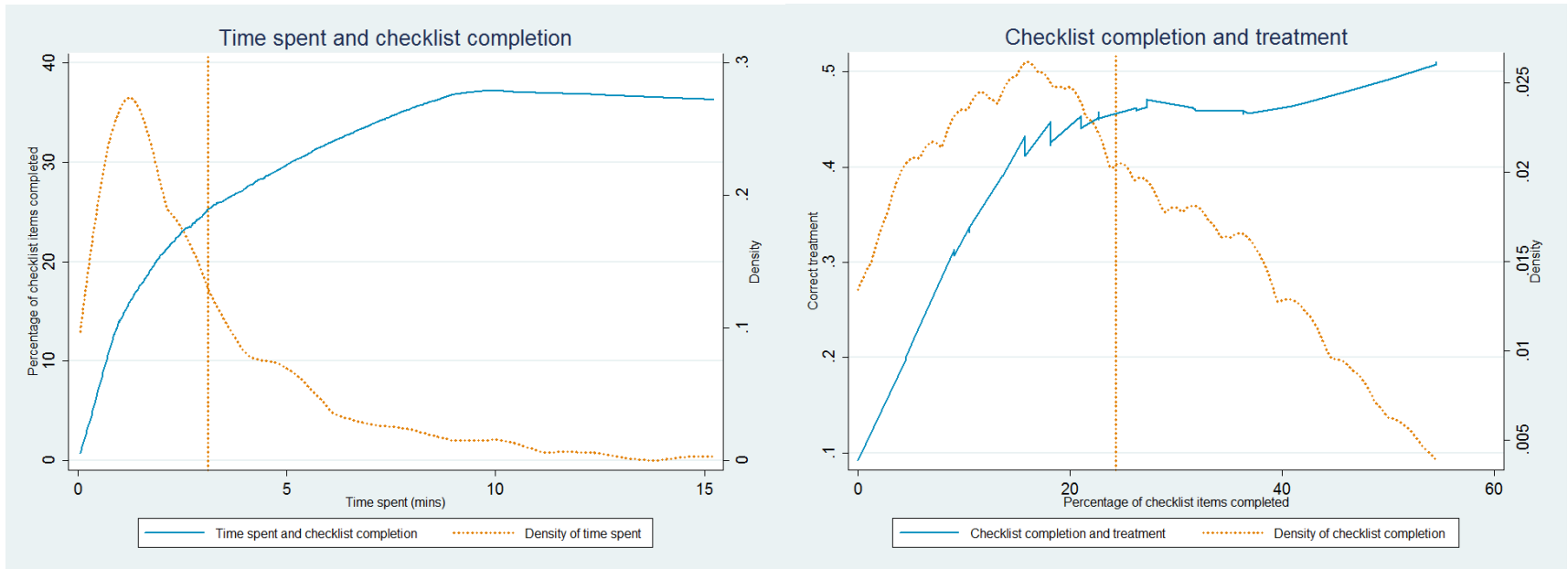
Standardized patients

- 22 SPs recruited from the local community, highly trained
- Three standardized cases
 - Unstable Angina: “Doctor, this morning I had a pain in my chest” – *Ramlal*, Male, 45 years old
 - Proxy Dysentery: “Doctor, my 2 year old child has been suffering from diarrhea for 2 days” – *Shankarlal*, Male, 25 years old
 - Asthma: “Doctor, last night I had a lot of difficulty in breathing” – *Rajesh* (Male) or *Radha* (Female), 25 years old

Standardized patients

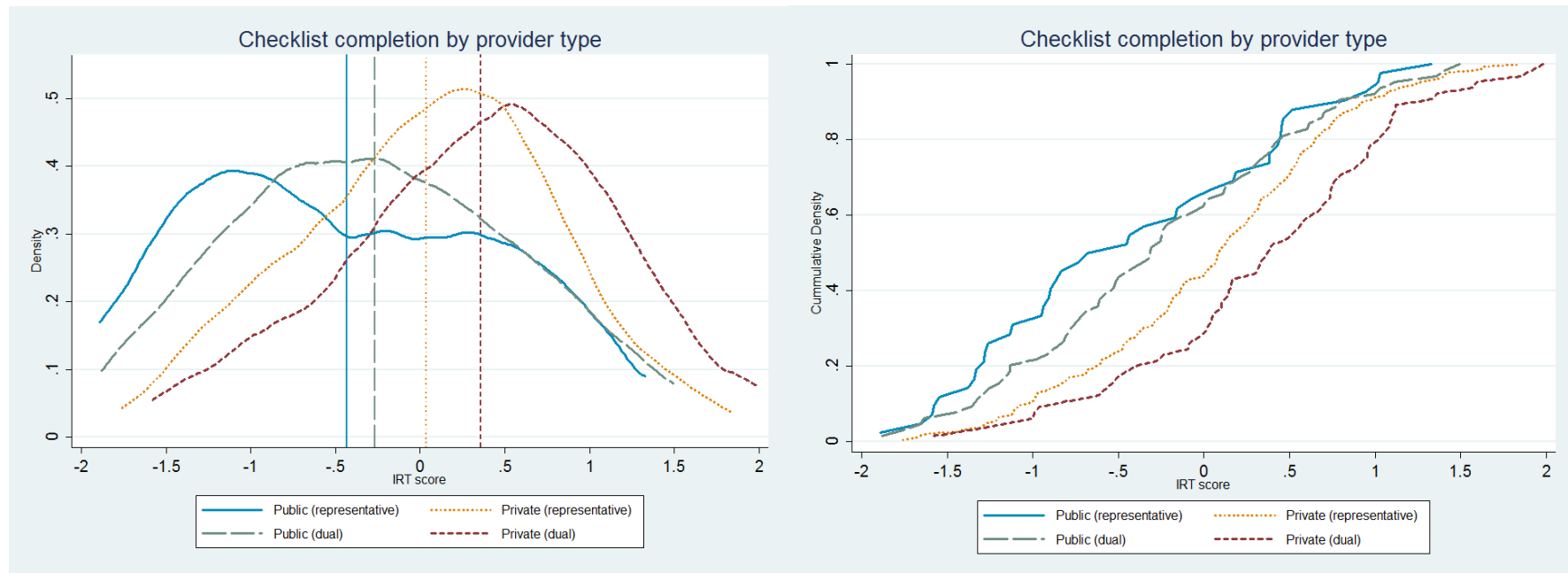
- What is measured
 - ▣ Quality of care through adherence to required and essential checklist of questions and examinations that the provider should complete for each patient
 - Highly correlated to diagnosis/treatment
 - Why this may be the most preferable outcome measure
 - ▣ Diagnosis: whether given, whether correct
 - ▣ Treatment: correctness, incorrectness, use of antibiotics and steroids for cases where they are not required
 - ▣ Direct Effort: Time spent, total questions asked, total examinations completed

Relation between quality measures



1. Worry: Doctors under-treat because they figured out that these were not “real patients”. But then, we should see that “correct treatment” is less likely for doctors who spend more time and complete more of the checklist, since they would be more likely to figure out that the patient is not “real”. We find exactly the opposite
2. Little evidence of signaling through medically irrelevant costly effort: more effort leads to better treatment through 90 percent of the distribution

Checklist adherence (Full Sample)



The difference we find in the dual sample of roughly $0.8sd$ is one of the largest in the literature; 8 times as high as the effect of pay for performance

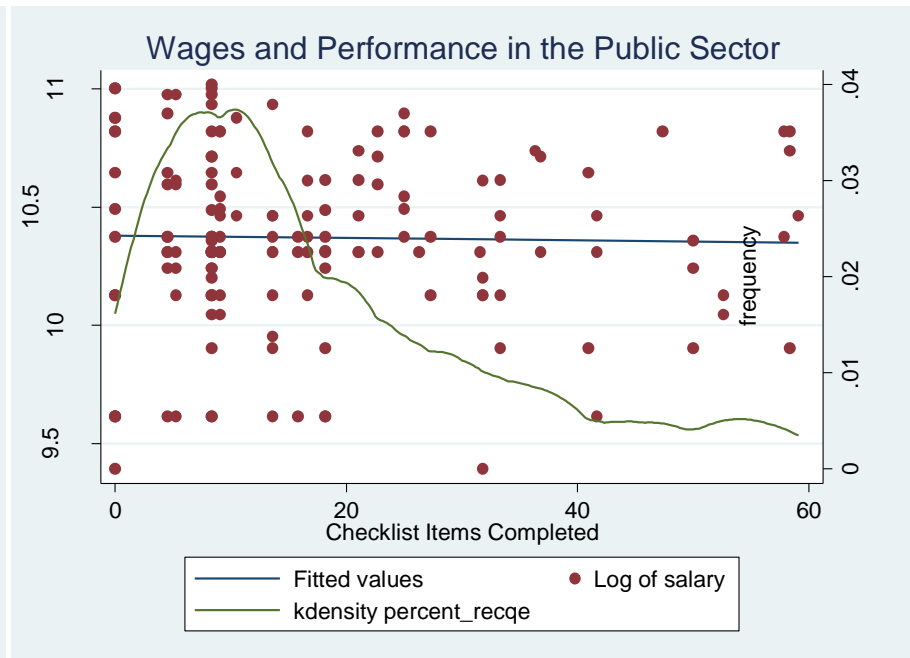
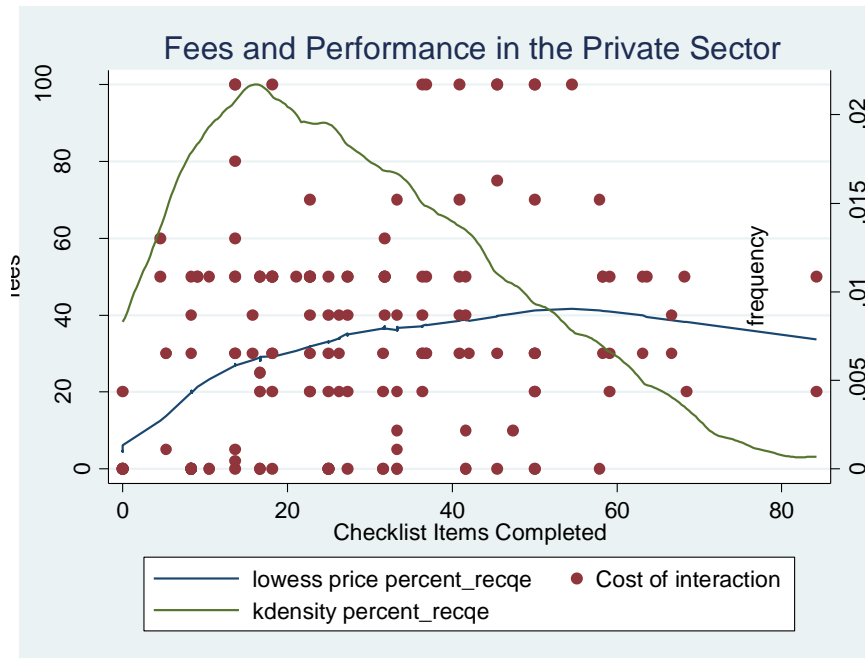
The result is extremely robust to a full set of geographical, case-load and infrastructure controls

The result reflects a vast increase in medically necessary history taking and examinations

Treatments

- Key issue: Required treatment and unnecessary treatment are *not* mutually exclusive
 - <5% of patients get only the correct treatment and nothing else
 - 40-60% get correct treatment + something else that they did not need
- No difference between public and private in correct treatment for representative sample
- 15.6 pp increase in correct treatment for dual sample (public sector mean of 37%)
- No difference in the high use of unnecessary treatment (73% - 83%) across representative and dual samples
- Trained MBBS doctors are 26.7pp more likely to give unnecessary antibiotics on base of 27.8%

Returns to performance in public and private sector



Prices and treatment

Private Sector

- Prices positively correlated with time spent, fraction of checklist items completed, correct treatment
- Also correlated with unnecessary treatments
- Market rewards providers for quality, but unnecessary treatments also higher priced

Public sector

- No link between wages and performance
- Low case-loads and high wages imply that cost per patient is 4-5 times higher in public relative to private sector

What have we learned

Customer accountability

- ▣ Leads to greater effort in the private relative to public sector
- ▣ Prices provide incentives for effort and to the extent that effort and correct treatment are correlated, correct treatment as well
- ▣ Prices do not penalize unnecessary medications, which may be demanded by the patient
- ▣ Public sector unable to correct for problems of the private sector
- ▣ “Rational” actor model for may be a better approximation to behavior than policy makers in global health believe
- ▣ Key problems with markets due to (a) use of unnecessary medicines (no incentive for cost cutting) and antibiotics (resistance in the future) and (b) greater use of antibiotics among fully trained doctors (norms/legitimacy?)
- ▣ Nuance where markets appear to do OK (provide incentives so that people get what they need) and where they don't (provide incentives so that people don't get what they don't need)
 - ▣ In this example, the two are not mutually exclusive; when they are mutually exclusive, different results may obtain



Additional slides

MP Study: The sample

1

- In each sampled village, surveyors complete Participatory Resource Assessments (PRAs) in at least 3 different geographical locations and ask for a list of all providers they visit for primary illnesses

2

- A unique list is compiled and a Master Code File (MCF) is filled out. A short survey is administered with each provider listed in the MCF

3

- Then a household census is completed in which members are asked about all illness in the last one month and names and locations of providers they went to

4

- If more than 5% of households report visiting a provider in a location (village/town) outside the village, that village/town is now considered a part of the health-market for the village. These are referred as “clusters”, generally on the main highway near the village

5

- Once all clusters are identified, surveyors visit each cluster and conduct PRAs in the same manner. All providers practicing in the clusters are added to the MCF and a survey is implemented

Basic Sample Description

	Madhya Pradesh (5 districts, 100 villages)			SP Sample Villages (3 districts, 46 markets)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Inside village	Outside village	Total	Inside village	Outside village
Panel A: Composition of markets based on census of providers						
Total	11.68	3.97	7.71	16.02	4.65	11.37
Public MBBS	0.45	0.05	0.40	0.50	0.02	0.48
Public alternative qualification	0.22	0.07	0.15	0.24	0.07	0.17
Public paramedical	1.58	1.13	0.45	1.98	1.30	0.67
Public unqualified	1.71	0.68	1.03	2.07	0.67	1.39
Private MBBS	0.40	0.00	0.40	0.59	0.00	0.59
Private alternative qualification	1.92	0.23	1.69	2.67	0.33	2.35
Private unqualified	5.40	1.81	3.59	7.98	2.26	5.72

	Madhya Pradesh (5 districts, 100 villages)			SP Sample Villages (3 districts, 46 markets)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Inside village	Outside village	Total	Inside village	Outside village
Panel B: Composition of demand from census of households in sampled villages						
Fraction of households that visited a provider in last 30 days	0.46			0.58		
Fraction provider visits inside/outside village		0.66	0.34		0.69	0.31
Distance traveled to visited provider (km)	1.61	0.40	3.83	1.37	0.38	3.51
Fraction of visits to MBBS doctor	0.04	0.01	0.09	0.02	0.00	0.06
Fraction of visits to private sector	0.89	0.92	0.85	0.96	0.97	0.93
Fraction of visits to private sector if public available	0.88	0.89	0.83	0.95	0.96	0.91
Fraction of visits to private sector if public MBBS available	0.83	0.84	0.79	0.93	0.98	0.90
Fraction of visits to unqualified providers	0.77	0.87	0.55	0.82	0.89	0.64
Panel C: Sample Characteristics from household census of provider choice						
Number of villages	100			46		
Average village population	1,149			1,199		
Average number of households per village	233			239		
Number of reported provider visits	19,331			12,122		
Average number of visits per household per month	0.83			1.10		

Standardized patients sample

- Sample in Audit 1 linked to *village* sample
 - ▣ Ruled out 2 remote districts entirely for private market
 - ▣ Ruled out very remote locations in other 3 districts (mainly because SP's appearance had to be credible)
 - ▣ Public providers are those who appear in health market of village
 - ▣ Include all MBBS private providers and all public
 - ▣ Add in private till 6 providers per village
- Audit 2 focuses on public clinics
 - All public facilities in all 5 districts
 - All private clinics of public doctors in all districts

Standardized patients

- Three standardized cases
 - ▣ Unstable Angina: “Doctor, this morning I had a pain in my chest” – *Ramlal*, Male, 45 years old
 - ▣ Proxy Dysentery: “Doctor, my 2 year old child has been suffering from diarrhea for 2 days” – *Shankarlal*, Male, 25 years old
 - ▣ Asthma: “Doctor, last night I had a lot of difficulty in breathing” – *Rajesh* (Male) or *Radha* (Female), 25 years old
- Cases are
 - ▣ Relevant to Indian context
 - Increasing incidence of cardiovascular and respiratory illness
 - Frequent diarrheal diseases (200,000 children die per year, Black et al. 2008)
 - ▣ No invasive treatment required: Minimize any potential harm to SPs
 - ▣ Difficult to self-triage: Each of these could be relative minor or may require medical attention (for instance, REACT study in U.S.)

Basic Sample Description

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Representative Sample			Representative sample of Public MBBS providers				Dual Practice sample		
	(3 districts)			(5 districts)				(5 districts)		
	Public	Private	p-value of (1)-(2)	All public	Public without dual practice	Public with dual practice	p-value of (5)-(6)	Public	Private	p-value of (8)-(9)
Panel A: Provider characteristics										
Age of Provider	46.92	43.51	0.10	44.52	44.74	44.43	0.89			
Is male	0.86	0.96	0.02	0.87	0.96	0.84	0.10	0.84	0.85	0.87
More than 12 years of basic education	0.58	0.52	0.48	0.64	0.52	0.69	0.09			
Has MBBS degree	0.25	0.07	0.00	1.00	1.00	1.00				
Has alternative medical degree	0.11	0.21	0.18	0.00	0.00	0.00				
No medical training	0.61	0.68	0.42	0.00	0.00	0.00				
Number of practices	1.14	1.07	0.21	1.83	1.16	2.13	0.00			
Tenure in years at current location	15.22	13.70	0.42	6.15	5.11	6.56	0.28			
Panel B: Clinic characteristics										
Dispense medicine	1.00	0.81	0.00							
Consultation fee (Rs.)	3.65	51.24	0.00	3.75	3.15	3.92	0.00	3.92	57.93	0.00
Number of patients per day (self reported in census)	28.06	15.74	0.00	31.85	31.30	35.00	0.74	35.00	17.59	0.07
Number of patients per day (from physician observations)	5.72	5.75	0.98	16.04	13.72	16.86	0.31	16.86	5.63	0.00
Electricity	0.94	0.95	0.93	1.00	1.00	1.00		1.00	1.00	
Stethoscope	0.97	0.94	0.47	1.00	1.00	1.00		1.00	1.00	
Blood pressure cuff	0.83	0.75	0.34	1.00	1.00	1.00		1.00	1.00	
Thermometer	0.94	0.92	0.64	0.97	0.94	0.98	0.20	0.98	0.97	0.63
Weighing Scale	0.86	0.52	0.00	0.94	0.94	0.94	0.96	0.94	0.82	0.04
Handwash facility	0.89	0.81	0.30	0.84	0.84	0.85	0.93	0.85	0.81	0.56
Number of providers	36	188		103	31	72		72	84	

	Representative sample			Dual practice sample		
	Time Spent (mins)	Percentage of checklist items	IRT score	Time Spent (mins)	Percentage of checklist items	IRT score
Panel A: SP and case fixed effects						
Is a private provider	1.222*** (0.250)	6.758*** (2.488)	0.512** (0.211)	1.471*** (0.267)	8.888*** (1.762)	0.729*** (0.178)
R-squared	0.305	0.160		0.237	0.219	
Number of observations	662	662	233	331	331	138
Mean of public	2.388	15.287		1.562	17.677	

What about conditioning on geographical location or patient load? Next slide

Panel C: SP, case and market/district fixed effects

Is a private provider	1.246*** (0.319)	5.999** (2.338)	0.500* (0.301)	1.452*** (0.268)	9.414*** (1.827)	0.770*** (0.190)
Has MBBS	-0.156 (0.568)	3.285 (2.940)	0.043 (0.257)			
Has some qualification	-0.131 (0.299)	2.518 (1.716)	0.157 (0.151)			
Age of provider	-0.004 (0.012)	-0.046 (0.071)	0.000 (0.008)	0.005 (0.015)	-0.064 (0.102)	0.004 (0.101)
Gender of provider (1=Male)	0.653 (0.544)	-0.949 (3.529)	0.212 (0.327)	-0.077 (0.386)	-1.383 (2.639)	-0.288 (0.309)
Patient load during visit	-0.096* (0.052)	-0.144 (0.554)	0.082** (0.040)	-0.106* (0.062)	-0.283 (0.424)	0.013 (0.517)
R-squared	0.399	0.259		0.275	0.233	
Number of observations	638	638	221	302	302	126
Mean of public	2.543	16.995		1.512	16.584	

What is driving these results? Basic questions and investigations, or case-specific items?

	Representative sample			Dual practice sample		
	Public	Private	Difference (2)-(1)	Public	Private	Difference (4)-(3)
Panel A: Unstable Angina						
<i>History questions</i>						
where is the pain	0.486	0.694	0.208***	0.528	0.645	0.117
when started	0.270	0.389	0.119*	0.167	0.129	-0.038
severity of pain	0.162	0.278	0.116*	0.167	0.419	0.253**
radiation	0.108	0.150	0.042	0.222	0.387	0.165*
previous similar	0.270	0.417	0.146**	0.278	0.387	0.109
since when	0.216	0.272	0.056	0.111	0.323	0.211**
shortness of breath	0.081	0.150	0.069	0.056	0.032	-0.023
sweating	0.270	0.294	0.024	0.194	0.452	0.257**
beedi-cigarette	0.054	0.072	0.018	0.083	0.194	0.110*
family history	0.000	0.017	0.017	0.000	0.097	0.097**
<i>Examinations</i>						
pulse	0.243	0.422	0.179**	0.417	0.677	0.261**
bp	0.135	0.350	0.215***	0.222	0.548	0.326***
auscultation (either front or back)	0.189	0.500	0.311***	0.444	0.613	0.168*
temperature attempt	0.108	0.139	0.031	0.028	0.258	0.230***
ecg in/outside clinic	0.243	0.228	-0.015	0.278	0.355	0.077
<i>Number of observations</i>	37	180		36	31	

Panel B: Asthma

History questions

current breathing probes	0.385	0.647	0.262***	0.422	0.671	0.250***
cough	0.590	0.696	0.106	0.453	0.686	0.233***
expectoration probes	0.077	0.163	0.086*	0.016	0.071	0.056*
previous breathing problems	0.333	0.462	0.129*	0.266	0.543	0.277***
since when problems	0.385	0.495	0.110	0.234	0.414	0.180**
shortness constant or episodic	0.051	0.114	0.063	0.047	0.129	0.082**
what triggers	0.077	0.125	0.048	0.094	0.229	0.135**
fever	0.231	0.326	0.095	0.219	0.386	0.167**
chest pain	0.154	0.375	0.221***	0.172	0.286	0.114*
weight loss	0.000	0.000	0.000	0.016	0.014	-0.001
beedi-cigarette	0.026	0.016	-0.009	0.016	0.071	0.056*
family history	0.000	0.027	0.027	0.031	0.043	0.012

Examinations

pulse	0.256	0.554	0.298***	0.313	0.457	0.145**
bp	0.205	0.293	0.088	0.109	0.357	0.248***
auscultation (either front or back)	0.333	0.554	0.221***	0.484	0.800	0.316***
temp attempt	0.103	0.179	0.077	0.063	0.100	0.038

Number of observations

39	184	64	70
----	-----	----	----

Panel C: Dysentery

History questions

age of child	0.795	0.945	0.150***	0.921	0.939	0.019
qualities of stool	0.077	0.186	0.109**	0.159	0.379	0.220***
frequency	0.179	0.311	0.132**	0.270	0.470	0.200***
quantity of stool	0.000	0.060	0.060*	0.016	0.045	0.030
urination	0.000	0.022	0.022	0.016	0.000	-0.016
active/playful	0.026	0.033	0.007	0.000	0.000	0.000
fever	0.077	0.191	0.114**	0.222	0.364	0.141**
abdominal pain	0.077	0.120	0.043	0.222	0.288	0.066
vomiting	0.077	0.246	0.169***	0.254	0.333	0.079
source of water	0.000	0.027	0.027	0.000	0.030	0.030*
what has eaten	0.000	0.060	0.060*	0.032	0.152	0.120***
taking fluids	0.000	0.027	0.027	0.048	0.076	0.028

Number of observations

39	184		63	67
----	-----	--	----	----

	Representative sample						Dual practice sample					
	Correct treatment	Helpful treatment	Unnecess- ary treatment	Correct treatment Only	Antibioti- c	Poly- pharmac- y	Correct treatment	Helpful treatment	Unnecess- ary treatment	Correct treatment Only	Antibioti- c	Poly- pharmac- y
Panel A: SP and case fixed effects												
Is a private provider	0.068	0.014	0.056	-0.020	0.016	0.130*	0.147**	0.029	-0.031	-0.009	-0.119*	0.075
	(0.056)	(0.055)	(0.074)	(0.021)	(0.062)	(0.068)	(0.064)	(0.063)	(0.054)	(0.024)	(0.068)	(0.048)
R-squared	0.302	0.051	0.070	0.029	0.079	0.054	0.271	0.041	0.075	0.018	0.114	0.138
Number of observations	334	365	392	440	440	440	199	200	201	201	201	201
Mean of public	0.267	0.662	0.696	0.026	0.263	0.697	0.380	0.730	0.820	0.030	0.480	0.800
Panel B: SP, case and market/district fixed effects												
Is a private provider	0.026	-0.001	0.104	-0.022	0.086	0.165**	0.148**	0.028	-0.031	-0.010	-0.121*	0.076
	(0.071)	(0.075)	(0.076)	(0.024)	(0.069)	(0.069)	(0.064)	(0.062)	(0.054)	(0.025)	(0.068)	(0.048)
R-squared	0.450	0.261	0.265	0.061	0.239	0.219	0.294	0.090	0.118	0.067	0.130	0.177
Number of observations	334	365	392	440	440	440	199	200	201	201	201	201
Mean of public	0.283	0.667	0.689	0.030	0.273	0.697	0.380	0.730	0.820	0.030	0.480	0.800

Diagnosis

- Problem: 67% interactions there is no diagnosis
- Problem noted in pilot
- Final survey: randomized SSPs into 2 groups
 - ▣ 1 group turns around as they are leaving and ask the provider “Doctor, what is wrong with me?”
 - ▣ Increases rate of diagnosis provision by 20-25 p.p. in all groups (but still below 50%)
- Hence, we show diagnosis results for completeness, but caveat the large amount of censoring
- Current results conditional on provision of diagnosis
 - ▣ Unconditional results similar

	(1)	(2)	(3)	(4)	(5)	(6)
	Representative sample			Dual practice sample		
	Gave diagnosis	Correct diagnosis (conditional)	Correct diagnosis (unconditional)	Gave diagnosis	Correct diagnosis (conditional)	Correct diagnosis (unconditional)
Panel A: SP and case fixed effects						
Is a private provider	0.168*** (0.052)	-0.014 (0.057)	0.016 (0.022)	0.095 (0.068)	-0.050 (0.105)	0.018 (0.053)
R-squared	0.130	0.121	0.075	0.130	0.114	0.054
Number of observations	440	178	440	201	88	201
Mean of public	0.263	0.150	0.039	0.380	0.395	0.150
Panel B: SP, case and market/district fixed effects						
Is a private provider	0.188*** (0.072)	-0.019 (0.093)	0.023 (0.031)	0.089 (0.069)	-0.067 (0.109)	0.018 (0.054)
R-squared	0.218	0.301	0.145	0.149	0.176	0.066
Number of observations	440	178	440	201	88	201
Mean of public	0.242	0.125	0.030	0.380	0.395	0.150

	(1)	(2)	(3)
	Binary regressions (Log of monthly salary)	Multiple regressions (Log of monthly salary)	
Percentage of checklist items	0.002 (0.003)	0.004 (0.003)	-0.000 (0.002)
Time spent with SP (minutes)	-0.049* (0.025)	-0.083*** (0.029)	-0.022 (0.016)
Correct Treatment	0.011 (0.059)	-0.103 (0.063)	-0.123** (0.058)
Helpful Treatment	0.116 (0.099)	0.030 (0.111)	0.036 (0.066)
Wrong Treatment	0.176** (0.072)	0.221*** (0.080)	0.083 (0.068)
Has MBBS	1.056*** (0.168)		1.334*** (0.212)
Has some qualification	-0.094 (0.367)		0.875*** (0.331)
Age of provider	0.011** (0.006)		0.018*** (0.006)
Gender of provider (1=Male)	0.114 (0.188)		0.099 (0.103)
Born in same district	-0.384*** (0.146)		0.037 (0.081)
Is a dual provider	0.578*** (0.135)		0.155* (0.085)
R2		0.097	0.611
Number of observations		318	288

Comparison of Costs of Care

Table 10: Cost in the public sector

Staff per facility	N	Average monthly wage (Rs.)
Medical Officer in Charge/Medical Officer	1.92	Rs.32,245
GNM/ANM/VHN/LHV	3.24	Rs.16,305
MPW/MNA/Assistant/Compounder	1.43	Rs.16,657
Pharmacist/Chemist/Lab		
Assistant/Technician	0.8	Rs.16,571
Paramedic/other	6.08	Rs.13,387
All	13.47	Rs.17,315
Number of facilities	115	
Visits to the public facilities per month		
Year 2008	111,039	
Year 2009	113,230	
Year 2010	111,473	
Average per patient cost		
Year 2008	Rs.241.87	
Year 2009	Rs.237.66	
Year 2010	Rs.241.61	

Some further interpretation results

- Audit patients present the same symptoms and same script to multiple doctors in different conditions. This may be off-equilibrium behavior. 3 sets of issues
 - “Serious” cases *never* go to the public sector. Therefore, if they do, it is an indication to the doctor (who is on the equilibrium path) that the patient is not serious
 - If the same case goes, the patient presents in a different way in the public to the private sector, accounting for lower incentives to put effort
- The public-private difference for the same doctors may reflect incentive effects *due* to the presence of the private sector clinic
- Difficult problems: in past led to differing results between audit studies and observational data
 - Famously, Ayres and Spiegelman (1995) versus Goldberg (1996)
 - More recently, discrimination against African American (names): Bertrand-Mullianathan versus Fryer and Levitt
- What we do in addition to the audit
 - First, observe equilibrium path behavior with real patients and check to see if the results are the same
 - Second, try to assess patient sorting
 - Third, try to rule out deliberately lower effort due to dual practice

Some further interpretation results

- Is it the case that they treat “real” patients this way?
 - ▣ Yes, we sat in their clinics for 1 day each and find identical results on things that we can measure in both (time spent, questions asked, examinations done) (link to table)
- Is it the case that the “regular” patient body is very different for public/private
 - ▣ We did exit surveys with patients from all practices. Patients were not very different in illness and severity, but in private had more access to transport and had more mobile phones (72 vs. 64%)
 - ▣ When we include (means) of the regular patient populations in the audit regressions, nothing changes
 - ▣ It seems like people use the public clinics precisely like they use unqualified providers (link to table)

Audits Vs. Real Patients

- Real patients do not control for case mix
- But audits may result in interactions that are “off the equilibrium path” for some providers
- So we measure quality both ways, and show that the main results continue to hold with real patients
 - ▣ Private providers spend more time, ask more questions, and perform more exams
 - ▣ They are also less likely to prescribe medicines

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Audit 1				Dual sample			
	Time spent (mins)	Total questions	Physical examination	Dispensed medicines	Time spent (mins)	Total questions	Physical examination	Dispensed medicines
Panel A: no patient controls or fixed effects								
Is a private provider	1.456*** (0.323)	0.799*** (0.180)	0.371*** (0.108)	-0.241*** (0.082)	1.894*** (0.569)	1.154*** (0.318)	0.143** (0.063)	-0.560*** (0.097)
R-squared	0.054	0.030	0.103	0.029	0.115	0.082	0.017	0.398
Number of observations	1,137	1,137	1,133	1,138	1,085	1,083	1,082	1,090
Mean of public	2.378	2.994	0.473	0.765	1.499	3.284	0.678	0.963
Number of public providers	29	29	29	29	51	51	51	51
Number of private providers	169	169	169	169	40	40	41	41

Some further interpretation results

- Is it the case that patients “expect” something very different from public and private?
 - If the patients *know* what they have, then it is likely that there will be complete separation by quality and price
 - Cases deliberately chosen so that same symptom can reflect a minor or major condition
 - Unclear whether this biases *against* private
 - Reasonable “expectation” of service in public
 - Sorting implies patient knowledge; relevant comparison could be with *better* private sector provider
 - Our results lower bound with other moments of the distribution; similar with case-load weights

Some further interpretation results

- Is it the case that public providers were “directing” patients to their private clinics?
- Or, would we expect very different care among public sector providers if they *did not* have a private clinic?
 - None of our SPs were directed to the private clinic of the public provider.
 - Referrals *lower* among dual practice
 - People already know where the private clinic is (and sometimes this is not in the same place)
 - Fully segmented markets
 - Some effect of location on estimated impact in checklist and time-spent, but not on treatment and diagnosis
 - Further, the guys with clinics in the same location are also *worse in their private practice*, suggesting that these guys are just selected worse
 - We cannot tell what would happen where there are is no dual-practice
 - We note that it is not allowed, but 80 percent of providers have them
 - The providers who have dual practice versus the 20 percent who do not behave identically in their public practice in treatment with lower referral rates, but have lower checklist completion and diagnosis rates

	Representative sample			Dual practice sample		
	Public	Private	Difference (2)-(1)	Public	Private	Difference (4)-(3)
Panel A: Unstable Angina						
Correct treatment	0.04	0.08	0.05	0.03	0.30	0.27***
Correct treatment (alternate)	0.55	0.48	-0.07	0.42	0.61	0.20*
Aspirin	0.03	0.04	0.02	0.03	0.23	0.20***
Anti-platelet agents	0.03	0.01	-0.02	0.00	0.03	0.03
Referred	0.30	0.24	-0.05	0.22	0.32	0.10
ECG	0.24	0.23	-0.02	0.28	0.35	0.08
ECG & Referred	0.11	0.12	0.01	0.08	0.16	0.08
Antibiotic	0.14	0.17	0.03	0.28	0.23	-0.05
Unnecessary treatment	0.66	0.74	0.09	0.67	0.77	0.11
Number of observations	37	180		36	31	
Panel B: Asthma						
Correct treatment	0.47	0.61	0.14*	0.58	0.68	0.10
Bronchodilators	0.33	0.36	0.03	0.52	0.59	0.07
Theophylline	0.13	0.22	0.09*	0.31	0.31	0.00
Oral Corticosteroids	0.15	0.31	0.16**	0.16	0.24	0.09
Antibiotic	0.38	0.40	0.02	0.59	0.46	-0.14*
Unnecessary treatment	0.73	0.82	0.09	0.91	0.83	-0.08*
Number of observations	39	184		64	70	
Panel C: Dysentery						
Correct treatment	0.08	0.14	0.06	0.33	0.22	-0.11*
ORS	0.08	0.13	0.05	0.33	0.22	-0.11*
Asked to see child	0.33	0.14	-0.20***	0.27	0.42	0.15**
Antibiotic	0.44	0.61	0.18**	0.75	0.61	-0.13*
Unnecessary treatment	0.11	0.41	0.30***	0.43	0.33	-0.10
Number of observations	39	183		63	67	

Table 6: Correlates of price charged (private interactions)

	(1)	(2)	(3)	(4)	(5)	(6)
	Fees in Rs.					
	Representative sample		Dual practice sample		Pooled sample	
	Binary regressions	Multiple regression	Binary regressions	Multiple regression	Binary regressions	Multiple regression
Time spent with SP (minutes)	1.763*** (0.454)	0.771 (0.475)	2.498*** (0.587)	2.017*** (0.679)	1.502*** (0.361)	0.805** (0.390)
Percentage of checklist items	0.411*** (0.091)	0.368*** (0.101)	0.355*** (0.100)	0.061 (0.124)	0.394*** (0.073)	0.309*** (0.093)
Correct diagnosis (unconditional)	-3.749 (4.212)	-2.137 (2.122)	6.353 (9.363)	5.459 (9.076)	2.674 (4.670)	2.803 (4.175)
Correct treatment	7.065*** (1.789)	0.050 (2.892)	6.301 (4.016)	1.508 (4.754)	7.633*** (1.872)	1.458 (2.305)
Palliative treatment	8.036*** (2.056)	5.581*** (2.036)	11.748*** (4.344)	7.798* (4.663)	8.124*** (1.811)	6.252*** (1.863)
Unnecessary treatment	14.039*** (2.395)	4.030 (3.341)	15.220*** (5.056)	3.145 (6.233)	14.355*** (2.129)	5.545* (2.864)
Number of medicines dispensed	4.774*** (1.656)	4.215*** (1.379)	9.247*** (2.997)	11.513*** (3.765)	4.080*** (1.371)	3.937*** (1.409)
Number of medicines prescribed	-0.202 (1.129)	-1.188 (0.881)	3.650** (1.845)	3.891 (2.672)	0.926 (0.861)	-1.020 (1.067)
Referred/Asked to see child	-19.161*** (4.115)	-13.301*** (3.636)	-10.082** (4.722)	-3.638 (4.495)	-16.857*** (3.356)	-14.151*** (3.229)

Wages and Quality in Public Sector

- Public sector pay in India follows a matrix
- Composed of: rank, tenure, qualifications
- Not surprisingly
 - ▣ No effect of checklist adherence, treatment, likelihood of discussing diagnosis on wages
 - ▣ Some (negative) effect on time spent, vanishes when controlled for provider qualifications
- Because of low case-loads in public sector and high wages, cost per patient is 4-5 times higher in the public sector for lower quality care

Policy Implications

- Results do not mean that the state does not have an important role
 - Location; Equity; Information
- Marginal returns to training likely to be higher in the private sector; while returns to improving incentives for effort likely to be higher in the public sector
- Policy seems to be doing exactly the opposite
 - Deep resistance to training/providing legitimacy to the private providers (though they are first line of primary care)
 - Lots of attention paid to training public providers
- Attempts to improve equity should try to retain elements of customer accountability in healthcare markets