Today

Measuring Returns to Healthcare:
Healthcare Costs
Potential Value
Credibly Measuring Value
1/4 of Federal Budget: Healthcare

- Medicare & Health: 24%
- Social Security, Unemployment & Labor: 34%
- Military: 18%
- Interest on Debt: 7%
- Food & Agriculture: 4%
- Veterans' Benefits: 4%
- Transportation: 2%
- Education: 2%
- International Affairs: 1%
- Energy & Environment: 1%
- Science: 1%
- Government: 1%

Source: OMB
The “Cost Curve”

% of GDP

Source: CBO
Why do we spend so much on healthcare in the US?
WE SHOULD RAISE THE PRICE OF AMBIEN TO ONE HUNDRED BILLION DOLLARS.
FIGURE 1. CUMULATIVE DISTRIBUTION OF PERSONAL HEALTH CARE SPENDING, 2009

Top 1% of spenders account for >20% of spending ($275 billion)

Top 5% of spenders account for almost half of spending ($623 billion)

NIHCM Foundation analysis of data from the 2009 Medical Expenditure Panel Survey.
Employer Sponsored Health Insurance

4th-party payment

- Insurance pays providers
- Employer pays insurance
- Premium increases fully shifted to wages (Gruber, 1994; Baicker & Chandra, 2006)

Hidden cost of healthcare
## Moral Hazard: The RAND Health Insurance Experiment

<table>
<thead>
<tr>
<th>Copayment Rate</th>
<th>Medical Care</th>
<th>Mental Health Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>95%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>50%</td>
<td>142%</td>
<td>124%</td>
</tr>
<tr>
<td>25%</td>
<td>300%</td>
<td>145%</td>
</tr>
<tr>
<td>0% (free)</td>
<td>417%</td>
<td>204%</td>
</tr>
</tbody>
</table>
Is our healthcare spending worth it?
The Cost of a Long Life

Average Life Expectancy

Per Capita Spending

United States

Japan, San Marino, Monaco, Switzerland, Australia, Sweden, Iceland, Andorra, Canada, France, Italy, Austria, Spain, Norway, Singapore, Israel, Luxembourg, New Zealand, Netherlands, Germany, Greece, Malta, Belgium, Finland, United Kingdom, Denmark, United States, Cuba, Cyprus, Ireland, Portugal

Life Expectancy Per Capita Spending (International Dollars)
Dartmouth Atlas of Healthcare: Medicare Spending per Capita by Hospital Referral Region
Figure 2. Male Life Expectancy in the United States, 1722–2010
Murphy & Topel “Diminishing Returns”

Staggering Magnitudes

- Gains life expectancy in the US 1970-1998: $73 trillion ($2.6t/yr)
- Increased cost of medical care: $46 trillion
- 1% reduction in cancer deaths:
  Value minus ongoing cost: $400 billion

Implications

- Once available, we will pay (see later in this lecture)
- Public investment?

Methodology: Murphy & Topel (2003)
Affordable Care Act: Healthcare Reform
Measuring Value in Healthcare

“Returns to Spending”
Potential Mortality-Treatment Relationship

Mortality

Treatment Intensity
Potential Mortality-Treatment Relationship

![Graph showing the relationship between mortality and treatment intensity. The graph illustrates a downward curve, indicating that as treatment intensity increases, mortality decreases.]
Mortality vs. Hospital Cost:
Heart Emergencies in FLA (1996-2002)
Potential Mortality-Treatment Relationship

Mortality

Treatment Intensity
Question: What Are the Returns to Health Care Spending?

Treatment is a choice (“endogenous”)

Worse health $\rightarrow$ More Treatment

Confounds the correlation between Treatment & Mortality
Randomized Experiments
Randomized Experiments
J-PAL Health Program

By the Numbers:

• To date, J-PAL affiliates have >700 ongoing and completed projects in 67 countries
• Of these, 145 are health projects
• 64 of 127 affiliates are involved in health projects
Hot Spotting
Limitations to Randomization

Internal Validity

Vs.

External Validity
Introduction to Natural Experiments
Natural Experiments

Mimic randomized controlled trials
Naturally occurring randomization

Requirements: Great data
Institutional details
(e.g. policy changes; treatment rules)
Measuring Returns to Physician Care
Top Doctor: Dr. Swanson, Thoracic Surgeon
Top Doctor: Dr. Jensen, Gastroenterologist
Measuring Returns to Physician Care

Do prestigious physician teams:
- Deliver care differently?
- Get better outcomes?
Measuring Returns to Physician Care

Natural Experiment

- Large VA hospital
- 2 Residency programs
  1. Most prestigious in the US
  2. Lower quintile of quality scores
- Random patient assignment:
Measuring Returns to Physician Care

Natural Experiment

- Large VA hospital
- 2 Residency programs
  1. Most prestigious in the US
  2. Lower quintile of quality scores
- Random patient assignment:
  ODD vs EVEN Social Security Number
Odd/Even

Do you think the more prestigious team has:
- Higher costs
- Lower costs
- Same costs
Figure 1A: Log(Length of Stay) vs. Last Digit of SSN
Figure 1B: Log(Accounting Cost) vs. Last Digit of SSN
Odd/Even

Do you think the more prestigious team will get:
- Better outcomes?
- Worse outcomes?
- Same outcomes?
Figure 2C: 5 Year Mortality vs. Last Digit of SSN
Figure 2B: 1-year Mortality vs. Last Digit of SSN
“As good as random”: Ex: Treatment Thresholds
Returns to Hospital Care: Case of Very-low Birthweight Newborns

Almond, Doyle, Kowalski & Williams
frequency of birth weight by gram nationwide full sample
frequency of birth weight by gram around 1500 grams
Other variables smooth across 1500g threshold

predicted one-year mortality

birth weight (grams)
One-Year Mortality Near Very Low Birthweight Threshold
Another example: Alcohol & Health
Appendix A: Arrest Counts by Days Until Birthday

Counts of Arrest by Days Until Birthday

- 20th Birthday (Red)
- 21st Birthday (Black)
- 22nd Birthday (Green)

Days Until Birthday
Figure 2
Age Profiles for Death Rates in the United States

Motor vehicle accidents
Internal causes
Suicide
Take-Aways

Healthcare

Huge value potential

Potential to bankrupt us!

Credibly Show Value

Randomized Trials

Natural Experiments
Measuring Returns to Hospital Care: Evidence from Ambulance Referral Patterns

Doyle, Graves, Gruber & Kleiner
Idea 1: Ambulance companies are effectively randomly assigned within neighborhoods over time

→ A shifter for hospital choice unrelated to patient health
### Destination of Patients Picked Up In The Bellevue Hospital Zip Code Area

<table>
<thead>
<tr>
<th>Destination</th>
<th>All Voluntary Hospital Ambulances</th>
<th>Fire Department Ambulances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bellevue Hospital (HHC)</td>
<td>25%*</td>
<td>61%**</td>
</tr>
<tr>
<td>Any Voluntary Hospital</td>
<td>75%</td>
<td>39%</td>
</tr>
</tbody>
</table>

*157 taken to Bellevue/632 total. **815 taken to Bellevue/1,346 total.
Figure 2a: First Stage
Hospital log(Cost) vs. Ambulance Co's Hospital log (Cost)
Figure 2b: Mortality-Hospital Cost Relationship

![Graph showing the relationship between 1-year mortality and E(Hospital Cost | Z)]
Idea 2: Ambulance Company Boundaries
Measuring Returns to Hospital Care: Evidence from Ambulance Referral Patterns

Findings:

High-cost/High-tech/Teaching Hospitals
→ Significantly better outcomes

Hospitals that send patients to Skilled Nursing Facilities (instead of home)
→ Significantly worse outcomes
Take-Aways

Healthcare

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