Improving Health Care Delivery in India[1]

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This paper presents descriptive evidence on health and health care in Udaipur district, Rajasthan, India, and uses it as a case study to illustrate the difficulties of providing health care to the poor. We show that, while the Indian public health system is, on paper, an ideal health care system for a developing country, it is all but defunct in practice, due to the lack of interest of both the providers and the putative patients. We discuss the possible sources of the problem, and use the results from two randomized field experiments to shed some light on what is going on and what needs to be done.

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[1] This paper was prepared for the Angus Deaton Festshrift, held in Princeton in September 2009. It builds on several years of work in Udaipur, which started with Angus Deaton, starting in the winter of 2002.This paper also builds on early analyses of this data we did together with Angus (Banerjee, Deaton and Duflo 2004). We remain for ever indebted to Angus for his role in starting this research program. Rachel Glennerster is a collaborator on the two experiments we present here, and we thank her too. The research reported here is collaborative work, involving many people. We particularly thank the team at Seva Mandir, especially Neelima Khetan, CEO, Dr Sanjana Mohan (the head of the health unit when this project was started), and Priyanka Singh (head of the health unit when the project was finished). We thank Hardy Dewan (Vidya Bhawan), Tushita Lodha (Project-in-Charge for the Health Study) and Pramod Tiwari (Field Coordinator), from Vidya Bhawan, for directing and coordinating the data collection. Several research assistants did spectacular work in the field over the years: Annie Duflo, Callie Scott, Danielle Li, Vanessa Valentino, Cindy Palladines, Andrew Fraker, Anuja Singh, Payal Hathi, Neil Shah, Dhruva Kothari and Michael Eddy. We are grateful to the Center of Health and Well Being at Princeton University, the MacArthur Foundation, and the National Institute of Health for funding this research. A version of the first five sections was initially prepared for the Stanford India conference in 2005, and we are grateful to Nicholas Hope, Director, Stanford Center for International development for allowing us to use the text here. We are grateful for comments from participants at the SCIED conference, and the Deaton Festshrift conference, and to Nick Ryan for comments.

1. Introduction

The recent launching of the National Rural Health Care Mission in India reflects the widely held view that the government in that country needs to do more about health-care. The problem of low quality of health care delivery is not specific to India. Worldwide, 9 million children die before the age of five, mostly of diseases that could have been prevented or treated. Every year, 25 million children do not receive essential vaccinations. Commenting on health and education, the World Bank development report (2004) concludes that "Social service delivery fail the poor''. Case and Paxson (2009) report that the access to antenatal care, hospital deliveries, and rates of immunization for children *deteriorated* in Africa between 1988 and 2005, particularly in countries that were more strongly affected by the HIV-AIDs epidemics.

While the delivery of high-quality social services to the poor is never easy, there are several factors that make health-care especially difficult. First, as has been widely documented, a person's decision about when and where to seek health care often has very little to do with his or her medical condition itself: It could just as well reflect how the person is feeling about life in general and health in particular,[2] or his or her theories about the nature of diseases and treatment. These decisions may have little to do with the quality of care, since it is not easy to judge the efficacy of the treatment one is getting, given that one does not know what would have happened absent the treatment. For example, it is estimated that 80% of all diseases in a setting like India are self-limiting in the sense that one would get better without any treatment, but people may not be aware of this and as result may credit the doctor with the cure. To make matters worse, patients may not aware of the possibility that he could be actually harming you by giving you powerful medicines

[2] Das (2005) discusses a number of case studies of TB patients in India that eloquently illustrate this point.

for something that was self-limiting. In this setting, the types of care which patients demand may have very little to do with what would be socially efficient to deliver. This problem of demand makes it particularly difficult to deliver heath care to the poor.

Second, there is no obvious aggregate measure of the performance of the health care system that is comparable to the matriculation rate in the case of education or the number of brown-outs in the case of electricity. The problem is that age-specific death rates may reflect the state of the health system where and when the person was a child, rather than the health system he currently lives under. This makes it difficult to assess the performance of a system. Without a correct assessment of the system and an identification of the main problems, designing and evaluating possible solutions is almost impossible.

This essay starts by bringing together some recent evidence, which highlights some of the difficulties that will have to be faced by any government that is serious about improving health-care for the poor. Most of this evidence comes from a survey we conducted in 100 villages, over 100 public health facilities, and several hundred private and traditional providers in rural Udaipur district in 2002 and 2003, and we also draw on a survey of seven Delhi neighborhoods between 2001 and 2003 (reported in Das and Hammer 2004, 2005).

On paper, India's public health care system looks like the model for delivering universal health services in a large, poor country. Its comprehensive three tier design ensures that all households, rural and urban, are close to a free government health facility. The infrastructure for this system is operational: the average household is within 2 kilometers of the nearest public facility; the facilities all fully staffed, by qualified medical personnel; and, while not free, public facilities are still far and away the cheapest option available for qualified medical care (Banerjee, Deaton, and Duflo, 2004). Yet, the system quite apparently fails to deliver. Even though government facilities are cheaper and staffed by trained and certified personnel, most households prefer to see private providers, who are not only unregulated, but are often unqualified.

This situation could either reflect a problem of supply, a problem of demand, or both. Public health care center are closed more than half the times, whereas private doctors are available round the clock. On the other hand, private doctors happily deliver shots of antibiotics and steroids that the patients appear to demand, which public doctors are often (rightly) not allowed to prescribe. To investigate the role of supply and demand, and how they may interact, we have conducted two randomized experiment, in collaboration with Seva Mandir, a local NGO, and Vidhya Bhawan, a network of school and teaching colleges. In the first one, Seva Mandir collaborated with the government to monitor nurses on specific days. The intervention was initially successful in reducing absenteeism, but was eventually undermined from within. This illustrates the difficulty to improve supply reliably without some feedback coming from the demand. In the second intervention, Seva Mandir provided very reliable immunization services in villages. This improved the rate of full immunization significantly (from 5% to 17%), but adding a small incentives further increased the rate (from 17% to 38%). Combined, these two studies suggest that increasing demand for preventive care (and for the "proper" curative care) is essential for any supply driven intervention to be sustained in the long run. But they also suggest, fortunately, that improving demand may not be so difficult: households may be more indifferent than opposite. Once demand is stimulated, it may be possible to use it as a lever to improve supply.

In the reminder of the paper, we first describe the Udaipur health survey (section 2). The results are discussed in section 3 to 5. In section 6, we pose the central challenge of health care: a combined supply and demand problem. Section 7 describes and interprets the two experiments. Section 8 concludes.

2. The Udaipur rural health survey

The data collection took place between January, 2002 and August, 2003 in 100 hamlets in Udaipur district, Rajasthan. Udaipur is one of the poorest districts of India, with a large tribal population and an unusually high level of female illiteracy (at the time of the 1991

census, only 5% of women were literate in rural Udaipur). The survey was conducted in collaboration with two local institutions: Seva Mandir, a NGO that works, on health in rural Udaipur, among other things, and Vidya Bhavan, a consortium of schools, teaching colleges and agricultural colleges, who supervised the administration of the survey. The sample frame consisted of all the hamlets in the 362 villages where Seva Mandir operates in at least one hamlet.[3] This implies that the sample is representative only of the population served by Seva Mandir, not of rural Udaipur district as a whole; Seva Mandir tends to operate in poorer villages, with a larger tribal population. This sample frame presents several important advantages, however. It represents a population of interest to this paper--households in India who are among the most likely to be under-served by the health care system. Seva Mandir's relation with the villages ensured collaboration with survey, and allowed us to collect very detailed information at the village and household level. Seva Mandir's long standing relationship with the health authorities also gained us their full collaboration, making possible a weekly survey of all public health facilities and subsequently, allowed Seva Mandir to implement a number of health interventions based, in part, on the results from the survey. Finally, the extensive network of Seva Mandir's employees in the district allowed us to hire, when needed, large numbers of reliable employees. The sample was stratified according to access to a road (out of the 100 hamlets, 50 hamlets are at least 500 meters away from a road). Hamlets within each stratum were selected randomly, with a probability of being selected proportional to the hamlet population.

The data collection had four components: a village survey, where we obtained a village census, a description of the village's physical infrastructure, and a list of health facilities commonly used by villagers (100 villages); a facility survey, where we collected detailed information on activities, types and cost of treatment, referrals, availability of medication

[3] A hamlet is a set of houses that are close together, share a community center, and constitutes a separate entity. A village is an administrative boundary. One to 15 hamlets constitute a village (the mean number of hamlets in a village is 5.6). Seva Mandir in general operates in the poorest hamlets within a given village.

and quality of physical infrastructure in all public facilities (143 facilities) serving the sample villages, all "modern" private facilities mentioned in the village surveys or in the household interviews (we have surveyed a total of 451 facilities) and a sample of the bhopas (traditional healers) mentioned in the village surveys (98 traditional healers were surveyed); a weekly visit to all public facilities serving the villages (143 facilities in total, with 49 visits per facility on average); and a household and individual survey, covering 5759 individuals in 1024 households.

The data collected in the household survey include information on economic well being using an abbreviated consumption questionnaire similar to the one that was used in the National Sample Survey in their 1999-2000 survey (the 55th Round), measures of integration in society, education, fertility history, perception of health and subjective well being, and experience with the health system (public and private), as well as a small array of direct measures of health (hemoglobin, body temperature, blood pressure, weight and height, and a peak flow meter measurement of lung capacity).

The Continuous Facility Survey (CFS) may be the most original part of the survey. We identified all the public facilities (143) serving the sample villages, and hired one paraworker who lives close to each facility, who was given the responsibility of checking the facility every week. The para-worker pays an unannounced visit to the facility during opening hours, checks whether the facility is open, and counts the number of doctors, nurses, other medical and non-medical personal, as well as of clients present in the facility. If the facility is closed, because the staff is performing a scheduled village visit, the para-worker goes to the village that the staff is supposed to be visiting, and checks whether he or she can be found in that village. To ensure the quality of the data collected in the Continuous Facility Survey, we have put in place a strictly enforced monitoring system: every four weeks, all the CFS para-workers of a block met, and we collected their data entry forms. They were also given a schedule indicating on which day they must complete their visit in each week of the following month. Two members of the team of investigators used motorcycle transport to visit

several facilities every day, following the schedule given to the CFS para-worker. The para-workers were paid only if their visits have been completed on the planned day, and if there were no unexplained discrepancies between their report and that of the CFS monitor. The CFS monitors also visited the facilities on different days, so that we could check that there was no collusion between the para-worker and the facility staff. This survey took place for 13 to 14 months, including a "pilot period" of one to two months in each facility, where the system was fine-tuned. We report data for 12 months for each facility. The survey is complemented by a detailed one time facility survey, which, among other things, will allow us to identify correlates of absenteeism in the centers.

3. Health status

The households in the Udaipur survey are poor, even by the standards of rural Rajasthan. Their average per capita household expenditure (PCE) is 470 rupees, and more than 40 percent of the people live in households below the official poverty line, compared with only 13 percent in rural Rajasthan in the latest official counts for 1999-2000. Only 46 percent of adult (14 and older) males and 11 percent of adult females report themselves literate. Of the 27 percent of adults with any education, three-quarters completed standard eight or less. These households have little in the way of household durable goods and only 21 percent of households have electricity.

In terms of measures of health, 80 percent of adult women, and 27 percent of the adult men have hemoglobin levels below 12 grams per deciliters. 5 percent of adult women and 1 percent of adult men have hemoglobin levels below 8 grams per deciliters. Strikingly, using a standard cutoff for anemia (11 g/dl for women, and 13 g/dl for men), men are almost as likely (51%) to be anemic as women (56%) and older women are not less anemic than younger ones, suggesting that diet is a key factor. The average body mass index is 17.8 among adult men, and 18.1 among adult women. 93 percent of adult men and 88 percent of adult women have BMI less than 21, considered to be the cutoff for low

nutrition in the US (Fogel, 1997). We also used peak-flow meter measurement to measure lung capacity in an attempt to detect asthma or other respiratory disorders (e.g., chronic bronchitis). Among adults, the average peak flow meter measurement is 316 ml per expiration (anything below 350 for an adult 1.60 meters tall is considered to be an indicator of respiratory difficulties).

Symptoms of disease are widespread, and adults self-report a wide range of symptoms. A third report cold symptoms in the last 30 days, and 12 percent say the condition was serious. A third reported fever (14 percent serious), 42 (20 serious) percent reported "body ache" 23 (7) percent reported fatigue, 14 (3) percent problems with vision, 42 (15) percent headaches, 33 (10) percent back aches, 23 (9) percent upper abdominal pain, 11 (4) percent had chest pains, and 11 (2) percent had experienced weight loss. Few people reported difficulties in taking care of themselves, such as bathing, dressing, or eating, but many reported difficulty with the physical activities that are required to earn a living in agriculture. Thirty percent or more would have difficulty walking 5 kilometers, drawing water from a well, or working unaided in the fields. Eighteen to twenty percent have difficulty squatting or standing up from a sitting position.

In Table 1, we show the number of symptoms reported in the last 30 days, Body Mass Index, fraction of individuals with hemoglobin count below 12, peak flow meter reading, high blood pressure, low blood pressure, broken down by which third of distribution of the monthly per capita expenditure they fall into, which we collected using the abbreviated consumption questionnaire. Individuals in the lower third of the per capita income distribution have, on average, a lower body mass index and lower lung capacity and are more likely to have a hemoglobin count below 12 than those in the upper third. Individuals in the upper third report the most symptoms over the last 30 days, perhaps because they are more aware of their own health status; there is a long tradition in the Indian- and developing-country literature of better-off people reporting more sickness (see for example Murray and Chen (1992) and Sen (2002)).

Despite these poor readings, most respondents grade their own health as rather good. Shown a ladder with 10 rungs, 62 percent of respondents place themselves on rungs 5 through 8 (more is better), and less than seven percent place themselves on one of the bottom two rungs. Unsurprisingly, old people report worse health, and women at all ages also consistently report worse health than men, which appears to be a worldwide phenomenon (Sadana et al. (2002)), and richer people report better health than poorer people. Most people report themselves close to the middle. Nor do our life-satisfaction measures show any great dissatisfaction with life: on a five point scale, 46 percent take the middle value, and only 9 percent say their life makes them generally unhappy. Such results are similar to those for rich countries; for example, in the United States, more than a half of respondents report themselves as a three (quite happy) on a four-point scale, and 8.5 percent report themselves as unhappy or very unhappy. People in rural Udaipur are presumably adapted to the sickness that they experience, in that they do not see themselves as particularly unhealthy nor, in consequence, unhappy. These optimistic health reports do not imply that people never complain. When asked about their financial status, which was also self-reported on a ten-rung ladder, the modal response was the bottom rung, and more than 70 percent of people live in households that were self-reported as being on the bottom three rungs.

These health evaluations suggest the possibility that people are not particularly demanding about their own physical well-being and hence may under-use health care facilities. A glance at the actual use data, however, disrupts this quick conclusion, as the average adult in the Udaipur survey visits a health facility once in two months. In the next section we consider the kinds of facilities that they visit.

4. Health-care facilities in rural Udaipur

Types of facilities

There are three broad categories of facilities: Public, private and traditional. The official policy on public facilities requires that there should be one subcenter, or sometimes an aid-post, staffed by one trained nurse (ANM), for every 3,000 individuals. These sub-centers provide the first point of care, the PHCs or CHCs the next step, and the referral hospitals deal with the most serious health problems. In our data, each subcenter serves 3,600 individuals on average, and is usually staffed by one nurse. Almost none of the subcenters report vacancies: i.e. there are as many nurses posted to the subcenter as there are posts. A primary health center serves 48,000 individuals and has on average 5.8 medical personnel appointed, including 1.5 doctors. Once again very few of the PHCs report vacancies.

What we include as private facilities are all the places that our respondents report as private providers that they have visited. Private facilities include a wide range of options ranging from facilities run by people who have completed their medical training and have additional post-graduate medical degrees, to traditional birth attendants (TBAs/"Daima"s) and pharmacists who in most cases have no formal medical training whatsoever.

Within traditional healers there are two main categories. Out of the 98 we have in our sample, 63 are jhad-fook practitioners who focus mainly on exorcisms and prayers, 5 just do desi ilaaj (they give traditional, usually herbal, medicines) and the rest do both.

Doctor's qualifications

The ANM in a sub-center is someone who has at least a high-school degree and has then undergone training to be an ANM (in Rajasthan the training lasts a year and a half). They are trained to handle a limited set of health conditions and to identify a wider set, which get referred to the PHC/CHC or to the referral hospital. The doctors in the PHC/CHC's are fully qualified to practice as general practitioners and might have some specialized degrees (87% of the CHCs and 13% of the PHCs have one or more specialists)

Table 2a in the appendix reports that 27% of the private doctors who are described as the main provider in their facility claim to have some kind of specialist degree over and above the standard medical college degrees. Another 28% self-report a medical college degree, though this includes a sizeable fraction who have degrees in Ayurvedic (traditional Hindu) medicine (BAMS) or Unani (traditional Islamic) medicine. Only 10.7% have an MBBS, the qualification for conventional modern medicine. The rest do not claim a medical college degree. They may however be trained as a compounder (i.e., a pharmacist) or have attended a course that gives them some medical training. In the local parlance these doctors are referred to as Bengali doctors.

However looking only at the main providers in the facility may be misleading. Each facility reports 2.6 staff members, of which only one can be the main provider (by the way a main provider gets defined). However 87.8% of all the staff members are reported to see patients: This implies that most of these other staff members also see patients. Among them 67.2% have no formal qualifications, and less than 3% are qualified as an MBBS. Whether this is a problem depends on whether they are just helping the main doctor or whether they actually independently deal with patients. The anecdotal evidence suggests that they do act as independent providers. One hears about the doctor's son who now takes care of the practice because the older doctor who has the qualifications is now retired or the well-known (and well-qualified) doctor who rents out her name to a large number of local clinics. This is an area where we clearly need more data.

The fraction of these doctors who claim to have an MBBS (37.7%) is slightly higher than the corresponding fraction in low income neighborhoods in Delhi (34% according to Das and Hammer (2004)). Given how backward this area is in other ways compared even to the poorer parts of Delhi, this might suggest that the self-reports tend to exaggerate the qualifications.

Apart from those described as private doctors there are also self-described compounders, nurses and pharmacists, who also practice medicine. About 10% of the compounders and

nurses claim to have a degree from medical college, always an Ayurvedic college. The rest have no college degrees, though more than half the nurses claim to have been trained to be an ANM.

About 36% of the private doctors do not have a college degree in any subject (appendix Table 2b). Among them the average years of schooling is 11 years, which is a year less than what it takes to graduate from secondary schooling. The education level among the nurses and compounders is very similar.

Table 2a also shows that traditional healers do not claim to have any formal medical training. They are also less educated than the private doctors, with an average schooling level of between 4 and 5 years (Table 2b).

Competence

Having a degree is not necessarily evidence that the doctor knows what he is doing. In an recent innovative study, Das and Hammer (2004) attempt to quantify the competence of doctors in seven Delhi neighborhoods using a combination of vignettes and item responses. They started with a sample of 205 public and private providers from 7 Delhi neighborhoods. The original sample frame was the set of providers who were visited by anyone in the Delhi healthcare survey (Das and Sanchez (2004)), which was a representative sample of 1641 individuals from these 7 neighborhoods. They then added a certain number of additional providers who were in the same neighborhoods, but had never been visited by those in the survey.

Each of these providers was presented with 5 vignettes representing the symptoms of 5 common health problems and asked what questions they would ask about the patient's history if someone showed up with the symptoms described in the vignette, what steps they would use to examine the patient and what treatment would they recommend. The answers were then compared to the "ideal" answers to these questions and an item-response methodology was used to extract a single parameter that predicts the ability of

the provider to give a correct answer to each of these questions. This is what they call the doctor's competence.

The average competence in the sample was remarkably low. Even in the top quintile of the competence index, doctors asked no more than 48% of the history questions that they were supposed to ask, which went down to 15% at the lowest quintile. For the treatment, doctors had to be between 0.6 to 1.3 standard deviations above the mean in competence before their recommended treatment had a more than 50% chance of not doing harm.

Das and Hammer (2004) go on to correlate competence with doctor characteristics. They find that public doctors in hospitals are 0.4 standard deviations better than public doctors in small clinics, while private MBBS doctors are more than one standard deviation better than private non-MBBS doctors. Both types of public doctors are located between the two types of private doctors in terms of competence. Doctors located in the poorest neighborhoods are one full standard deviation worse than doctors located in the richest neighborhoods and this is as true of public providers as it is of the private. This inequality is compounded by the fact that the fraction of MBBS private providers is only half as high in the poorer neighborhoods as it is in the richer ones.

Distance to facilities

Returning to Udaipur, the median distance to the closest public facility is 1.53 Km while the mean is 2.09 Km. The mean distance to the closest PHC/CHC I s 6.7 Km. The median distance to the closest private provider that anyone in our sample has reported using is 2.83 Km and the average is 3.78 Km. The median distance to the closest self-described qualified private doctor (once again that anyone has reported using) is 6.72 Km while the mean is 8.01 Kms. Traditional healers are much closer. The closest traditional healer in our sample is 0.62 Km away (median, the mean is 1.53 Km), and this probably understates how close they are since we only have a sample of the traditional healers.

Cost of treatment

The services of the government doctors are supposed to be free, though everyone who is above the poverty line is required to pay for medicines, tests, etc. Nevertheless visits to sub-centers are cheap. Table 3 in the appendix reports that the average visit to a subcenter/aidpost costs only Rs. 33, whereas visiting a Bengali doctor costs Rs. 105. The average cost of visiting a PHC/CHC is Rs. 138 (only Rs. 100 if we leave out operations and tests) while visiting a qualified private doctor costs Rs. 179 (not including operations and tests).[4] Surprisingly visiting a traditional healer can be quite expensive---the average visit costs Rs. 131 (typically because you have to bring a chicken or a goat).

Equipment and Infrastructure

Every public health facility has syringes and needles, but beyond these equipment availability is patchy. About 20% of the aidposts and one-thirds of the subcenters lack a stethoscope, or a blood pressure instrument, or a thermometer or a weighing scale, and only a quarter of the sub-centers have a sterilizer. Since every facility is supposed to have at least one of each of these there is some concern that the practitioners might have "privatized" the equipment that was provided to them.

The quality of the infrastructure is also unimpressive. None of the subcenters have a water supply, 7% have a toilet for patients and 8% have electricity. It is therefore not surprising that only 3% rooms have fans, despite the 50 degrees centigrade plus weather in the summer. Finally, 45% of the rooms leak when it rains.

Unfortunately we do not have comparable data on private facilities. Casual observation suggests that the infrastructure is not much better there but almost all of them seem to have a stethoscope and a thermometer (this is part of what makes them credible as doctors).

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[4] In a previous paper we had said that visits to public and private facilities cost more or less the same. The difference comes from a relatively small number of operations/tests in public facilities which were very expensive.

Our interpretation is that these procedures are inherently expensive and the government facility may well be the least expensive and perhaps the only place to get them done.

5. Patterns of health-care use

The evidence in the previous section, while somewhat mixed, suggests that in terms of observable characteristics, public health facilities tend to dominate their private equivalents. The government ANM is significantly closer than the private unqualified doctor and much cheaper. In terms of "human capital" they seem comparable: The ANM has at least 12 years of schooling and is sure to have gone through a year and a half of training, while the qualifications of the unqualified private doctor are often either non-existent (especially given that the non-main providers also see patients) or of questionable worth (many claim to be Registered Medical Practitioners (RMP), which only guarantees six months of training). Moreover among the private doctors who have no college degree, years of schooling is only 11 years. Among the higher quality facilities, once again, the PHC is both closer and cheaper than a qualified private doctor and there is no obvious difference in the qualification.

Yet, as we will see, most people, including the poorest, visit health-care providers quite often but do not make much use of the public facilities. The extra cost of the private facility therefore adds up to a significant financial burden.

How frequent are health-care visits?

In the household survey we asked where people go to get health care. Table 4 on the next page shows these results. We see that adults visit a health facility on average 0.51 times a month. The poor, defined here as people who are in households in the bottom third of the distribution of PCE (average Rs. 219) per month, visit a facility 0.43 times in a month, while an adult in the middle third of the distribution (average PCE Rs. 361) visits a facility 0.54 times a month and an adult in the highest group (average PCE Rs. 770) visits the facility 0.55 times a month. The difference between the top third and the middle third, on the one hand, and the bottom third on the other, is significant, and remains so with village fixed effects.

Das and Sanchez (2004), using data from the Delhi survey find the opposite relation of visits and income. The Delhi survey followed 1,621 individuals in seven Delhi neighborhoods over a period of 16 weeks with detailed weekly interviews. In their data the poor are actually twice as likely as the rich to visit a health provider for what Das and Sanchez call a short-term morbidity, which are non-chronic illnesses that are medically expected to get cured in less than two weeks. This is partly because the poor are sicker but the main difference comes from the fact that the rich are much more likely to self-medicate than the poor.

The difference between our results and those in Das and Sanchez (2004) may reflect the difference between our settings. Urban Delhi is vastly richer than rural Rajasthan and in particular the rich in Delhi (defined as those with per capita monthly income of about Rs. 6000) are much richer from those who we call rich in the Udaipur sample (defined as those with per capita monthly expenditure of Rs. 770). To the extent this difference in earnings is mirrored in the difference in their sophistication in matters of health, we might expect very different patterns of behavior. The rich in Delhi are much more likely to have the know-how and the confidence to self-medicate than the rich in rural Udaipur.

In the Udaipur survey each adult interviewee was also asked what symptoms of ill-health he/she had had in the past month and what he/she did about it. Table 5 in the appendix reports the results. When respondents report a symptom they visit some facility 31% of the time. This frequency varies substantially by disease. They will see a provider more than 50% of the time for hot fever and more than 45% for diarrhea, but less than 20% of the time for chest pains, trouble breathing, genital ulcers, blood in spit, worm in stool, weight loss, night sweats and hearing and eye-sight problems. The pattern seems to be that they

are more likely to see someone for relatively short-duration morbidities than for more chronic problems (other conditions which make them go to the doctor include vomiting (40% of time), cold symptoms, headaches and productive coughs (about a third of the time each)). This is especially striking given that most of the short-duration morbidities tend to get cured on their own, or in the case of acute diarrhea, with help of some simple home remedies, while many of the chronic conditions are either potentially debilitating (hearing problems, eye-sight problems, etc.) or possible symptoms of some grave condition (chest pains, breathing problems, blood in sweat etc.)

Choice of health-care providers

Where do these people get the health-care they are buying? In the Udaipur survey, of the 0.51 visits to a health facility that the average person in our survey reports in a month, only 0.12 visits (i.e. less than quarter) are to a public facility. The fraction of visits to a public facility is highest for the richest group, and lower for the other two groups, but about the same for each. Overall, the rich have significantly more visits to public facility than the poor. No one uses public facilities very much, and if anything, the poor use them less than the non-poor. The majority of the rest of the visits (0.28 visits per adult per month) are to private facilities. The rest are to Bhopas (0.11 visits per adult per month), who are the traditional healers. For the poor, the fraction of visits to a Bhopa is well over a quarter of all visits, while for the richest group it is about an eighth of all visits.

Patients also seem to associate specific diseases with specific providers. Table 5 lists the conditions in the order of how likely it is that the person will see a doctor for them. When we compare public versus private facilities there is no discernable pattern, except that those who have blood in cough tend to go to the public facility relatively more often. This might reflect the success of the government TB program. On the other hand, it is clear that the person is somewhat less likely to see a bhopa for the conditions at the top of the Table, which are the conditions which the patient presumably takes most seriously (since he goes to the doctor more for them). People are more likely to see the bhopa for spitting blood, weakness, headache, backache, shortness of breath, abdominal pains, genital ulcers than

for cols, dry cough, diarrhea and skin disease. A regression of the share of visits to the Bhopa on the probability of seeing anyone for that condition delivers a coefficient which is negative and almost significant. Of course this would be more reassuring if we were confident that they were seeing the doctor for the right reason.

How much do you spend?

In terms of healthexpenditure, Columns 1 and 2 of Table 6 in the appendix shows the monthly expenditure on health in the Udaipur survey, calculated in two ways: from the expenditure survey, and from the expenditures reported in the adult and children survey. The numbers are similar, except for the rich where the expenditure derived from the expenditure survey is much larger than the expenditure calculated from adding up the previous month's visits to the "doctors". Column 3 shows the expenditure as a fraction of household total expenditures, and from the expenditures reported in the adult and children survey, as a fraction of personal expenditures. The average household spends 7% of its budget on health. While the poor spend less in absolute amount, they spend the same amount as a share of their budget. Column 4 shows the average health expenditure for adults. It is about 60 rupees, or 13% of the monthly PCE of his family, which tells us, among other things, that most of the spending is on adults. This fraction is highest for the poorest (15%) and lowest for the richest group (11%).

The Delhi survey shows similar but more extreme results. Das and Sanchez (2004) report that the poor and rich spend the same absolute amount on short duration morbidities, which is not surprising given that the poor go to doctor more often. On the other hand the middle and high income groups spend more than 7 times as much as the poor on treating chronic illnesses. Nevertheless, the share of monthly income that is spent on health is significantly smaller for the rich.

In terms of expenditures poor adults in the Udaipur survey spend 13% of their total health expenditures at public facilities, 23% on Bhopas, and the rest at private facilities. The rich spend 23% of their total health expenditures at public facilities, and less than 10% on

Bhopas, while the middle group spends more than 17% of their health expenditures on Bhopas and 13% at the public facilities.[55] The rich therefore spends a significantly larger fraction of their health rupees on public facilities than do the poor, and a significantly smaller fraction on Bhopas. Part of the difference in the consumption of public health care can be attributed to where the rich live, since, once we control for village fixed effects, the difference is smaller (5%) and insignificant.

6. The health care knot: Supply, demand, or both?

The evidence reviewed above is rather damning for India's public health system. Poor patients seem to largely avoid it, despite the fact that private doctors are less qualified, further away, and more expensive. The policy response crucially depends on why this is the case. A first possibility is that the public system is much worse in reality than it appears to be on paper. A second possibility is that the demand for health care may be distorted, because people do not understand what is good for them. In this view the public health care system is (rightly) concerned with preventive care, and correct drug regiments. However, because learning about the effectiveness of any health treatment is particularly difficult, patients want something entirely different, and a completely unregulated private system is ready to provide that to them. The two phenomenon can easily co-exist and reinforce each other. For example, nurses may have very little motivation to go to work if they know that their prospective patients have no interest in what they do.

Our data shed light on both hypotheses. The public health system is indeed worse than it appears. The most obvious problem is that many providers are almost never there. Public subcenters and Primary Health Centers are supposed to be open 6 days a week, 6 hours a

[5] The percentage do not necessarily add up to 100, because some people did not know whether some facilities were public or private.

day. In the Udaipur survey Public health facilities were surveyed weekly, and we have on average 49 observations per facility. Table 7 below summarizes the main results. On average, 44% of the medical personnel are absent in subcenters and aid posts, and 36% are absent in the (larger) Primary Health Centers and Community Health Centers. These high rates of absence are not due to staff outreach activities since, whenever the nurse was absent from a subcenter, we made sure to look for her in the community. Since subcenters are often staffed by only one nurse, this high absenteeism means that these facilities are often closed--we found the subcenters closed 56% of the time during regular opening hours. Only in 12% of the cases was the nurse to be found in the catchment area of her sub-center. The situation does not seem to be specific to Udaipur. Similar rates of absenteeism are found in nationally representative surveys in India (where absenteeism in PHCs was found to be 43%) and Bangladesh (where it was found to be 35%) (Chaudhury et al. (2003), Chaudhury and Hammer (2003)).

Table 8 reports results on the kinds of facilities we are most likely to find closed. The 6% of subcenters that are far from the road have only 38% of the personnel present, compared to about 55% for the average. Facilities that are closer to Udaipur or to another town do not have lower absenteeism. The available amenities (water, electricity) do not seem to have a large impact, except for the presence of living quarters, which has a large impact on the fraction of personnel present, particularly in subcenters. Reservations of the position of chairperson (Sarpanch) of the local government (panchayat) for women, sometimes suggested as a lever against absenteeism because women are said to care more about healthcare, have no impact on the observed absence in subcenters, but seem to be associated with increased presence in PHCs.

The weekly survey allows us to assess whether there is any predictability in the fraction of staff present at a center or subcenter. Table 9 shows a regression of the fraction of missing personnel on facility dummies (columns to 1 to 3), day of the visit dummy, and day of the visit interacted with facilities dummies (in column 2) and time of the visit dummy,

interacted with facility dummies (column 3). The facility dummies are strongly significant, with F statistics of 6.16 for the subcenters, and 17.5 for the PHC and CHC. There are clearly better and worse facilities. However, the F-statistics for the interaction between day of the week and the time of the day and the facility dummies are much smaller. For each center, we ran a regression of the fraction of personnel missing on dummies for each day of the week, time of the day, and seasonal dummies. We find that the day of the week dummies are significant at the 5% level in only 10% of the regressions for the subcenters, and in none of the regressions for the PHC and CHC; the time of the day dummies are significant only in 17% of the regressions for the PHC, and 9% for the subcenters. The public facilities are thus open infrequently and unpredictably, leaving people to guess whether it is worth walking for over half-an-hour to cover the 1.4 miles that separate the average village in our sample from the closest public health facility. The probability that a center is open is correlated with utilization of these facilities. In random visits, we find that, on open days, public facilities where the personnel are present more often have significantly more patients than those where the personnel is present less often. In the household survey, we find that, in villages that are served by a facility that is closed more often, the poor (though not the middle class or the rich) are less likely to visit the public facilities, and more likely to visit the bhopa. Of course, the causality could be running either way; from utilization to presence of the personnel, or from presence of the personnel to utilization.

Compounding the problem of facilities being closed, when you do get to an open public facility, the wait can be quite long. Figure 1 shows how long people had to wait, based on the household survey. 35% had to wait more than a half hour. Another 25% had to wait an hour or more.

Surprisingly, neither the fact that the facility is closed nor that there is a wait came up very often when we asked people who had never been to a public facility why they have not. Out of 898 people who responded (roughly 35% of those asked) the most common answer, chosen by over 250 people, was “no proper treatment at government facilities”. Another 60 people said that “better treatment (was) available elsewhere”. The other most common

answers were “I did not need to go” (roughly 175 people), followed by “too far” (roughly 100 people), “too expensive”, “do not know where it is” (roughly 50 people each), and “do not know about government hospitals” (roughly 35 people).

The last few answers suggest disinterest, but there is clearly a large group that feels that they are not getting the care they want. Part of this may be due to the fact that public doctors spend less effort with their patients. We have no direct evidence on the quality of care in our data, but for Delhi, Das and Hammer (2005) reports very clear evidence. Approximately one month after the vignettes that we described above were administered, one of the interview team sat with the provider for a whole day, recording details of their interaction with each patient. These included some information about the patient such as age, gender, whether s/he was a repeat patient, the number of days sick before seeking treatment for this episode and the symptoms reported. They also recorded details about the transaction including the number of questions concerning the history of the problem, examinations performed, medicines prescribed and (for the private sector) prices charged. Finally, they noted down the medication given, including the names and types of medicines dispensed or prescribed along with the dosage. In total, they observed 4,108 doctor/patient interactions for 193 providers.

The overall sense of health-care in India that we get from their study is nothing short of frightening. In the median (mean) interaction the provider asks 3 (3.2) questions regarding the illness and performs some examinations (which would probably involve using a stethoscope and checking the patient’s temperature). The patient is then provided with 3 (2.6) different medicines (providers dispense rather than prescribe medications in 69 percent of all interactions) and the interaction is over in 3 (3.8) minutes. Patients are seldom referred (less than 7 percent), given instructions (50 percent of the time), or offered guidance regarding follow-up (35 percent of the time). Care appears even worse in the public sector. The median public provider (median in terms of ability, as measured by performance in the vignette) spends 2.19 minutes with the patient (compared to 4.06 for a private provider), asks 2.17 questions (3.55 for private providers) and does any sort of

physical exam 42% of the time (against 75% for the private provider). A part of this difference is explained by the fact that public providers have to see more patients, but even after controlling for the case-load they spend more than one and half minutes less with patients. Moreover after controlling for the case-load *and the time spent with the patient*, public providers do an examination in 28 percent less cases. This is also not because the cases are less difficult. If anything the average case in the public facility is slightly more serious than that in the private facility.

For diarrhea and cough without fever, Das and Hammer collects specific data on what doctors did, which allows them to compare what they know (from what they said they would do in the vignette) to what they actually do. They show that doctors always do less in real exams than what they know to do (as evidenced by what they say in the vignettes) but this gap is much larger for public providers. Finally, they compare how public and private providers examine patients. In the case of diarrhea public providers ask questions much less often about fever and the nature of the stool. This, they conclude, implies that a public provider would probably be unable to differentially diagnose dysentery from viral diarrhea, with potentially life threatening consequences.

The private providers ask more questions and also tend to prescribe more medicines, which may not be warranted. After controlling for qualifications and the type of illness, public providers prescribe 0.13 less antibiotics (this amounts to 0.2 standard deviations of the distribution of antibiotics prescribed) and 0.53 less drugs overall (amounting to almost 0.4 standard deviations of the distribution of the number of drugs prescribed). Given that most of the cases they were treating were of the self-limiting kind, this suggests (but does not prove) that private doctors tend to over-medicate. This is consistent to what we observe in Udaipur, where the patient is given a shot in 68% of the visits to a private facility and a drip in 12% of the visits. A test is performed in only 3% of the visits. In public facilities, they are much less likely to get an injection or a drip (32% and 6% respectively) but no more likely to be tested. Among private doctors, in this sample, it does not appear that more qualified doctors are less likely to administer shots. Given the evidence on the

nature of the ailments that people see doctors for it does seem likely that shots and drips are being overused, at least by the private doctors, and perhaps even by the public providers.

Advocates for an expanded public health system point to facts like these to argue that we cannot expect the market to function effectively in this environment. People simply do not have the necessary judgment. For example, a number of public health officials told us that private doctors were popular because people wanted to be given shots and drips even when they were not medically necessary and private doctors were willing to give them what they wanted, while they, the public health providers, were discouraged from doing so. They also claimed that they needed to buy shots and drips from the market and sell them to the patients, in order to compete effectively with the private doctors.

There is thus evidence that people find it difficult to navigate the market for private health-care. The pattern of doctor visits we described above is consistent with the view that people do not demand the services most important for their health. Adults are more likely to see doctors for acute conditions that will go away on their own their for symptoms of chronic conditions that are potentially much more serious. The fact that people spend so much money on bhopas and trust them to deal with what could be serious health problems (28% of the visits for a pain in the upper abdomen, 33% of the visits for a pain in the lower abdomen or a genital ulcer, and 40% of the visits for menstrual problems are to the bhopa) is obviously worrying, as is the fact that many of them (especially the poor) treat short duration morbidities but not dangerous chronic conditions.

Das and Sanchez (2004) and Das (2000) reach the same conclusion based on the analysis of a data set from Uttar Pradesh and Bihar, as well as the observations in the Delhi survey. They conclude that there are reasons to be concerned about the possibility that the poor are wasting their money on curing diseases that will cure themselves, while the rich know

that they are better off self-medicating and letting nature take its course. It is true that this evidence is not entirely water-tight. After all it is possible that what the poor describe as short duration morbidities are actually symptoms of some chronic illness. However as Das and Sanchez point out, the fact that the ratio of expenditures on chronic illnesses relative to short duration morbidities is much higher for the rich than for the poor, remains true when the sample is restricted to those who are under 30 and therefore have very few chronic illnesses. And while it is possible that the poor are just much more sick when they have a short duration morbidity, the rich-poor gap remains when Das and Sanchez control for the type and duration of the illness.

There is also reason to be concerned about the fact that competition does not eliminate the many private practitioners who are both unqualified and incompetent. One reason may be that people actually do not know the qualifications of the people they see. In the Udaipur we asked people who they saw and whether he/she was a qualified doctor. Comparing these answers with the provider's sell-description (we can match 440 facilities), we see that when the household say that the provider is not qualified, he/she has an MBBS or equivalent in 27% of the cases and is semi-qualified (RMP etc.) in 32% of the cases. When they say he/she is qualified, 24% turn out to be entirely unqualified and another 26% are semi-qualified. Thus, while people do not always know about the qualification of the providers they see, there is no evidence that they are systematically deluded.

There is thus potentially some truth to both the supply and the demand hypotheses. Finally there is some evidence that they interact. Where public health facilities are available, people are less likely to go to unqualified private doctors. In the Udaipur data we recorded the GPS location of each of the facilities and the households. From this we computed the distance from each household to all the private and public facilities in the sample. We use this to identify the closest modern private facility (doctor, compounder, RMP, etc…) from this sample household, the closest qualified doctor (a private facility where at least one provider as an MBBS degree or equivalent) and the number of modern private facilities

within 5, 10 and 20 kilometers from the household respectively. Likewise we identify the closest public facilities, and the closest PHC or CHC.

We then regressed a dummy for whether the last health visit of the individual was at a bhopa, a private practitioner, or a public facility (qualified or unqualified) on the distance from the closest PHC, the distance from the closest public facility, the number of qualified and unqualified doctors within 5 kilometers, and other control variables. The results show that people are more likely to visit a private unqualified practitioners if the PHC or CHC is further away. We also find that people are more likely to visit bhopas when the public facilities are closed more often, though it is not clear how we should interpret this last piece of evidence. Is it the case that patients are more desperate in places where public facilities are closed more often, and turn to bhopas? Or is it the case that nurses' intrinsic motivation plummets when they find that there is no demand for their services, and that they stop coming to work?

7.Identifying policy levers: Two randomized experiments

The evidence presented above suggests that both supply and demand play a role in the low quality of health care received by the population in Udaipur, and that they probably mutually reinforce each other. It leads to two essential research and policy questions. First, what can be achieved by intervening exclusively on the supply side? Is it possible to influence supply without affecting demand? Or would such a policy fall flat on its face without popular pressure to sustain the intervention? Second, what can be achieved by intervening on the demand side? Is it possible to direct demand towards "right" behavior, or is pandering to what poor patients want the only way to affect demand for the public health care, as the discouraged nurses in Udaipur say?

To answer these questions, we set up two randomized experiments in collaboration with Seva Mandir and with the district administration in Udaipur.

7.1 A failed supply-side intervention: Monitoring the Nurses

The first intervention (Banerjee, Duflo and Glennerster, 2008) was a pure supply-side, top-down, targeted at the problem of absent nurses, which was one of the priorities that emerged from the public discussions of the results from the 2003 Udaipur Health Survey. Seva Mandir had some experience in dealing with absenteeism. Faced with a 40 percent teacher absence rate in its schools, it introduced a system of strict monitoring and incentives based on presence, which halved teacher absence, increased the number of child-days in the schools by 30 percentage points, and increased test scores by 0.2 of a standard deviation (Duflo, Hanna and Ryan, 2008). In 2004, Seva Mandir opened negotiations with the government to implement a similar monitoring and incentives program for nurses. By this time a number of sub-centers had two nurses—a "regular", tenured ANM, and an "additional ANM," hired on a yearly contract basis). In November 2005, Seva Mandir and the government agreed that Seva Mandir would monitor the additional ANM for three days a week (the days were agreed to with the local administration), in 16 randomly selected centers (12 two-nurse centers were assigned to be controls). In January 2006, the district administration also passed a directive requiring all nurses in all centers to be at their center every Monday (so no field visit and no meetings were supposed to occur on this day). Seva Mandir was asked to monitor the regular ANMs on Mondays in 33 randomly chosen centers with just one ANM. Thirty-nine single ANM centers were left as controls for this experiment.

To monitor presence, Seva Mandir used date and time stamping machines, locked into a caddy and password protected to prevent tempering. The ANM was supposed to stamp a register secured to the wall of the sub-center three times a day: once at 9AM, once between 11AM and 1PM, and once at 3PM. She must both sign and stamp following a routine that ensures that only the ANM can sign. If an ANM does not stamp on a particular day but has a

legitimate reason, she indicates this on the register. Some absences are "excused" and count as presences; we refer to those days below as "exempt days". In particular, any absence that is the result of a government-mandated meeting, survey, or other health work is authorized. Exempt days are then supposed to be verified by the ANM's supervisor in the PHC. Another reason why an ANM may not be able to stamp is if the machine malfunctions, in which case the ANM was given the responsibility of warning the office to get a replacement.

The sub-center registers were collected at the beginning of each new month by Seva Mandir, and delivered to the nurses' supervisors, who were supposed to verify them and then send them to the district headquarters. The incentives based on these reports were supposed to have some bite. In February 2006, the Chief Medical Health Officer (CHMO) of Udaipur District announced the following incentives to complement the monitoring in the randomly assigned centers: ANMs absent for more than 50 percent of the time on monitored days would have their pay reduced by the number of absences recorded by Seva Mandir's monitoring system for that month. Further, ANMs absent for more than 50 percent of the time on monitored days for a second month would be suspended from government service.

The main results of the evaluation are presented graphically, in Figures 1 and 2 (updated from Banerjee, Duflo and Glennerster (2008), with more recent data). These graphs show the rate of presence of nurses, as verified by random checks at unannounced times. As we explained above, there were two distinct experiments: the monitoring of the single ANM and the monitoring of the additional ANM in two ANM centers. Figure 1 shows the fraction of centers where the regular ANM was present in treatment and control centers. We separate out data for Mondays—the days when these ANMs were monitored and had to stamp the register—and for the other days of the week.[6] Figure 2 shows the

[6] In the first few weeks of the evaluation, due to a miscommunication in the field, random checks happened only on Mondays in the treatment centers and only on other days in the comparison centers. In all the analysis below, we control for the day of the week in which the random check happened.

results for the second ANM in two ANM sub-centers. In this case the second ANM is monitored three days a week. Again we show presence for monitored and unmonitored days separately and contrast this with the control. Both graphs tell the same story. Early on, there was a large impact of the experiment. For centers where there was a single ANM, presence was initially 60% in the treatment group, and 30% in the control group; for the additional ANM in centers with two ANM, the rate of presence of the treatment ANM is about 15 percentage points higher than for the control ANM. However, the presence of the monitored ANM plummets over time (whereas some improvement is observed in the control group, for single ANMs on Monday). After 6 months, the treatment effect entirely disappears, and even turns negative in some cases. Furthermore, The rate of presence of both treatment and control ANM by the end of the evaluation period are both staggeringly low, much worse than the 44 percent documented in 2002-2003.

What accounts for these results? An analysis of the register data given by the nurses sheds some light on this. As presence declined in the registers (consistent with our data), two categories gained in importance over time, "exempted" days and "broken machines". The "machine problems" are likely to be the result of the ANM's response to the incentive system. When a machine is broken, she does not have to stamp until she gets a new one or gets hers fixed. But she cannot get a new one if she is not at the sub-center to meet the program monitor. So if she deliberately stops coming to the sub-center after the machine starts malfunctioning, she does not need to stamp (and is therefore not monitored anymore). Over time, we saw a number of machines that had very clearly been deliberately broken.[7] It also took longer and longer to find the ANM after she reported a problem. The increase in the number of "exempt days" is very likely to be a systemic response also. The exempt days can only be granted by the PHC (they are intended to make it possible for the ANM can perform other duties or attend meetings) and therefore the PHC officials can always check if there are any fake exempt days. The ANM cannot lie about the number of

[7] Some of them were in a state suggesting they had been hurled onto a wall. The ANM also explicitly told Seva Mandir that this is what they would do.

exempt days without the explicit complicity of the PHC officials that she reports to. In turn, the activities at the PHC are monitored by the CMHO of the district, who also gets data and graphs showing the increase in the number of exempt days over time from Seva Mandir. In short, one of two essentially equivalent things is happening. Either the PHC, knowing fully well that being exempt from monitoring is essentially a license to stay home, is providing those excuses to the ANM; or the ANM is making them up, and the PHC is not sanctioning them. In either case, the health administration has undermined the system it had itself put in place, so that the incentives, which remain on the books, no longer have any bite.

Thus, the monitoring system collapsed from within. Why did the district administration undermine a very successful system of incentives that it had introduced? One possibility is that the idea that the nurses should be given some incentives came from the Collector, the head of the district administration, but he was not directly in charge of implementing it. Given that the idea came from the head of the district, the health administrators (the CMHO, and the doctors at PHC) probably could not refuse to implement it. However, they (the CMHO and other health officials) were probably the people who faced pressure from the ANMs to get rid of the new policy. Rather than press for canceling the system, which would have been somewhat embarrassing given that it only required that the ANMs come to work half of the time, it was easier to arrange things so that the incentives were not binding. This was a convenient way to save face while being compliant with the orders, at least on paper, though it meant Seva Mandir was wasting resources by monitoring the nurses. Since the rules were respected, it gave the collector no reason to take disciplinary action against anybody.

But there remains a bigger puzzle. Why was the health administration free to let the nurses off? Why were they not under pressure from the would-be beneficiaries, through the political system, to actually deliver improved services? A part of the answer is that the local governments have little power over the health administration. The only way to put pressure on the health officials is to go all the way up to the areas representative in the state assembly (the “MLA”). The MLA represents many villages, each with multiple

demands. Unless the health system is a top priority for a large number of these villages, it is not clear that it would ever claim enough of the MLA's attention to make a difference. And improving the public health system is probably not at the top of the list of what people are demanding. This is consistent with the evidence that, even when the nurses were coming to work (during the first six months of the program), and this was announced in the communities, we don't find any increase in the (very low) number of patients in the health centers.

The fact that demand for the nurses system was low does not have to mean that people do not care about healthcare, not even for the type of health care provided in the health facilities. It could mean that they have decided the government is unlikely to be particularly effective at providing health care. In this particular case, had they switched from their private provider to the public system just after the program was introduced, they would have regretted it, because the improvement was extremely short-lived. In other words, the lack of a demand response to the supply improvement may be due to the fact that this supply improvement was rightly perceived as unreliable and temporary.

7.2 A successful supply-side intervention: Immunization camps

To find out whether a significant, credible and durable improvement in the supply of one particular kind of health services would result in a change in the pattern of health care demand, we designed another experiment with Seva Mandir (the results are reported in Banerjee, Duflo, Glennerster and Kothari (2008)). Seva Mandir, which enjoys a very strong reputation for reliability, earned through 50 years of dedicated work in the district, set up some regular camps in 60 villages, randomly chosen out of 134. Lack of immunization is a serious issue in Udaipur district. At baseline, less than 3% of the children aged 1 to 5 were fully immunized, although almost half had received at least one of the required shots (and almost all of them had been given the pulse polio drop at least once). These results are much bleaker than what is usually assumed. Official statistics vastly inflate the number of immunized children, because everyone, from the nurses to the government, has incentives to over-report. Nurses are subjected to numerical targets (Coutinho, Bisht, Raje, 2000),

and State Governments like to show off their immunization rates.[8] Even survey data (such as the National Family Health survey) over-estimates immunization because parents are simply asked whether or not the child received certain vaccines. But when parents do not have the card, it is unreasonable to assume that they actually remember exactly what the child has received, or to be able to accurately identify between vaccine doses and shots that were intended as a treatment for a disease, and this tends to inflate the number of doses that are claimed to have been received.

In 30 of these villages, the camps simply tried to replicate what would be a reliable supply of immunization services, organizing an immunization camp once a month, at a fixed date in the village. The nurse in charge of the immunization and his assistant were hired by Seva Mandir, and their pay was tightly tied to attendance (which was monitored using time and dated stamps, as in the teacher project). As a result, over 95% of the scheduled camps took place. Furthermore, a Seva Mandir para-worker was in charged of mobilizing mothers to attend them camp. The para-worker was rewarded as function of children who attended the camp. Given the trust in Seva Mandir as an organization, this intervention probably represented the best possible scenario for a purely supply driven intervention. Mistrust of immunization, which is sometimes an issue in India (immunization has sometimes been accused by people of causing sterilization, for example, see Nichter (1995)), was minimal, and villagers were assured that the camps would indeed be held as announced, and they would not waste their time coming to the village center to get their child immunized. Furthermore, the para-worker played exactly the role that the new cadre of health worker, introduced under India's National Rural Health Mission (the “ashas”), are supposed to play, an intermediary between the population and the formal health system.

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[8] Although the countries they cover do not cover India, Murray et al (2009) show the extent of overestimation of immunization in the official statistics in countries that receive GAVI payments (about $20 per child immunized above the baseline). In the sample they look at, compared to survey data, the number of additional children receiving DTP was overestimated by a factor of 2 in the official statistics, compared to the survey data.

The results of setting up this infrastructure were positive, but relatively modest. An average of 4.5 children per month attended each camp. After two years, 17% of the children aged 1-3 were fully immunized in the villages were the camps were held (against 5% in the control group). There was no spillover to neighboring villages. We surveyed children in villages in a neighborhood of about 6 kilometers and there was essentially no increase in immunization in villages located near the treatment villages, compared to other villages in the control group. On balance, it does not seem that a pure supply-side intervention would be sufficient to induce large increases in the take-up of the services provided in public health centers. Furthermore, because few children attended each camp, this approach turns out to be rather expensive, on average $55 to fully immunize a child in the camp. This is more than the $20 dollar a month disbursed by GAVI to its partner countries for additional children immunized (and of course significantly more than the budget for immunization in India, something of the order of $2 a child).

7.3 Influencing demand: "conditional lentil transfers"

If even a fully reliable supply of immunization, doubled with a real effort to inform and motivate parents via the para-workers, does that mean that convincing households to get preventive care is impossible? Does a health system that does not pander to demand lose any chance to attract clients?

The pattern of results in the immunization camps does not suggest that the relatively low rate of immunization is due to fear or mistrust, as 77% of children receive at least one shot, and 72% receive at least two shots, in two separate visits. Thus, it is not the case that, for example, that the first shot did something they did not expect, and this discouraged them from coming back. It is by the third shot that the rate starts to go down (42% of children receive 3 shots or more –the full course being 5 shots). Parents were at least willing to give it a try but progressively lost interest. The failure to fully immunize is more likely to be a certain indifference than any real resistance. The reason for this indifference might either be a lack of understanding of how immunization works or some form of procrastination, a

certain tendency to delay incurring some small costs. If this is the case, a small incentive might tip the balance in favor of immunization. To test this idea, Seva Mandir selected another 30 villages (they were also randomly selected out of the 134 villages) where the same camps were introduced, but in addition villagers were offered a kilogram of lentils (worth about half a day of the minimum wage) for each immunization and a set of plates for a completing a full round of immunization.

The results of this seemingly small inducement were impressive. The complete immunization rate jumped to 38%, and 46% of children received at least 4 shots. Moreover, immunization rates also increase in neighboring villages. The immunization rate in villages located within a radius of 6 kilometers increased to 20%. The number of children immunized in these camps was on average 13 per month. Since the fixed cost was spread over a larger number of children, the cost per child fully immunized turned out to be lower in these camps despite the cost of the lentils (on average around $28 per child).

8. Conclusions

At one level what we need to do is clear: Get rid of the unqualified doctors, regulate treatments better and improve incentives to put in effort, especially in the public sector. The question, of course, is how.

There are some relatively easy ways to improve regulation, at least if the political will exists. The fact that any Indian can walk into pharmacy and buy essentially any drug without a prescription is one of the main reasons why so many unqualified and semi-qualified practitioners survive and flourish. First the law on who can prescribe what could be tightened and enforced better. One can imagine random checks of what was prescribed or even sting operations to make the law more effective. Second, pharmacies could be penalized for selling scheduled drugs without a valid prescription from somebody who is

allowed to prescribe that particular drug (as they supposed to be). Once again sting operations could be used to identify violators. Once these two restrictions are in place, unqualified doctors would have a hard time staying in business since their patients would not have access to any drugs. Moreover the tendency to over-medicate would somewhat curbed, because a lot of the semi-qualified doctors would be limited in what they are allowed to prescribe.

The government could also create a standardized system for classifying doctors that is simple enough to be intelligible to all patients: say, specialist, qualified, semi-qualified. These classifications should be verified and updated every five or ten years, to avoid the problem of hereditary doctors. The current classification of the doctor would be required to be prominently displayed at the dispensary, using colors or icons that anyone can identify.

None of this really solves the core problems of distorted demand and doctor indifference, at least in the short run. At best the regulations will improve the average quality of the doctors that people see and put some limits on how easily the patients can be mistreated. But if the patients really want a certain type of treatment, they will probably be able to get it. Over-medication is as much a problem in the case of qualified private doctors as it is for the unqualified (Das and Hammer (2005)), and a black-market in drugs may emerge to circumvent the regulations. Nevertheless the fact that these drugs are now harder to obtain and more expensive, combined with the fact that they now hear that these drugs are illegal, might, in the long run, persuade people to try the alternative of letting self-limiting ailments take their course. And perhaps once they see that it works, they might actually grow to think of it as the norm. More generally educating patients has to be a priority if the system has to work better.

The harder question is how to get the doctors to behave, to use what they know and put more effort into examining patients. The most basic issue here is how to deal with absence in public facilities. Local control is the one solution that is being widely discussed these

days. This was the main approach advocated by the World Bank (2004) Development Report on social services delivery. Shanta Devarajan, who directed the report, summarizes the idea: "Services can work when poor people stand at the center of service provision - when they can avoid poor providers, while rewarding good providers with their clientele, and when their voices are heard by politicians - that is, when service providers have incentives to serve the poor." In Uganda, Bjorkman and Svensson (2009) found significant improvement in the quality of the health care provided in public facility after a successful campaign to strengthen local control over the health facilities. The situation is quite different in Uganda than in India, however. There are few private doctors in Uganda, and the alternative to government facilities are either self remedy or traditional healers, who offer very different services. Local control would be much less likely to work in India, where people are largely indifferent to what is happening in the public facilities.

Low demand unfortunately affects more than community-control. Through the political channel, it also undermines the effectiveness of purely supply-driven intervention. Without demand for these services, the pressure to maintain them cannot be sustained, as the ANM experiment demonstrated.

It thus seems that finding successful ways to affect demand is essential. Fortunately, it does not seem to be so difficult, as the results of the "lentils for vaccine" program suggests. Affecting demand turns out to be much easier than what may have been expected. This is consistent with evidence from a number of settings and countries, suggesting a very large price elasticity of the demand for preventive products.[9] One consistent finding of a number of independent randomized studies is the price elasticity of demand around zero is huge. Kremer and Miguel (2007) found that raising the price of de-worming drugs from 0 to 30 cents per child In Kenya, reduces the fraction of children taking the drug from 75% to 19%.

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[9] This is of course also consistent with the evidence that conditional cash transfers increase the take up of preventive health services (see Fiszbein and Schady (2008) for a review), but CCT are typically much larger transfers, which would be expected to have both income and price effects.

Also in Kenya, Cohen and Dupas (2007) find that raising the price of insecticide treated bednets from 0 to 60 cents reduces the fraction of those who buy the nets by 60 percentage points. Raising the price of water disinfectant from 9 cents to 24 cents, Ashraf, Berry and Shapiro (2007) found, reduces the fraction who take up the offer in Zambia by 30 percentage points. Similar large responses are also found with small subsidies. Most remarkably, a reward of 10 cents got 20 percentage more people in Malawi to pick up the results of their HIV test (Thornton, 2007). Moreover, Dupas (2009) finds encouraging results that, when a household has received one free bednet, they are at least as likely (and even somewhat more likely) to pay for a second one, and that their neighbors are also more likely to acquire one. This suggests that affecting the demand for health services may not be so difficult. Once demand is stimulated somewhat, one may hope that this will provide the necessary feedback to allow improvements in care to be sustained over time.

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Table 1: Selected health indicators, by position in the income distribution

group	self reported	No. of symptoms in last 30 days	BMI	hemoglobin below 12 g/dl	peak flow meter reading	high blood pressure	low blood pressure
bottom third	5.87	3.89	17.85	0.57	314.76	0.17	0.06
middle third	5.98	3.73	17.83	0.59	317.67	0.15	0.08
top third	6.03	3.96	18.31	0.51	316.39	0.20	0.09

Table 2a: Medical Training

Facility Type	No Formal Qual	RMP	BAMS	BIMS	BUMS	MBBS	BHMS/ DHMS	MBBS + Spec	ANM	Pharm	Seva Mandir	Other NGO Training	Govt Training	Other Trainin
private doctor	13.9%	21.3%	6.6%	0.8%	0.0%	10.7%	10.7%	27.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.8
nurse/MPW	0.0%	0.0%	11.1%	0.0%	0.0%	0.0%	0.0%	0.0%	55.6%	0.0%	0.0%	0.0%	0.0%	33.3%
compounder	15.6%	6.3%	12.5%	0.0%	3.1%	0.0%	0.0%	1.6%	6.3%	3.1%	0.0%	0.0%	6.3%	45.3%
pharmacist	75.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	18.8%	0.0%	0.0%	0.0%
TBA/Dai	76.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.5%	0.0%	0.0%	0.0
VHW	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	86.4%	9.1%	4.5%	0.0%
Commmunity Health Worker	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	50.0%
Home Remedy Worker	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Trad healer/ desi ilaj practitioner	60.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	20.0%	0.0%	0.0%
jhaad fonk practitioner	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
desi ilaj and jhadd fonk	96.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.3%	0.0%	0.0%
private hospital	0.0%	2.4%	0.0%	2.4%	0.0%	9.5%	0.0%	63.1%	2.4%	0.0%	0.0%	0.0%	0.0%	27.4%
ayurvedic	50.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
non medical profession	75.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%
other	28.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	28.6%	0.0%	0.0%	42.9%

Main Provider Education Table 2b

Main Providers						
factype	Percentage Educated People	Percentage Educated in NFE	Percentage Who Went To School	Percentage Graduate People	Percentage Who Went To School But Not Graduates	Mean Class Reached By People Who Went To School and Do Not Have Grad Diploma
private doctor	100.0%	0.0%	100.0%	63.1%	36.9%	11.1
nurse/MPW	100.0%	0.0%	100.0%	22.2%	77.8%	11.4
compounder	100.0%	3.1%	96.9%	34.4%	62.5%	11.5
pharmacist	100.0%	0.0%	100.0%	6.3%	93.8%	9.3
TBA/Dai	7.2%	5.4%	1.8%	0.0%	1.8%	2.5
VHW	95.5%	4.5%	90.9%	0.0%	90.9%	6.4
Commmunity Health Worker	100.0%	0.0%	100.0%	0.0%	100.0%	10.0
Home Remedy Worker	100.0%	0.0%	100.0%	50.0%	50.0%	11.0
Trad healer/desi ilaj practitioner	60.0%	20.0%	40.0%	0.0%	40.0%	4.5
jhaad fonk practitioner	23.8%	6.3%	17.5%	0.0%	17.5%	5.0
desi ilaj and jhadd fonk	40.0%	10.0%	30.0%	0.0%	30.0%	3.7
private hospital	97.6%	0.0%	97.6%	92.9%	4.8%	12.0
ayurvedic	100.0%	0.0%	100.0%	0.0%	100.0%	11.0
non medical profession	75.0%	0.0%	75.0%	0.0%	75.0%	8.0
other	85.7%	14.3%	71.4%	14.3%	57.1%	8.8

Table 4: Health-care costs

Total Health Visit Cost (w/o Transportation)	Visit Cost (average of all) According To					Costs with Test/Ope		Cost Without Test/Ope
	Clients	Private Provider		Public Provider		Client	Provider	Client
Facility type	Average cost	Total Consultation Fee (Poor)	Total Consultation Fee (Rich)	Percentage of Facilities Who Charge Any Fee	Maximum Fee That Can be Charged	Cost of Visits with Tests or Operations	Amount for Lab Test + Operation+ InpatientStay	Cost of Visits Without Tests or Operations
CHC/	138.1			87.50%	17.3	683.0	14	100.2
PHC				0.0%				
Government referral hospital	1217.2					3145.2		555.0
Private hospital	889.5	1364.1	1344.5			3106.4		462.4
Ayurvedic hospital	1981.4			0.0%		29326.7		73.6
TB hospital	401.0					6667.0		.
dispensary	0.0					0.0		.
aidpost/subcenter	32.8			0.0%		300.0		32.5
angawadi	0.0					.		0.0
health camp	0.0					0.0		0.0
Ngo clinic	121.8					774.0		78.5
private qualified doctor	178.6	107.4	130.0			1788.0		145.3
private nurse/	157.9	53.3	61.7			4410.0		91.4
componder		44.0	46.9					
private pharmacist	16.7	38.5	37.3			.		16.7
bengali doctor	105.2					394.7		99.5
government doctor, private practice	179.2					3383.3		132.9
practitionner, private practice	103.7					540.0		93.5
TBA/Dai	103.3	6.2	10.7			.		103.3
VHW/	0.9	4.0	4.5			.		0.9
CHW		42.5	50.0					
HRW	33.2	767.5	767.5			.		33.2
bhopa	130.8							
(desi ilaj/		11.9	11.9					
jhaad fonk/		8.0	8.0					
both)		7.4	12.0					
OTHER	16.1	18.6	27.1			0.0		17.1
Don’t know	144.5					2050		103.8
ayurvedic		30.0	30.0					
non medical profession		2.8	2.8					

Note: we do not have detail on operations/lab test for private providers

Table 2: frequency of health care visits

	Per capita monthly expenditure	Total number of visits in the last 30 days			
		ALL	Public	Private	Bhopa
PANEL A: MEANS					
ALL	470	0.51	0.12	0.28	0.11
poor	219	0.43	0.09	0.22	0.12
middle	361	0.54	0.11	0.29	0.13
rich	770	0.55	0.15	0.33	0.07
PANEL B: OLS REGRESSIONS: dependent variable: number of visits					
Middle		0.11	0.02	0.07	0.01
		(.052)	(.023)	(.034)	(.027)
Rich		0.12	0.06	0.11	-0.05
		(.05)	(.024)	(.034)	(.022)
PANEL C: OLS REGRESSIONS, WITH VILLAGE FIXED EFFECTS					
Middle		0.14	0.02	0.09	0.02
		(.047)	(.024)	(.033)	(.023)
Rich		0.13	0.04	0.11	-0.03
		(.05)	(.026)	(.036)	(.025)
Villages Fixed effects		yes	yes	yes	yes

Note: Omitted dummies in panel B and C: poor
Standard errors in parentheses below the coefficients

Table 5: Choice of Facilities

Condition	Mean	Any Visit	Fraction of Private Hosp	Fraction of Private Visit	Pub	Pvt	NGO	Bhopa
MILD AND SERIOUS								
Hot Fever	0.32	0.54	0.03	0.02	0.19	0.59	0.01	0.14
Diarrhea	0.16	0.45	0.05	0.02	0.20	0.62	0.01	0.10
Vomiting	0.09	0.40	0.02	0.01	0.18	0.61	0.00	0.16
Pain in Upper Abdomen	0.23	0.38	0.03	0.01	0.20	0.45	0.00	0.29
Body Ache	0.42	0.37	0.04	0.02	0.21	0.51	0.01	0.20
Cold Symptoms	0.33	0.35	0.03	0.03	0.20	0.61	0.01	0.10
Cough with Blood	0.01	0.34	0.20	0.00	0.30	0.40	0.00	0.10
Dry Cough	0.20	0.34	0.02	0.01	0.23	0.60	0.02	0.10
Headache	0.42	0.34	0.03	0.01	0.20	0.53	0.02	0.19
Productive Cough	0.11	0.33	0.07	0.00	0.22	0.54	0.02	0.13
Pain in Lower Abdomen	0.12	0.31	0.01	0.04	0.14	0.47	0.00	0.33
Back Ache	0.33	0.28	0.03	0.03	0.21	0.49	0.03	0.19
Weakness/Fatigue	0.23	0.25	0.05	0.02	0.18	0.53	0.02	0.19
Skin Problems	0.03	0.24	0.15	0.00	0.10	0.55	0.05	0.10
Swelling Ankles	0.01	0.24	0.00	0.11	0.22	0.33	0.00	0.33
Menstrual Problems	0.06	0.24	0.05	0.05	0.25	0.20	0.05	0.40
Painful Urination	0.10	0.21	0.04	0.00	0.23	0.52	0.02	0.19
Chest Pain	0.11	0.20	0.02	0.02	0.24	0.51	0.02	0.18
Trouble Breathing	0.07	0.19	0.03	0.06	0.17	0.57	0.03	0.14
Genital Ulcers	0.01	0.18	0.00	0.00	0.17	0.50	0.00	0.33
Blood in Spit	0.01	0.17	0.00	0.00	0.25	0.50	0.00	0.25
Worms in Stool	0.03	0.14	0.00	0.09	0.55	0.18	0.00	0.18
Weight Loss	0.11	0.07	0.05	0.05	0.26	0.42	0.05	0.16
Problems with Vision	0.14	0.06	0.05	0.00	0.30	0.45	0.00	0.20
Night Sweats	0.03	0.04	0.00	0.00	0.33	0.67	0.00	0.00
Hearing Problems	0.04	0.03	0.00	0.00	0.00	0.33	0.00	0.67

Table 6: Patterns of Health-care Spending

	household monthly health expenditure			Average adult monthly expenditure on:				Average cost per visit			
	level		share/monthly exp.								
	expenditure survey	individual surveys	individual surveys	All visits	share public	share private	share bhopa	all visits	Public	Private	Bhopa
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
PANEL A: MEANS											
ALL	286	196	0.07	59	0.18	0.66	0.15	117	113	144	74
poor	70	99	0.07	32	0.13	0.61	0.24	72	71	84	61
middle	162	195	0.09	52	0.14	0.68	0.17	95	52	130	76
rich	571	286	0.08	88	0.23	0.68	0.09	166	173	191	90
PANEL B: OLS REGRESSION											
middle	92	96	0.02	19	0.01	0.07	-0.07	23	-19	46	16
	(21)	(38)	(.018)	(8)	(.042)	(.051)	(.041)	(12)	(24)	(20)	(31)
rich	500	187	0.01	55	0.10	0.07	-0.16	94	102	107	29
	(109)	(34)	(.012)	(12)	(.042)	(.053)	(.041)	(24)	(45)	(35)	(34)
PANEL C: OLS REGRESSIONS, WITH VILLAGE FIXED EFFECTS											
middle	92	63	0.02	16	0.01	0.08	-0.07	5.7	-33	0.46	-7.9
	(21)	(39)	(.015)	(12)	(.04)	(.049)	(.039)	(26)	(78)	(42)	(36)
rich	500	135	0.01	43	0.05	0.07	-0.10	76	-21	73	81
	(109)	(42)	(.016)	(13)	(.042)	(.052)	(.041)	(28)	(86)	(43)	(49)
village fixed effects	yes	yes		yes	yes	yes	yes	yes	yes	yes	yes

Table 7: Continuous facility survey: summary statistics

	Subcenters & aidposts	PHC & CHC
doors closed	0.56	0.03
no personnel found	0.45	0.03
fraction of medical personnel found	0.55	0.64
doctor is appointed	0	0.89
fraction of doctors present	--	0.55
at least one medical personnel is missing	0.56	0.78
observations	5268	1716
number of facilities	108	35
number of visits per facility	49	49

Table 8: Where is absence higher?

		Fraction of medical personnel present	
	number of visits	Subcenters & aidposts	PHC & CHC
Distance from road			
0 Km from road	5103	0.56	0.65
>0 and <=5 Km from road	1478	0.55	0.63
>5 Km from road	403	0.38	
Distance from Udaipur			
closest to udaipur	2315	0.53	0.61
farther	2254	0.58	0.68
farthest	2415	0.54	0.66
Distance from the nearest town			
closest to town	2350	0.56	0.64
farther	2396	0.55	0.75
farthest	2238	0.54	0.59
Reservations for women			
no reservation for women	2583	0.57	0.50
reservation for women	1843	0.56	0.68
Electricity			
no electricity	3123	0.56	0.60
electricity	1564	0.52	0.65
Water			
in facility	757	0.53	0.61
less than 30 meters from facility	2365	0.57	0.68
30 to 100 meters from facility	794	0.49	0.62
more than 100 meters from facility	771	0.59	0.62
Medical personnel living in facility			
no medical personnel living in facility (with living quarters)	2640	0.56	0.80
at least one medical personnel living in facility	853	0.64	0.69
no living quarters available	3171	0.49	0.64

Note: some data covers only a subset of facilities

Table 9: Pattern in center opening

	Dependent variable: Fraction of medical personnel present					
	Subcenters and Aidposts			**PHC and CHC**		
A. F statistics						
Facility dummies	6.16	6.13	5.62	17.51	16.77	17.12
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Day of visits dummies	no	1.99	no	no	1.49	no
		(0.09)			(0.2)	
Facility dummies* day	no	1.17	no	no	1.06	no
		(0.01)			(0.3)	
Time of visit dummies	no	no	5.35	no	no	9.57
			(0.02)			(0.00)
Facility dummies* time of visit	no	no	1.19	no	no	1.91
			(0.05)			(0.00)
Adjusted R2	0.12	0.13	0.13	0.21	0.22	0.23
Observations	6342	6342	6327	2078	2078	2074
B. Fraction of facility level regressions where the dummies are jointly significant						
Day of visit dummies	0.095			0.000		
Time of the day dummies	0.086			0.171		

Note: 1. Panel A report F statistics and p value for the joint hypothesis that the dummies are significant in a regression
where the dependent variable is the fraction of personel present on the day of the visit

2. Panel B reports the results from running a separate regression for each facility, where the dependent variable is the fraction of person present on the day of the visit, and the explanatory variables are days of the visit dummies, time of the visit dummies, and season dummies.

Figure 1

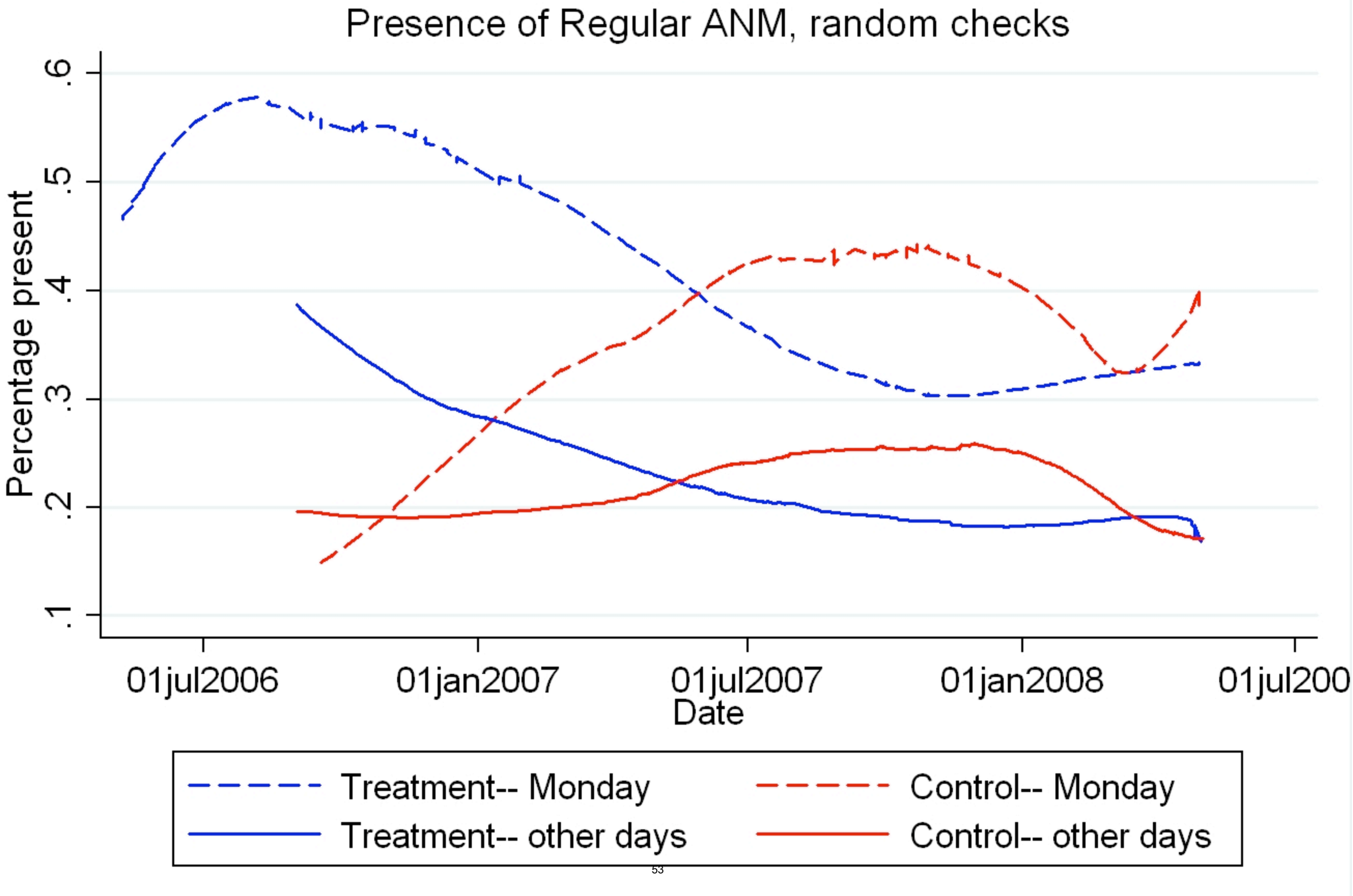
Presence of Regular ANM, random checks
Percentage present
.1
.2
.3
.4
.5
.6
01jul2006
01jan2007
01jul2007
01jan2008
01jul200
Date
Treatment-- Monday
Control-- Monday
Treatment-- other days
Control-- other days

Figure 2

Additional ANM present, two ANMs centers, random checks