



# 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)

### Static Efficiency

### • 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)

### **Dynamic Efficiency**

- 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 longterm investments
- Firms avoid standardization and commoditization, pursue prices and profits to finance R&D

### **The Policy Dilemma**

### Static Efficiency

**Dynamic Efficiency** 

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?

### "Push" Drivers (or Inhibitors) of Innovation

Intellectual, Financial, and Organizational Capabilities for Translating Ideas into Products and Products into Firms National Institutes for Health (NIH), state Scientific Research government investments, major philanthropies, Clinical research, strong IP protection, and fluid Translational research boundaries between universities and industry Angel investors, venture capital, strategic investors **Finance** from Big Biopharma **Culture of** Experienced risk-taking individuals, incubators, entrepreneurship magnet for young and passionate people

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**



Ð

### 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

12

### Defining Social Value: Combining Clinical Contribution and Price



# **DrugAbacus: You Define the Value**

#### US Medicare Monthly Drug Prices at Launch (2014 dollars)



#### Modifiable Price Components

ACCOUNTS ....

Dollars per life-year \$300,000	Toxicity discount 30%	Novelty multiplier 3.0	Cost of development 3.0	Rarity multiplier 3.0	Pop. burden of disease 3.0
		0	<u></u>	- C	0
\$12,000	0%	1.0	1.0	1.0	1.0
\$216,000	15%	1.0	1.0	1.0	1.0

#### Source: http://www.drugabacus.org

#### 2015E Spending



14

### **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.

NATURE REVIEWS | DRUG DISCOVERY

# **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



castight



### **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



AND DECK AND

### Price Trends for 5 Most Common Tests NOT Subject to Reference Pricing



Although the second

### Reference Pricing Causes Shift in Consumer Choices towards Low-Priced Diagnostic Tests, 2008-2013



Difference-in-Difference Regression: Effect of Reference Pricing on Prices Charged for In Vitro Diagnostics, 2008-2013 (N=693,074 claims)

Reference Pricing x Year	Log price change	Dollar changes
DDD2012	-0.325***	-8.249***
KDD2U15	(0.0288)	(0.726)
DDD2012	-0.243***	-6.180***
KDDZUIZ	(0.0233)	(0.591)
DDD2011	-0.196***	-4.969***
KDDZUII	(0.0238)	(0.600)
DDD2000	-0.0509***	-1.295***
KDD2009	(0.0157)	(0.399)
DDD2009	-0.0393**	-0.998**
KDD2008	(0.0193)	(0.491)
		**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 priceconscious 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**