The Demand for Health care: The role of hyperbolic discounting

Esther Duflo

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Lecture 7
The Udaipur Health Project

- A five-year collaboration with Seva Mandir, a local NGO active for over 50 years in Udaipur, Rajasthan.
- Seva Mandir was interested in overhauling the work of their health unit, and contacted my colleague Abhijit Banerjee and me to see whether we would be interested in working with them on it.
- We had no idea what the problems were on the ground, so we decided to start with a year-long survey of health status, health services and health behavior in Udaipur.
  - We would then analyze the data and hold a consultation in Udaipur with representatives from everyone working in the health sector in the area (doctors, NGOs, government officials) to decide on promising interventions.
  - We would then test those ideas in several randomized evaluations and meet again to discuss the results.
The Udaipur Health and Well Being Survey

This survey took place in 2002-2003. It covered:

- 100 villages;
- 1,000 households: long household interviews, some measures of health status;
- 451 “modern,” private facilities; and
- 123 public facilities, visited every week.
The Survey: Interview
The Survey: Measuring Height
Some Striking Facts about Health. Udaipur, Rajasthan, India

Some Striking Facts

- Health status is poor.
- Patterns of demand for health care.
- Patterns of supply of health care.
Health Status Is Poor

- Diseases [Data]
- Nutritional status:
  - Height and weight: 88% of women, and 93% of men, have Body Max Index below 21 (average=18).
  - Respiratory problems: peak flow meter on average 316 ml per expiration (anything below 350 is symptoms of respiratory difficulties).
  - Anemia: 56% of women, and 51% of men are anemic.
An Ocean of Disease

Cold Symptoms
- Presence: 18%
- Serious: 12%

Fever
- Presence: 19%
- Serious: 14%

Headaches
- Presence: 27%
- Serious: 15%

Body Ache
- Presence: 22%
- Serious: 20%

Back Ache
- Presence: 23%
- Serious: 10%

Trouble Walking 5km, Drawing water
- Presence: 80%

Abdominal Pain
- Presence: 14%
- Serious: 09%

Fatigue
- Presence: 15%
- Serious: 07%

Trouble Squatting/Standing
- Presence: 80%

Vision Problems
- Presence: 11%
- Serious: 03%

Chest Pain
- Presence: 07%
- Serious: 04%

Percentage of Adults Reporting Symptom

- Presence
- Serious
Some Striking Facts about Health. Udaipur, Rajasthan, India

Patterns of Demand for Health Care

- High share of budget is devoted to health, even by the poor
- On average, household visits are provided once every two months.
- Most health visits are to private “doctors.”
- In contrast to curative care, preventive care is very limited. E.g.,
  - Full immunization rate: less than 2% at baseline.
Share of Budget Devoted to Health

- Poor: 7%
- Middle: 9%
- Rich: 8%
- All: 7%
Some Striking Facts about Health. Udaipur, Rajasthan, India

Share of Visits to Different Facilities
Pattern of Supply of Health Care: The Private Sector

- The Private Sector:
  - Completely un-regulated, terrible quality.
  - Treatments that emphasize antibiotics and drips, not tests.
Qualifications of Private “Doctors”

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBBS + Spec</td>
<td>27.0%</td>
</tr>
<tr>
<td>Medical college degree</td>
<td>28.8%</td>
</tr>
<tr>
<td>RMP</td>
<td>21.3%</td>
</tr>
<tr>
<td>Other Training</td>
<td>14.8%</td>
</tr>
<tr>
<td>No formal qualification</td>
<td>13.9%</td>
</tr>
</tbody>
</table>
Some Striking Facts about Health. Udaipur, Rajasthan, India

Treatment in Private Facilities
Pattern of Supply of Health Care: The Public Sector

- The public sector:
  - On paper, the “ideal” system for a developing country.
    - A 3-tiered system of public health facilities:
      - One sub-center for 3,000 people (3,600 in our data), close (within 2 km in Udaipur), a nurse provides preventive care and referral, free treatment;
      - One primary health center for 50,000 people (48,000 in our data); and
      - Community health centers and district hospitals for bad cases.
  - In practice:
    - Dismal physical state of facilities.
    - Absenteeism: 54% absence rate (weekly measures over a year), not only Udaipur.
    - Treatments: less antibiotics but no more tests.
    - Multiple missions for the nurses:
      - Undo their credibility (e.g., sterilization campaigns).
      - Leads them to completely give up on discharging any of these duties.
Some Striking Facts about Health. Udaipur, Rajasthan, India
Some Striking Facts about Health. Udaipur, Rajasthan, India
Preventive Care: The Demand Problem

- Low utilization of cheap health saving medical interventions
  - In India: Only a quarter of mothers breast-fed the child within an hour of birth and the average extent of exclusive breastfeeding was only 2 months (WHO recommends breastfeeding within an hour of birth, and to exclusively breastfeed for 6 months).
  - Fraction of children receiving deworming medicine dropped from 78% to 59% when parents had to sign a form, to zero when they had to pay low cost-sharing fee.
- Very high price-elasticity for those services, both for positive prices, and negative prices.
  - Positive prices (even small) discourage use:
    - Bed-nets (Kenya, Uganda, Madagascar)
    - Deworming (Kenya)
    - Chlorine (Kenya, Zambia)
  - Small rewards greatly encourage use:
    - Immunization (India, several African countries)
    - Learning HIV-Aids Status (Malawi)
Some Striking Facts

Preventive care: the Demand problem

Why Is Demand Low?

Low use of preventive care

Positive Prices Discourage Use: Deworming
Low use of preventive care

Positive Prices Discourage Use: Bednets

![Graph showing the relationship between price and demand for deworming and bednets.](image)
Positive Prices Discourage Use: Chlorine
Do the difference in take up correspond to real difference in usage?

- Perhaps people are less likely to buy bednet or chlorine when price is higher, but *conditional on purchasing* they are more likely to use ("social marketing" view, against free bednet distribution)
- Two reasons for this:
  - Selection: those who don’t really need a net still get it when it is free
  - Psychological sunk cost effects:
- There have been several experiments done on this: randomly vary price, and afterwards check whether or not people actually use the good later on.
- Cohen-Dupas and Dupas are two bednet experiments
- High elasticity of purchase but no difference in final use
Low use of preventive care

Fraction of Households Who Buy the First Net

Redeemed 1st Voucher and Purchased Net

Share of Households within 500m radius with Max Subsidy

- 0-10%
- 10-19%
- 20-29%
- 30-39%
- 40-59%
- >59%

- Average
- 95% CI
Some Striking Facts

Low use of preventive care

Preventive care: the Demand problem

Why Is Demand Low?

Fraction of Households Who Use the First Net, if Purchased

Panel C: Among those who redeemed 1st voucher, share using the net after 1 year

If Purchased: Using Net at 2nd Follow-up

- Price of 1st Voucher (in Ksh)
- Average
- 95% CI
The Impact of Small Incentives on Immunization

- Experiment where to improve both supply and demand for immunization services.
- In some immunized camps, Seva Mandir 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.
Some Striking Facts

Preventive care: the Demand problem

Why Is Demand Low?

Low use of preventive care

Fraction of Children Fully Immunized

<table>
<thead>
<tr>
<th>Group</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Control</td>
<td>6%</td>
</tr>
<tr>
<td>Camp</td>
<td>17%</td>
</tr>
<tr>
<td>Camp + Lentils</td>
<td>38%</td>
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</tbody>
</table>
Low use of preventive care

Fraction of Children Receiving Different Number of Immunizations

- At least 0 immunizations: 50% control, 26% Camp, 23% Camp + Lentils
- At least 1 immunization: 77% control, 44% Camp, 70% Camp + Lentils
- At least 2 immunizations: 50% control, 39% Camp, 39% Camp + Lentils
- At least 3 immunizations: 55% control, 42% Camp, 55% Camp + Lentils
- At least 4 immunizations: 46% control, 23% Camp, 23% Camp + Lentils
- At least 5 immunizations: 38% control, 17% Camp, 17% Camp + Lentils

Preventive care: the Demand problem

Why Is Demand Low?

- 0
- 6%
Spillovers to Other Villages

- Control: 6%
- Camp: 17%
- Next to Camp: 10%
- Camp + Lentils: 38%
- Next to Camp + Lentils: 20%

Low use of preventive care
The Impacts of Small Incentives on Learning HIV-Aids Status

- A study by Rebecca Thornton (Malawi)
- Voluntary Counselling and Testing (VCT) is seen as a cornerstone in the fight against HIV (Mozambique: 55% of all HIV-Aids expenditures were for VCT).
- Yet, few people know their status: It is often assumed that psychological and social barriers are very strong.
- As part of a survey, over 2,812 respondents were tested for HIV-AIDS.
- A few weeks later, they could pick up their results if they wanted to (in a tent set up in the village).
Experimental Design

Two elements were randomized:

- At the end of the interview, respondents drew a bottlecap with a number, with an indication of a small thank you voucher (between 0 and 3 dollars) for picking up their tests.
- The location of the tent was also randomized within the village (close or far).
- Results suggest that fear or stigma may not explain the low take up rate of VCT.
Preventive care: the Demand problem

Why Is Demand Low?

Low use of preventive care
Low use of preventive care
Low use of preventive care

Impact of Incentive: Percentage Learning Results

Figure 3. Percentage Returning for HIV Results

Notes: Sample includes 2,812 individuals who tested for HIV; 0.05 percent error bars are presented. Figures present the percentage of individuals attending HIV results centers.
Impact of Distance and Incentive: Percentage Learning Results

Figure 4. Impact of Distance to VCT on Returning for HIV Results

Notes:
Nonparametric Fan regression where distance is measured as a straight-line spherical distance from a respondent's home to randomly assigned VCT center from geospatial coordinates and is measured in kilometers. Sample includes 2,812 individuals who tested for HIV. Lines indicate percentage attending the results centers and upper and lower confidence intervals.

- A. Entire sample
- B. Sample receiving and not receiving an incentive

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THORNTON: THE DEMAND FOR, AND IMPACT OF, LEARNING HIV STATUS

to offering no incentive) was greater than the effect of distance. The effects of incentives and distance are similar when using a nonlinear model (Table 4, columns 6–10).

VCT center attendance varied by HIV status. Overall, HIV-positive individuals were approximately 5.5 percentage points less likely to obtain their results (Table 4, column 1). In the district with the highest HIV prevalence rate, Balaka, those infected with HIV were 11 percentage points
Why Is the Demand for Preventive Care So Sensitive to Prices?

- The high sensitivity to (even small) prices on the demand for financial 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: But in that case small changes in prices should not have any effect (e.g. immunization, HIV-test).

- Two explanations have been proposed:
  1. Time inconsistent preferences.
  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

- 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 (O’Donoghue and Rabin, Laibson).
  - 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.
- Example: Hyperbolic discounting: entire future discounted at rate $\beta$.
  \[
  V(c) = u(c_0) + \beta \sum_{t=1}^{T} \delta^t u(c_t)
  \]
- 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 offset 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, subsidy, incentives, making some behavior compulsory, can 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.
Smoking is a public health epidemic in developing countries.

Self-aware individuals with time inconsistent preferences may want to commit to stop smoking.

A microcredit bank in the Philippines proposed the CARES program, a commitment contract to smokers:

- They open a (interest free) savings account.
- They make regular deposits in the account.
- After 6 months, they have to pass a surprise smoking test.
- If they fail the test, they forfeit their money.

No one would take this product if they were not looking to force themselves to stop smoking.

The CARES program was evaluated by Dean Karlan and Jon Zinman.
The Impact of the CARES Program

- CARES randomly offered to 781 out of 2000 smokers (randomly selected). 83 out of 781 (11%) accepted to take up the program.
- After 6 months, everyone performs a smoking test.
- Smoking cessation rates:
  - 11% in the treatment group (all those offered CARES)
  - 8% in the control group
- 29 out of 83 who took CARES stopped smoking (35%). But note that we cannot compare those who took up CARES and those who did not: Those who took-up may be those who are the most (or the least!) likely to stop smoking.
- Impact of being offered CARES: 3 percentage points.
- If we assume that being offered CARES has no effect on those who do not take it up, these extra 3% are due to the 11% of people who took up the program. Effect of the program: \( \frac{0.03}{0.11} = 30\% \).
The Perception of Benefits

- Thus, there is evidence that time inconsistency plays a role.
- However, constantly postponing preventive care, if we are fully aware of its benefits, requires to be both time inconsistent and very naive.
- May be it is not the entire explanation, and part of the problem has to do with low perceived benefits: how we learn about health.