Lecture 4: Health

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Recap from last lecture....

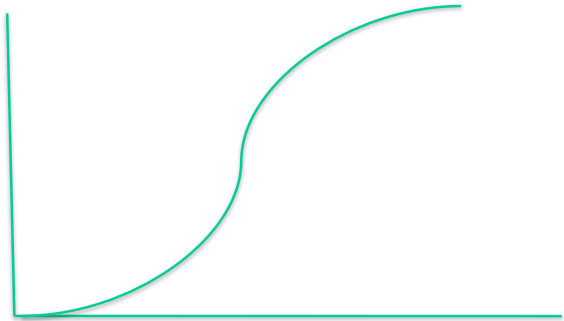
- Nutrition-based poverty trap only arises if there is a very strong relationship between income and nutrition, and between nutrition and income
  - Basically need inherited income x to generate $> x$ in returns (at least somewhere).

- Even after controlling for endogeneity we find a pretty robust response of food expenditure to total expenditure.
- But that elasticity is below one (0.83).
- As people become richer, they also buy more expensive calories, so this is an upper bound for calorie/nutrition response
- And when people eat more, they get more productive, but not by a lot (at most elasticity may be around 0.5).
- So it seems it will be hard to generate a nutrition based poverty trap based just on this phenomenon.

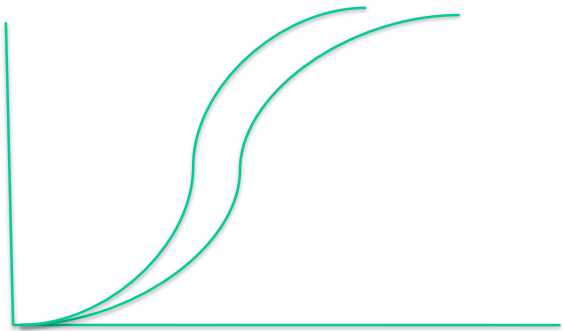
Child nutrition

- Child nutrition may be a mechanism through which such a productivity trap emerges.
- This is because a one time investment potentially has long-term impacts: can generate much larger returns in terms of life time income.
- E.g. better in utero nutrition makes you a stronger/smarter/healthier worker $\rightarrow$ steeper capacity curve.

Capacity curve with different nutrition histories



Capacity curve with different nutrition histories



Example: The Long-Term Effect of Deworming

- Why deworming ?
- The program was started in 1999.
- A first study (Miguel and Kremer, 2004) was undertaken in the short run (before the control group was treated) to look at the effect of the program on school participation, anemia, etc.
- A second and third study (Baird et al, 2016, 2021) were undertaken in the longer run: 7,530 of children who were in schools at the time of the deworming program were followed at home, in 2003-2005 and 2007-2009, and hen again 10 years later.

Randomization Design

In the original program, the decision was taken to randomize at the school level. Schools were assigned into three groups:

- Group 1 Deworming program received in 1998-2003
- Group 2 Deworming program received in 1999-2003
- Group 3 Deworming program recevied in 2001-2003

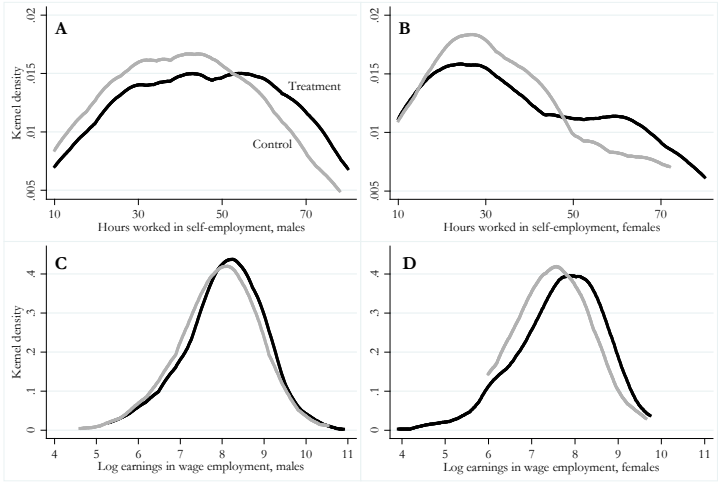
Thinking carefully about Design

- Why not randomize within school instead (treat some kids and not some other)?
- Externalities—Worms are contagious: if some children are treated, they are less likely to be sick, so then even their untreated friends might also be less likely to get sick. What does it do to our treatment effect if we randomize within school?
- Can we do this design with just a few large schools?
- Careful! since the variation is at the school level we need to have enough school!

The results

- Short run: Large effects on school participation (mainly due to more than 25% reduction in absenteeism: presumably because kids are sick less often).
- Long run...

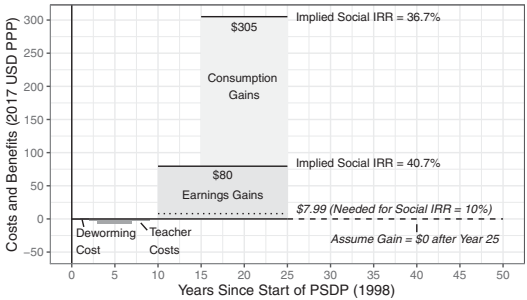
Figure II: Kernel densities of hours worked in self-employment and log earnings in wage employment, treatment versus control



Notes: Kernel density in the treatment group is shown in black, and in the control group shown in grey. Panel A displays hours worked in self-employment in the last week (among those working 10 to 80 hours in the sector) for males, and Panel B displays the same for females. Panel C displays log earnings in wage employment in the past month (among those with positive earnings) for males, and Panel D displays the same for females.

Table 2. The 10- to 20-y deworming treatment effects on earnings, labor supply, occupation, and sectoral choice, KLPS-2, KLPS-3, and KLPS-4

	Treatment (λ_1)			Full sample	
	(1)	(2)	(3)	(4)	(5)
	Full sample	Male	Older	Control mean	Number of obs.
A: Earnings and wealth					
Log annual individual earnings	0.09	0.06	0.19**	6.73	7,698
	(0.06)	(0.07)	(0.08)		
Wage earnings (annual)	81	138	162*	887	13,628
	(68)	(110)	(89)		
Self-employment profit (annual)	41*	51	70*	212	13,638
	(24)	(48)	(39)		
Individiual farming profit (annual)	−0	1	−3	9	13,707
	(2)	(3)	(3)		
Nonzero earnings	0.02*	0.04**	0.02	0.59	13,794
	(0.01)	(0.02)	(0.02)		
Hourly earnings	0.14*	0.22	0.32*	1.07	6,096
	(0.08)	(0.15)	(0.16)		
Per capita household wealth (KLPS-4)	69	102	253***	522	4,085
	(50)	(97)	(89)		
B: Labor supply, occupation, and sectoral choice					
Urban residence	0.04**	0.06**	0.03	0.45	13,793
	(0.02)	(0.03)	(0.03)		
Total hours worked (last 7 d)	1.04	2.20**	1.79**	24.19	13,807
	(0.66)	(0.92)	(0.91)		
Hours worked—agriculture (last 7 d)	−0.87**	−0.57	−0.46	3.99	13,807
	(0.43)	(0.62)	(0.56)		
Hours worked—nonagriculture (last 7 d)	1.91***	2.77***	2.24**	20.20	13,807
	(0.65)	(0.94)	(1.08)		
Employed—agriculture/fishing	-0.003	−0.001	0.004	0.043	13,768
	(0.008)	(0.013)	(0.012)		
Employed—services/wholesale/retail	0.002	0.012	−0.002	0.230	13,761
	(0.014)	(0.020)	(0.019)		
Employed—construction/trade contractor	0.004	0.011	−0.007	0.033	13,760
	(0.007)	(0.014)	(0.009)		
Employed—manufacturing	−0.001	0.002	0.002	0.026	13,760
	(0.004)	(0.007)	(0.006)		


Costs and Benefits (2017 USD PPP)
300
250
200
150
100
50
0
−50
0
5
10
15
20
25
30
35
40
45
50
Years Since Start of PSDP (1998)
$305
Implied Social IRR = 36.7%
Consumption Gains
$80
Implied Social IRR = 40.7%
Earnings Gains
$7.99 (Needed for Social IRR = 10%)
Deworming Cost
Teacher Costs
Assume Gain = $0 after Year 25

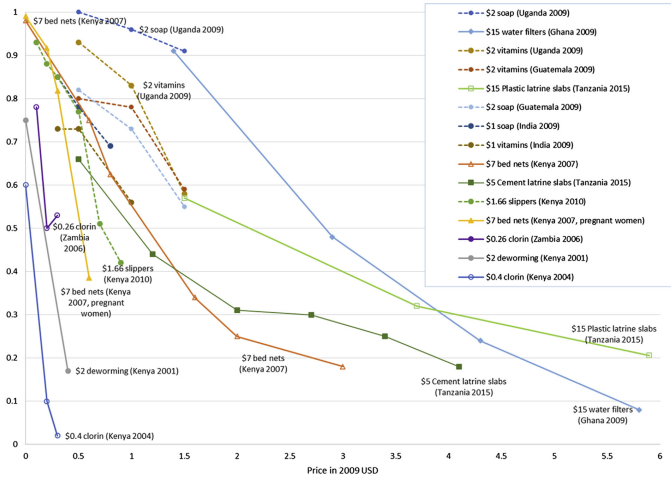
Deworming: Taking stock

- School-based deworming is extremely cheap and easy to do. In places where worms are a problem (which can be measured with a survey) it is recommended policy (by WHO). This shows that a "small" program can have very large impact (there are very few things we know of that can increase wages by 20% every year!!!)
- This also suggests a large elasticity of lifetime earnings with respect to better nutrition in childhood.
- However one surprising thing is that paren ts are not doing it themselves. In fact, when cost-sharing was introduced in the schools in treatment 1, take up fell to almost zero.
- Why could that be?
- Where does this leave us in terms of thinking about poverty traps?
- If there is a cheap investment with a very high return (like deworming), then it is very hard to think that it could be the source of a poverty trap, in a mechanical sense. People should be able to do this!! We need another ingredient (such as lack of information, low valuation of children's earnings, etc.)

Preventive Care: The Demand Problem

- This problem is more general...
- Low utilization of cheap health saving medical interventions (breastfeeding, immunization, oral rehydration solution, chlorine).
- Very high price-elasticity for those services, both for positive prices, and negative prices.
  - Positive prices (even small) discourage use:

Positive Prices Discourage Take up:



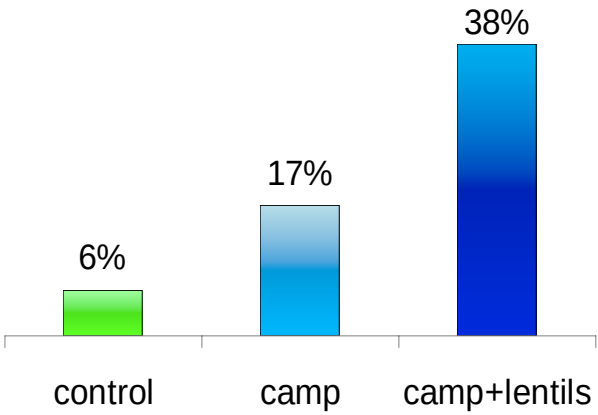
Beyond prices

- Small rewards greatly encourage use: The example of immunization
  - 25 million children annually do not get immunized, many in India and Nigeria.
  - This does not appear to be due to a resistance to immunization
  - Can small incentives make a difference ?

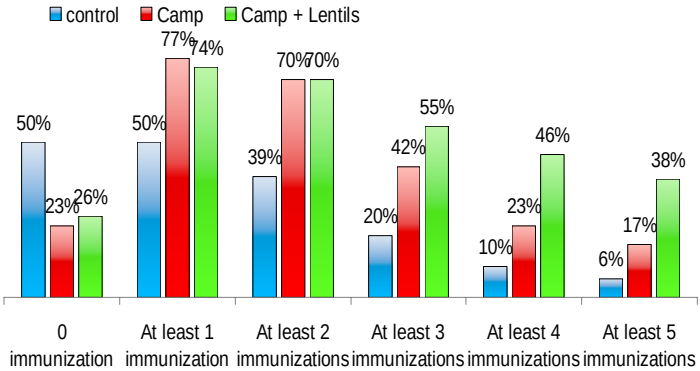
The Impact of Small Incentives on Immunization

- An experiment concerning where to improve both supply and demand for immunization services.
- In some immunized camps, Seva Mandir (an NGO) offered one kilogram of lentils to mothers who took their children to be immunization, and a set of plates for completed immunization.
- A very small reward would not convince people who are strongly against immunization.
- Large impact on full immunization, especially on getting more than one of the needed shots.
- Similar results have been replicated in other contexts with different types of incentives (vouchers, cell phone minutes, cash transfers): Pakistan, India, Nigeria...

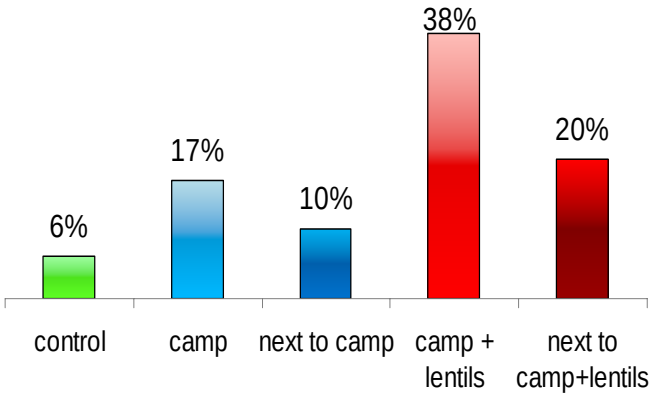
Fraction of Children Fully Immunized



Fraction of Children Receiving Different Number of Immunizations



Spillovers to Other Villages



Why Is the Demand for Preventive Care So Sensitive to Prices?

- The high sensitivity to (even small) prices on the demand for preventive care is surprising. In a standard model of investment in health, the individual compares the costs and the benefits. Given the very high returns of those investment in terms of health, the demand should be high.
- There could be fear, or lack of trust (as in the US, for the COVID vaccine): But in that case small changes in prices should not have any effect
- Two explanations have been proposed:
  1. "Time inconsistent preferences" a.k.a, the clocky problem.
  2. The perceived benefits of those actions is low (even if the real benefits are high): Parents are largely indifferent between immunizing their children or not immunizing them.

Time-Inconsistent Preferences: What is this?

Time-Inconsistent Preferences

- Today, cost of immunizing the child is time taken, child discomfort, potential side effects.
- Benefits are in the future (at some unknown time).
- Human beings think of the present and the future differently
  - In the present, we are impulsive: Costs incurred today appear very large relative to benefits.
  - In the future, we are more rational: Costs to be incurred next month appear small relative to benefits.
  - We have a tendency to postpone small costs to a future period.
  - But when the future comes, it is now the present, and the costs again seem large.

Time Inconsistent Preferences and Preventive Care

- This could explain why getting an immunization is always postponed until next month while people are willing to spend large sums of money on a dubious curative care treatment for the same disease for their child.
- In this case, a small benefit that offsets the small cost and is obtained today (e.g. a bag of lentils) can convince parents to take the step today.
- In most developed countries, there is a compulsory schedule of immunization: it plays the same role.
- In this world, subsidies, incentives, or making some behavior compulsory, can all be justified for two reasons:
  - Externalities: They convince us to undertake behavior that have positive spillovers on others.
  - "Internalities": They help us undertake behavior that are optimal from our own point of view.

The Role of Commitment Devices

- If time-inconsistency is the main problem, there can be other ways to help individuals in taking the right steps:
  - "Nudging," in the words of Richard Thaler and Cass Sunstein: Marketing techniques used to stir individuals to a choice that would be right from their rational's self point of view (e.g. "good" default choices).
  - Helping them to commit in advance to behave in a certain way in the future: commitment devices.

Demand for incentives to stop drinking

- A study by Frank Schilbach offers rickshaw drivers with a major drinking problem a chance to commit to stop drinking
- Individuals come into the lab, are given incentives to show up sober at the lab for a few days, and then some of them are given a choice between incentives and sure payment. Ask them to chose under 3 scenarios:
  - In one scenario they do better if they are sober under incentives than under the sure payment
  - In one scenario they do as well under incentives than under sure payment, and they lose money if they are drunk.
  - In one scenario they lose money EVEN if they are sober.
- Then one scenario is randomly chosen to be implemented.
- He finds that a substantial share of people are willing to chose incentives even in the third case: willing to lose money for sure to constrain themselves.

Can this be all?

- Thus, there is evidence that time-inconsistency plays a role.
- However, constantly postponing preventive care, if he/she is fully aware of the benefits, requires a household to be both time-inconsistent and very naive.
- Maybe it is not the entire explanation....
- How about our understanding of health?

Preventive versus curative care

- The low demand for preventive care contrasts with high expenditure on health
- Udaipur, India (Udaipur Health Project): 7% of budget is spent on health.
- Type of health care received:
  - Traditional medicine for some things
  - When modern medicine is used: shots, drips, pills etc.
- What is the difference between preventive and curative care?

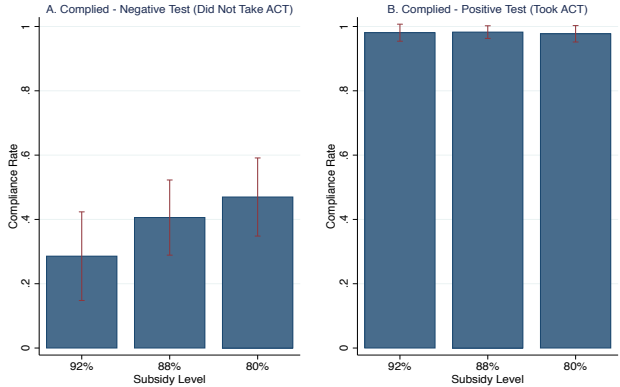
Learning about Health

- Suppose that your prior belief is that antibiotics help a great deal
- Then in a unregulated market you will always get an antibiotic
- Now if most diseases get well by themselves anyway, each new experience will reinforce your belief that indeed the antibiotic works.
  - Danger of large subsidy of antibiotics and other drugs: over-treatment
- Example: Malaria medicine and testing (Cohen, Dupas, Schaner).

Subsidy and testing of anti-malarial medication

- Subsidize ACT, a new malaria medicine, with a voucher for ACT at local pharmacy, in a randomized experiment
- Without subsidy, 19% of self-diagnosed malaria episodes get ACT; with 92% subsidy, 49% do so.
- But many self-diagnosed episodes are not malaria (see table).
- Possible solutions:
  - Lower subsidies reduce over-treatment without leading to under-treatment
  - Testing. However there is a trust issue: very poor compliance with test result if negative.

Figure 5. Compliance with Malaria Test Results



Teaching health behavior is not easy

- Deworming: zero impact of education components (wear shoes, etc.) on those behavior
- Iron-fortified Salt experiment in Bihar: zero effect of any type of information campaign (contrast to large effect of subsidy).
- HIV-AIDs prevention campaign in primary school in Kenya, evaluated in large RCT: no impact on pregnancy, STDs
- Some public health campaigns are more effective: e.g. skulls and bones for arsenic-exposed drinking water in Bangladesh did discourage people (on the other hand it sent them to shallow well which increased diarrhea....).

The policy implications

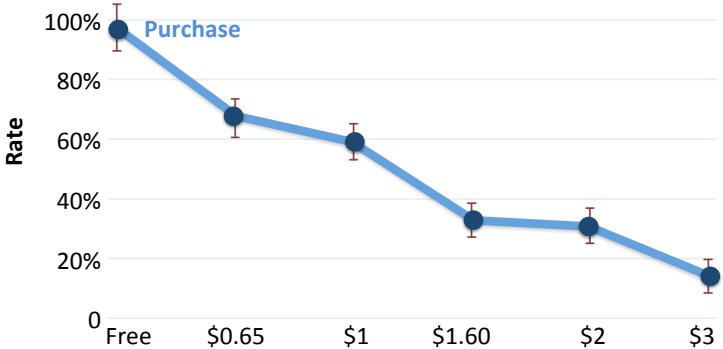
- Large benefits to make preventative actions as easy as possible for people: use of default options, compulsory behavior, etc.
- Where overuse an issue, try to make curative things a bit harder.
- In developing countries, things are almost the opposite of what it should be: everything is a little harder (the nurse is not present, etc.) while in contrast curative care is really easily available.

- So why not compensate by making things cheap/free/even cheaper than free?
- This gives rise to 3 questions among policymakers:
  - Will people mis-use a good they got for free?
  - Will people get used to handouts (or: alternatively, will they learn?)
  - Will others be discouraged from buying the goods (or, alternatively, will they learn?)

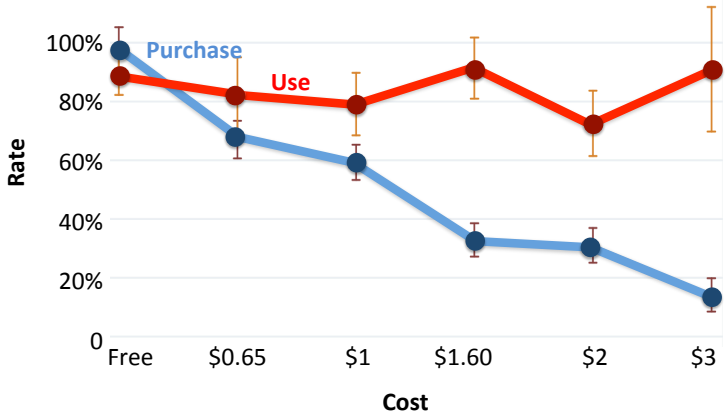
The effect of price on usage, learning, and social effects

- A study by Pascaline Dupas in Kenya provides answers to all 3 questions
- Design:
  - Round 1: People get a voucher for a bednet at reduced price (from free to a few dollars)
  - Round 2: A few months later, second vouchers, all at the same price (mid-point)
- Questions
  1. What is the price elasticity?
  2. What is the elasticity of price on usage?
  3. What is the elasticity of price on future purchase?
  4. Are the neighbors of people who got it for free more or less likely to purchase the new one?

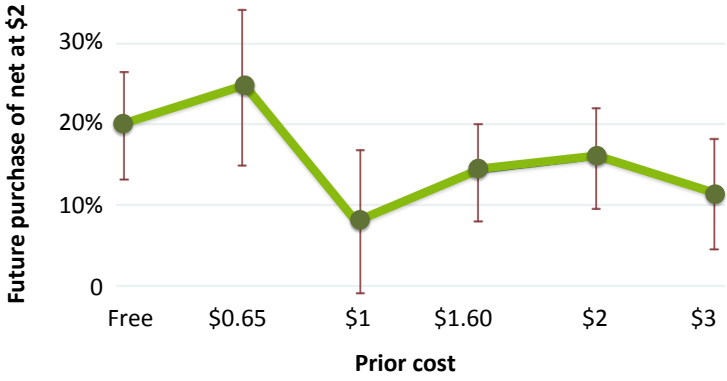
If people must pay for bednets, will they purchase them?



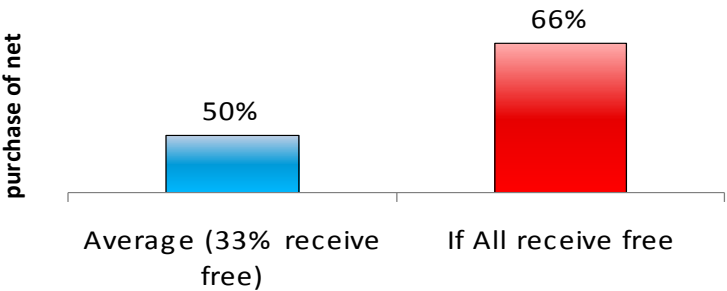
When people get bednets for free, will they use it?



Do free nets discourage future purchases?



Do neighbors buy nets if other got it for free?



Conclusion

- Still need much more research...
- We have some understanding of barriers to effective health behavior, but little idea about how to structure a health sector that works very well.
- Some of the obvious magic bullets (free health care, or the opposite, pay for everything) are not very effective.
- Some novel ideas: mobilize the social networks (India: immunization ambassadors) or social image concern (Sierra Leone: silicone bracelets for immunization) show promise but need to be tested some more on large scale!

Public or Private Health Care?

- Health care is a credence good, with substantial asymmetric information (Arrow, 1963): the provider knows more than the patient.
- Learning is very difficult.
- Furthermore there are substantial externalities: Individuals will tend to have too low demands for some goods (prevention) and too high for some goods (antibiotics): They cannot be relied upon to chose outcome efficiently.
- For all these reasons: unregulated private health care will be tend to treat badly, and to over-provide medication

  It is the general social consensus, clearly, that the laissez-faire solution for medicine is intolerable–Arrow

Consequence: the private health care sector is really very, very bad

- study in India 77% of private providers in rural areas have no medical degree,
- 18% have some other degree (BAMS, BIMS, BUMS, BHMS) and 4% have an MBBS degree (equivalent to MD in U.S.)
- Average village: 3.36 providers with no degree, 0.80 with some degree, 0.18 with MBBS
- Public providers more qualified, and offer free services, but have 20% market share, which increases to 35% in villages with a public primary healthcare center
- They know very little: Vignettes

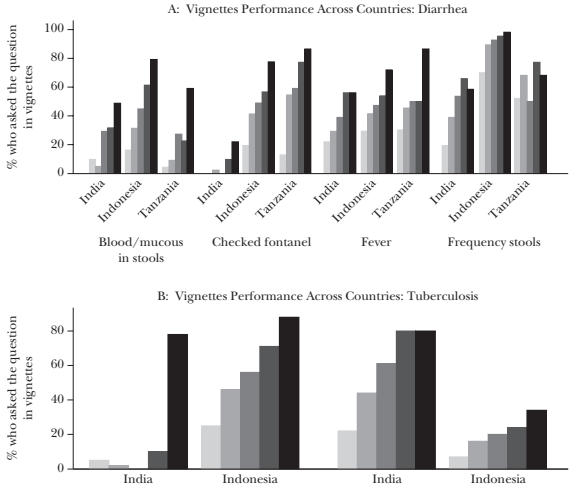
What do doctors know

- Vignette: standardized patient that is proposed to a doctor. doctor is told that the patient will follow instruction, and is given the standard tests.
- e.g. women comes to the clinic with a child who has a diarrhea for the least 2 days
  - Doctor must ask about stools to figure out if she has dysentery or a virus, and check for sign of dehydration
  - In this case the right treatment is ORS

Answer by competence

Figure 1

Performance Variation across Countries



Bottom line

- There is variation
- overall quality is very low: doctor has to be more than median quality not to harm the patient
- In India at the top, fully qualified private doctors know more than public doctors , but doctors in PHC know more than quacks.

What do doctors do: two methods

- Direct observations of medical practice
- Audit study: fake clients who are asking questions.
  - Standardized Patient (SP) visits healthcare provider and says: Dr., I woke up this morning with crushing chest pain and I was feeling very anxious
  - Answers questions, completes basic exams and provider recommends a treatment
  - Low detection rates and show that provider behavior is consistent with their believing the SP
  - That is, providers do not come to the conclusion that the SP is faking it. In fact, the more they do with the patient, the more they are convinced that the SP has the condition that they are presenting with
- SP and vignette can be combined: SP first then vignette a little later

Direct observation

Table 2
International Comparisons of Effort

Country/Effort category	*Time spent*	*Questions asked of patient*	*Number of physical exams*	*(Total number of medicines given)*
Dehli				
Doctors who exert low effort	1.9	1.36	0.97	2.13
Doctors who exert medium effort	3.36	2.94	1.0	2.72
Doctors who exert high effort	6.15	5.32	1.37	3.05
All doctors	**3.80**	**3.20**	**1.09**	**2.63**
Paraguay				
Doctors who exert low effort	5.79	5.33	1.38	1.36
Doctors who exert medium effort	7.90	7.50	2.93	1.55
Doctors who exert high effort	11.34	11.91	3.64	1.65
All doctors	**8.33**	**8.23**	**2.65**	**1.52**
Tanzania				
Doctors who exert low effort (25^{th} Percentile)	3	2	0	N/A
All doctors	**6.32**	**3.96**	**1.51**	**N/A**
Germany	7.6	N/A	N/A	N/A
Spain	7.8	N/A	N/A	N/A
Belgium	15.0	N/A	N/A	N/A
United Kingdom	9.4	N/A	N/A	N/A

Patterns of treatment

Table 2: Patterns of treatment

	(1) Any correct treatment	(2) Correct treatment	(3) Over-treatment	(4) Incorrect treatment	(5) Gave an antibiotic (excl. diarrhea)	(6) Gave a steroid (excl. asthma)	(7) Referred to another provider	(8) Number of cases
Madhya Pradesh	0.302	0.048	0.255	0.698	0.350	0.032	0.180	939
Birbhum	0.237	0.015	0.222	0.763	0.331	0.015	0.321	396
Delhi	0.108	0.008	0.100	0.892	0.540	0.092	0.104	250
Mumbai	0.292	0.033	0.258	0.708	0.566	0.198	0.086	1,583
Patna	0.310	0.051	0.259	0.690	0.679	0.096	0.057	1,019
China	0.361	0.237	0.124	0.639	0.512	0.000	0.191	299
Kenya	0.524	0.211	0.313	0.476	0.548	0.016	0.164	166

Notes: All figures are unweighted. In correct treatment definitions, referrals to a higher level of care alone are NOT considered the right treatment. The Birbhum data includes observations from the control group only.

And yet, most people chose the private sector

- Incorrect treatment cost the patient a lot of money (about 70% of the cost of a visit is un-necessary treatment)
- E.g. in udaipur, even among the poorest group, only 20% of visit to public sector, 28% to traditional healers, and the balance to the quacks
- In Madhya pradesh, 89% of visits are to a private doctor, and 83% even if there is an available MBBS trained public doctor.
- 77% of visits are to unqualified private provider
- In Delhi on average there will be 70 private providers within a 15 minute walks.

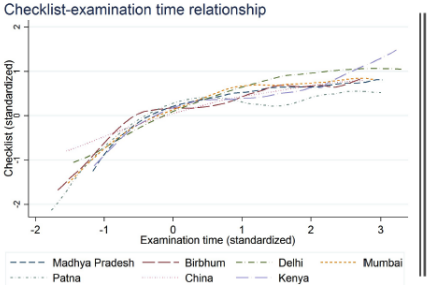
Why? study by Das et al, AER 2016

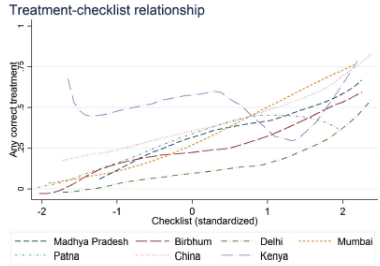
- Audit studies: Standardized patients trained to accurately represent symptoms for 3 diseases (unstable angina, asthma and dysenthery in a child (who is not here).
- Then they performed 1,100 visits to different practices in the state of Madhya Pradesh

Results

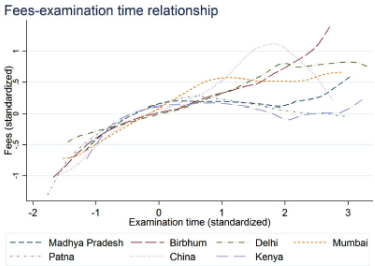
- Public sector doctors are better trained.
- And they know a bit more
- But they do even less
- (btw this is an underestimate of the difference in service because public sector nurses and doctors are absent a HUGE amount)
- And as a result they do not treat any better; possibly slightly worst.

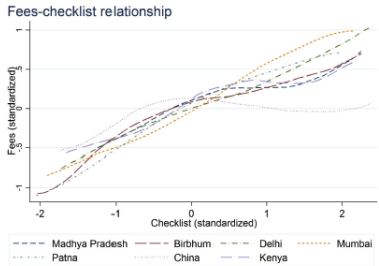
A general problem : The know do gap





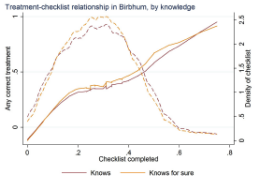
Fact #1: Providers who spend more time complete more checklist items; providers who complete more checklist items are more likely to treat correctly

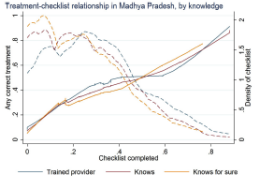




Fact #2: Providers who complete more checklist items and/or spend more time with their patients earn more money

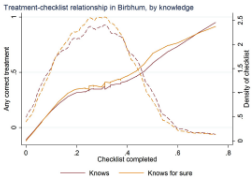
(positive return to effort)

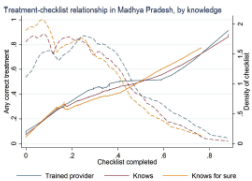




Fact #3a: Among those who "know" the correct treatment, wide variation in "do"

Fact #3b: Among those who know, the more they "do", the more likely they are to treat correctly





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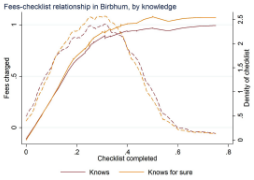
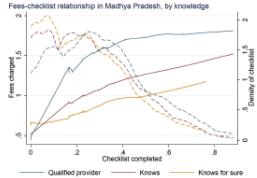
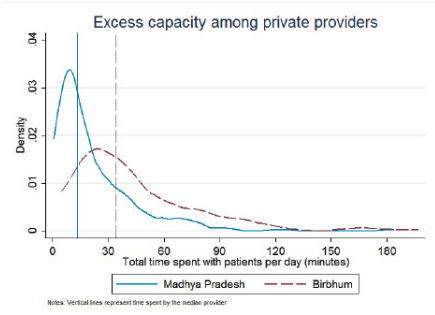




Fact #4: Those who do more charge patients more

In both MP and Birbhum, this wide variation in "do" is priced in the market: Fees increase by 300-400% depending on "do"

- MP: Qualified providers correctly treated in vignettes >90%
- MP and Birbhum: "Knows" are those who correctly treated at least once across two vignettes and "Knows for sure" are those who correctly treated the patient both times in the two vignettes (note that in MP, the "knows" combines qualified and informal providers)



Data based on spending a full day in the doctors clinic and noting down the time of entry and time of departure for each patient.

Fact #5: These patterns arise despite enormous excess capacity in providers' clinics

What to do?

- Try to incentivize the public sector to exercise more effort
- Try to work with the private sector to get a bit better trained

Incentivize the public sector?

- Banerjee et al: Incentive to nurses who are punished if they are absent.
- Bjorkman and Svensson: power to the people.

Banerjee et al: main finding

figures/fig1regularpresent.pdf

What happened?

- early on nurses showed up more
- but some were still absent and they realized that they could be marked "exempt"
- they came even less.

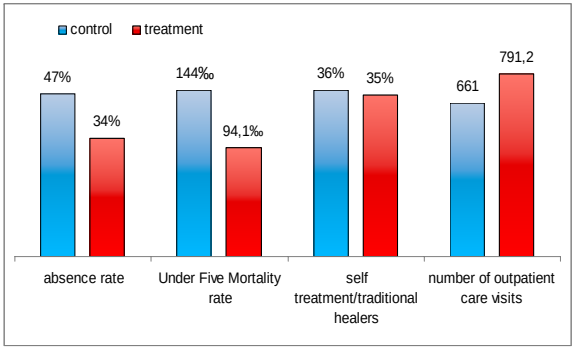
Demand for Health and Political Commitment

- How could the bureaucracy get away with not implementing its own rules?
- One possible answer: no political will, because there is no demand for incremental changes in public health care.
- One symptom: even during the six months where attendance was higher in treatment group, usage of the facility remained very low:
  - On average 0.74 client seen in treatment facility, when facility is open.
  - On average 0.81 client seen in control facility, when facility is open.
- It is possible that a system imposed from the top without any grass root demand cannot be sustained.

Power to the people: Improvement in Health through grassroot mobilization (Bjorkman, Svensson)

- An interesting contrast is provided by an experiment in Uganda.
- Problems are very similar (e.g., absence rate in health center: 47%)
- Instead of a top down approach, they involved the community in monitoring the providers.
- Intervention started with a household survey to collect data on experience with public health facilities.
- Then, community organizations facilitated three meetings: a community meeting, a meeting at the health center, and an interface meeting.
- The outcome of these meetings was an action plan on how to improve the situation, and how the community members would monitor the facilities.

Community-level Monitoring in Uganda: Results



Power to the people: Results

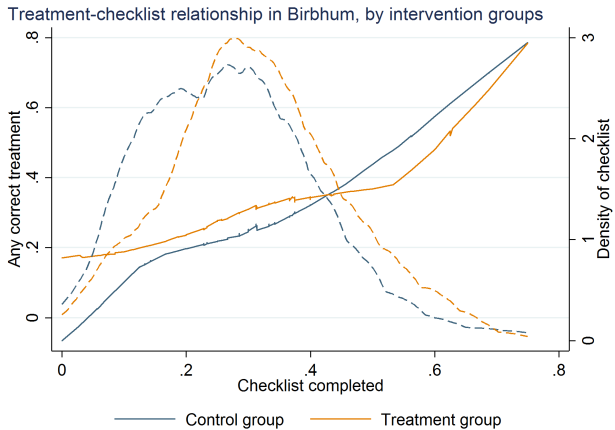
- Community became more involved in monitoring health workers.
- Health workers were more present.
- Health utilization improved in some respects.
- Health outcomes improved.
- Problem: an extremely expensive interventions that could never really be replicated (a cheaper one without the detailed report card but with all the mobilization produced no effect)

Working with the private sector: Banerjee et al, 2015

- 304 providers in a rural district of West Bengal (out of 360 approached) randomly assigned to either control or treatment: 9 months module with 72 sessions (cost of 175 dollars).
- Emphasis was placed on basic medical conditions, triage, and avoidance of harmful practices, accompanied by frequent patient simulations
- Trainees were tested but did not receive a certificate upon completion
- Main outcome: quality of care as measured by the same three SP as in Madhya Pradesh
- This types of program is very unpopular with real doctors who do not like the competition...

Results

They do more of what they know



To sum up

- The private sector provides very low standards of care
- The public sector as well, unfortunately
- And poor service which is why so many prefer the private sector
- Shutting down the unqualified private sector is an option MCI and others routinely push
  - Not realistic
  - Not consistent with the number of medical colleges
  - Not consistent with the resistance to draconian regulations to send doctors to remote areas

What then?

- Lack of training in the private sector is a problem
- But mostly people don't do even what they know
- The problem is that patients are skeptical of their advice
  - Know that they are not well-trained
  - Suspect of corruption
- So they stay within their capacity
- Some certification/other help in reputation building will help a lot
- Along with some technology to help them follow a checklist
  - Builds good practice
  - Gives them credibility (may be show the patient what the checklist says?)
- Other problem is revenue model is tied with selling antibiotics/medication: no incentive to reduce that.

Enforce some regulation

- Enforce the laws about who can prescribe sophisticated antibiotics and steroids
- Require the unqualified providers (may be qualified as well) to take a test every x years to get a certificate they can display
- Require them to attend trainings on basic patient safety
  - No sharing needles/proper sterilization
  - CPR
  - Etc.
- Involve them in public health campaigns on maternal and child health, NCDs, TB
- They are by far the most connected to patients

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