Cost-based, Value-based, and Reference-based Pricing for Diagnostics

James C. Robinson
Leonard D. Schaeffer Professor of Health Economics
Director, Berkeley Center for Health Technology
University of California, Berkeley
Overview

- Static and dynamic efficiency
  - Cost-based pricing
  - Value-based pricing
  - Reference pricing
## Two Social Goals
(in economic jargon)

<table>
<thead>
<tr>
<th>Static Efficiency</th>
<th>Dynamic Efficiency</th>
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- Achieved by maximizing output, given current inputs, via effective coordination, transparent information, aligned incentives
- Price competition or regulation drives firms to reduce costs and improve performance
- Standardization and “commoditization” allow product comparisons and enable competition and regulation (HTA)

- Innovation requires investments in R&D, which are risky and require profits to ensure adequate ROI
- Price competition and regulation reduce revenues and profits, and undermines incentives for long-term investments
- Firms avoid standardization and commoditization, pursue prices and profits to finance R&D
The Policy Dilemma

Standardization, regulation, and price competition are good for static efficiency but bad for dynamic efficiency.

Easy access to the market and high prices are good for dynamic efficiency but bad for static efficiency.

What is to be done?

What are implications for regulators, insurers, providers, and consumers?

What are the implications for innovators?
But capabilities for innovation will only lead to new products and firms if there is a reward for innovation. Otherwise the entrepreneurs, finance, and energy will go elsewhere.
“Pull” Drivers (or Inhibitors) of Innovation

- Market and Regulatory Factors that Reward Innovation: Access to the Market, Rapid Diffusion/Adoption, and High Prices
  - FDA: Market Authorization and Post-Market Surveillance
  - Insurers: Coverage, reimbursement, and pricing
  - Providers: Physician prescription and hospital budgets
  - Consumers: Cost sharing and engagement

Feedback Loop to Encourage further Investments in basic, clinical, and translational research, and then to product development
Cost-Based Pricing for Diagnostic Tests

- Many in vitro tests are very cheap, as they have been on the market a long time, have benefitted from process efficiencies, and are subject to price competition.
- Cost-based pricing has held down expenditures for insurers and hospitals.
- Discourages innovation if novel tests will be grouped with older tests and paid on a similar basis, or defined as the sum of several older (and cheap) tests.
- Defines the minimum that developer can accept (averaged across all products) and stay solvent.
Cost-Based Pricing Leads to Over-Payment and Under-Payment

- Many
Cost-Based Pricing for Clothing (by the Kilo)
Value-Based Pricing for Diagnostic Tests

- Garau, Goldman
More on Value-Based Pricing

- Ga
Defining Clinical Value: The Test-Treatment Pathway

1. Diagnostic test is actually delivered
   - Appropriate timing; acceptability to patient (completion); harms inflicted by test on patient; cost of test

2. Test result are actually produced
   - Speed of result; accuracy (sensitivity, specificity);

3. Diagnosis is made based (in part) on test
   - Was diagnosis affected by test (definitive dx, ruling out suspected dx, confirming previous dx)? Diagnosis incorporates results of all tests.

4. Treatment is decided based (in part) on test results
   - Did new dx affect treatment plan? Was new plan implemented?

5. Effect of new treatment plan on patient outcome is positive
   - Appropriate timing, efficacy of treatment; patient adherence
Defining Social Value: Combining Clinical Contribution and Price

- **HIGH VALUE:** Supports R&D
- **LOW VALUE:** Over-Charging
- **HIGH VALUE:** Promotes Affordability
- **LOW VALUE:** Cannot Sustain R&D

Follow-on or incremental

Innovation

Meaningful Clinical Improvement
DrugAbacus: You Define the Value

US Medicare Monthly Drug Prices at Launch (2014 dollars)

[Graph showing monthly drug prices at launch with a focus on Kadcyla.]

Modifiable Price Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Actual</th>
<th>Abacus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dollars per life-year</td>
<td>$12,000</td>
<td>$16,000</td>
</tr>
<tr>
<td>Toxicality discount</td>
<td>0%</td>
<td>15%</td>
</tr>
<tr>
<td>Novelty multiplier</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Cost of development</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Rarity multiplier</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Pop. burden of disease</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Source: http://www.drugabacus.org
Real Prices Lie Between Value and Cost

Figure 1 | The balance between the market and company perspectives determines the viable price range. A product price needs to fall between the maximum the market will bear and the minimum the company can accept and still make an adequate return.
Reference Pricing

“Geez Louise—I left the price tag on.”
What Drives Price Variation?

- Variation in price is driven by supply factors:
  - Manufacturers: patent protection
  - Providers: market consolidation

- Variation in price is permitted by demand factors
  - Consumers lack incentive to shop, as someone else is paying (insurer)
  - Consumers lack information on prices and quality at the time of making choices
What is Reference Pricing?

- Sponsor (insurer, employer) establishes a maximum contribution (reference price) it will make towards paying for a particular service or product
  - This limit is set at minimum or median of the price range charged by comparable providers
- Patient must pay full difference between this limit and the actual price charged by the provider (not just 20%)
- Patient has good coverage for low-priced options but full accountability if select a high-priced option
- In the US, reference pricing has been applied to:
  - Inpatient and outpatient surgery
  - Diagnostic radiology (e.g., CT, MRI)
  - Drugs and laboratory tests
Contrast “Reference Pricing” in the US with “Reference Pricing” in Other Nations

- National insurance payers in many nations group drugs by therapeutic class, and then set a maximum “reference price” or reimbursement for the class, linked to the lowest-price drug in the class and/or the lowest price in any other nation.

- This is *not a consumer cost sharing strategy*, because no one expects the consumer to pay the difference between the insurer’s limit and the list price.

- It is *price negotiation strategy* to obtain discounts and/or rebates from the list price.
Reference Pricing for Laboratory Tests

- In 2010 Safeway implemented RP for lab tests for 500+ in vitro diagnostic tests
- Exclusions: oncology, mental health, dialysis, infertility, genomic tests
- Exclusions: tests performed in hospital, ED, surgicenter, MD office (during course of care)
- Reference payment set at 60% of distribution of prices for each test
Study Design: Data

- Claims data from Safeway on all laboratory tests used by all covered employees and dependents (N=1 million)
- Claims data from enrollees in Anthem (WellPoint) Blue Cross on all laboratory tests and other services (N=250 million)
- Claims include information on lab test, price, patient demographics, other diagnoses/procedures, type and location of laboratory
- Experimental group: tests subject to reference pricing
- Control group A: tests not subject to reference pricing
- Control group B: tests subject to reference pricing at Safeway but using claims from enrollees in Anthem
Study Design: Methods

- **Descriptive statistics:**
  - % of patients selecting lab charging less than reference price (termed ‘compliance’)
  - Prices paid ($)
  - Employer spending on lab tests per employee

- **Charts:**
  - Five most common tests that are subject to reference pricing
  - Five most common that are not subject to reference pricing

- **Difference-in-difference multivariable regressions:**
  - Rate of change in compliance and prices for Safeway employees compared to rate of change for control groups
  - Adjust for demographics, co-morbidities, geography
Price Trends for 5 Most Common Tests Subjected to Reference Pricing

Trends in Lab Test Prices Subject to RBB

- health panel
- metabolic panel
- lipid panel
- HbA1c
- blood count
Price Trends for 5 Most Common Tests NOT Subject to Reference Pricing

Trends in Lab Test Prices NOT Subject to RBB

- urinalysis
- HPV test
- pap test
- chlamydia test
- C-peptide
Reference Pricing Causes Shift in Consumer Choices towards Low-Priced Diagnostic Tests, 2008-2013

Share of Lab Test Prices Above Reference Price

Dashed line represents March 2011 RBP implementation.
**Difference-in-Difference Regression: Effect of Reference Pricing on Prices Charged for In Vitro Diagnostics, 2008-2013 (N=693,074 claims)**

<table>
<thead>
<tr>
<th>Reference Pricing x Year</th>
<th>Log price change</th>
<th>Dollar changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBB2013</td>
<td>-0.325***</td>
<td>-8.249***</td>
</tr>
<tr>
<td></td>
<td>(0.0288)</td>
<td>(0.726)</td>
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<tr>
<td>RBB2012</td>
<td>-0.243***</td>
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<td></td>
<td>(0.0233)</td>
<td>(0.591)</td>
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<tr>
<td>RBB2011</td>
<td>-0.196***</td>
<td>-4.969***</td>
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<tr>
<td></td>
<td>(0.0238)</td>
<td>(0.600)</td>
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<tr>
<td>RBB2009</td>
<td>-0.0509***</td>
<td>-1.295***</td>
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<tr>
<td></td>
<td>(0.0157)</td>
<td>(0.399)</td>
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<tr>
<td>RBB2008</td>
<td>-0.0393**</td>
<td>-0.998**</td>
</tr>
<tr>
<td></td>
<td>(0.0193)</td>
<td>(0.491)</td>
</tr>
</tbody>
</table>

**Significant to .01  
***Significant to .001**
Reference Pricing for Diagnostics: Discussion

- Reference pricing for laboratory tests at one major US employer reduced average price per test by 17.8% in the first year, 21.6% in the second, and 27.7% in the third year, compared to price trends for tests not subject to reference pricing.

- These results are in line with measured effects of reference pricing on orthopedic surgery, cataract surgery, colonoscopy, arthroscopy.

- When spending their own money, consumers make price-conscious choices.

- If providers want to charge high prices, their test must offer high value and not merely complement existing tests.
Conclusion: Social Value for Diagnostic Tests

- Static and dynamic efficiency require:
  - Low prices for standardized, commodity lab tests
  - High prices for innovative, clinically meaningful lab tests
- Reference-based pricing promotes the former
- Value-based pricing promotes the latter
PURCHASING MEDICAL INNOVATION
THE RIGHT TECHNOLOGY, FOR THE RIGHT PATIENT, AT THE RIGHT PRICE
JAMES C. ROBINSON