



BERKELEY CENTER
FOR HEALTH TECHNOLOGY

Purchaser and Policy Strategies for Managing Specialty Pharmaceuticals: Research at UC Berkeley

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Overview

- Similarities in DE/US pharmaceutical markets
- Reference pricing research
 - Pharmaceuticals
 - Diagnostic procedures
- Research on alternative pricing models
 - Subscription pricing
 - Value-based access pricing



Similarities Despite Many Differences: DE and US Pharmaceutical Markets

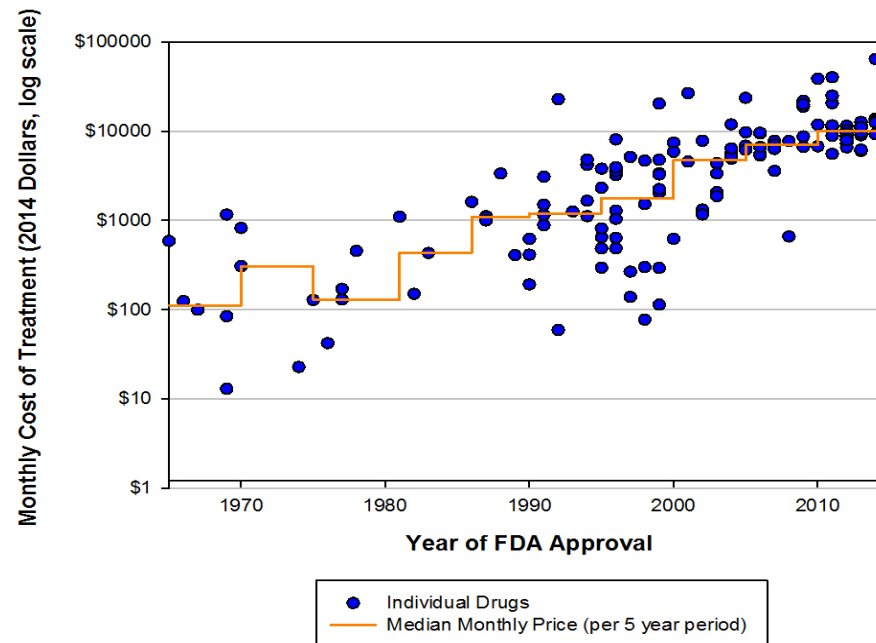
- High income nations, with willingness to pay high prices to ensure access to innovative drugs
- Strong research-based biopharmaceutical industries (jobs, exports, tax revenues) and political influence
- Multiple semi-public, semi-private payers
- Non-specialty drug spending seems under control
 - Reference pricing in DE; tiered formularies in US
- Specialty drug spending is not under control
 - AMNOG shows early success in DE
 - Loud but fragmented debate in US
- Potential for comparative/collaborative research?



Reference Pricing for Drugs



**Monthly and Median Costs of Cancer Drugs at the Time of FDA Approval
1965-2015**



Source: Peter B. Bach, MD, Memorial Sloan-Kettering Cancer Center

Rising Prices After Drug Launch

Top selling U.S. drug prices over five years

Prices rose 54 percent to 126 percent.

DRUG (COMPANY)	PRICE*		PRICE GROWTH
	Dec. 31, 2010	Present	
Humira (AbbVie) 40 mg/0.8 ml pre-filled syringes	\$1,676.98	\$3,797.10	126.4%
Enbrel (Amgen) 50 mg/ml subcutaneous sol.	\$427.24	\$932.16	118.2%
Copaxone (Teva) 20 mg/ml subcutaneous sol.	\$3,025.04	\$6,593.00	118.0%
Crestor (AstraZeneca) 10 mg tablets	\$350.17	\$745.41	112.9%
Abilify (Otsuka) 10 mg tablets	\$454.07	\$891.97	96.4%
Lantus Solostar (Sanofi SA) 100 units/ml subcutaneous sol.	\$191.96	\$372.76	94.2%
Advair Diskus (GlaxoSmithKline) 250/50 inhalation discs	\$199.90	\$334.63	67.4%
Remicade (Johnson & Johnson) 100 mg IV powder for solution	\$657.87	\$1,071.48	62.9%
Neulasta (Amgen) 6 mg/0.6 ml subcutaneous sol.	\$3,320.00	\$5,155.65	55.3%
Nexium (AstraZeneca) 10 mg oral packets	\$162.55	\$250.94	54.4%

* Reflects wholesale acquisition prices before volume-related rebates and other discounts. Prices are based on most commonly prescribed dose.

Source: Truven Health Analytics

S. Culp, 30/03/2016

REUTERS

Even After Negotiated Rebates, Most Drug Prices Are Higher in US than in Comparable Nations

Average Drug Prices for Top-Selling Drugs in 2015

Drug	Monthly Price, US \$				
	United States		Canada	France	Germany
	Nondis- counted Price	Estimated Discounted Price			
Adalimumab (Humira), 40 mg biweekly	3430.82	2504.50	1164.32	981.79	1749.26
Fluticasone/salmeterol (Advair), 250 µg, 50 µg daily	309.60	154.80	74.12	34.52	37.71
Insulin glargine (Lantus), 50 insulin units daily	372.75	186.38	67.00	46.60	60.90
Rosuvastatin (Crestor), 10 mg daily	216.00	86.40	32.10	19.80	40.50
Sitagliptin (Januvia), 100 mg daily	330.60	168.61	68.10	35.40	39.00
Sofosbuvir (Sovaldi), 400 mg daily	30 000.00	17 700.00	14 943.30	16 088.40	17 093.70
Trastuzumab (Herceptin), 450 mg every 3 wk	5593.47	4754.45		2527.97	3185.87

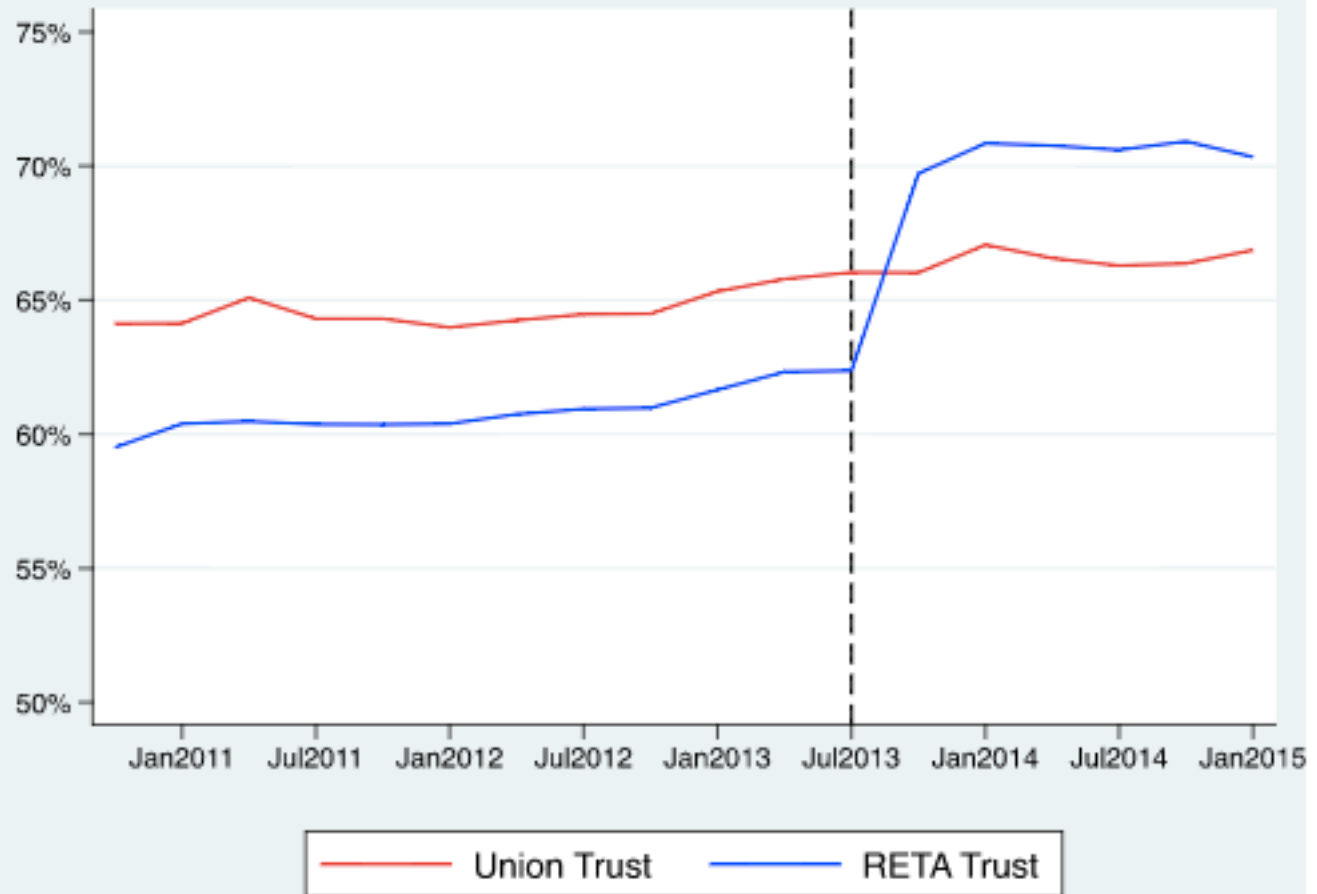
AS Kesselheim et al. The High Cost of Prescription Drugs in the United States: Origins and Prospects for Reform.
JAMA 2016;316(8):858-871.

Multivariable Statistical Analysis of Reference Pricing for Private Firms

- Drug claims from 2010 to 2014 were obtained from private employer alliance (N=573,456) and from comparison labor union (N=549,285)
- Multivariable (difference-in-difference) analyses:
 - 11.3% growth in probability that a patient selects the low-priced drug within its class
 - 13.9% reduction in average price paid
 - 5.2% increase in employee cost sharing
- JC Robinson et al. Association of Reference Pricing with Drug Selection and Spending. New England Journal of Medicine 2017;377:658-75

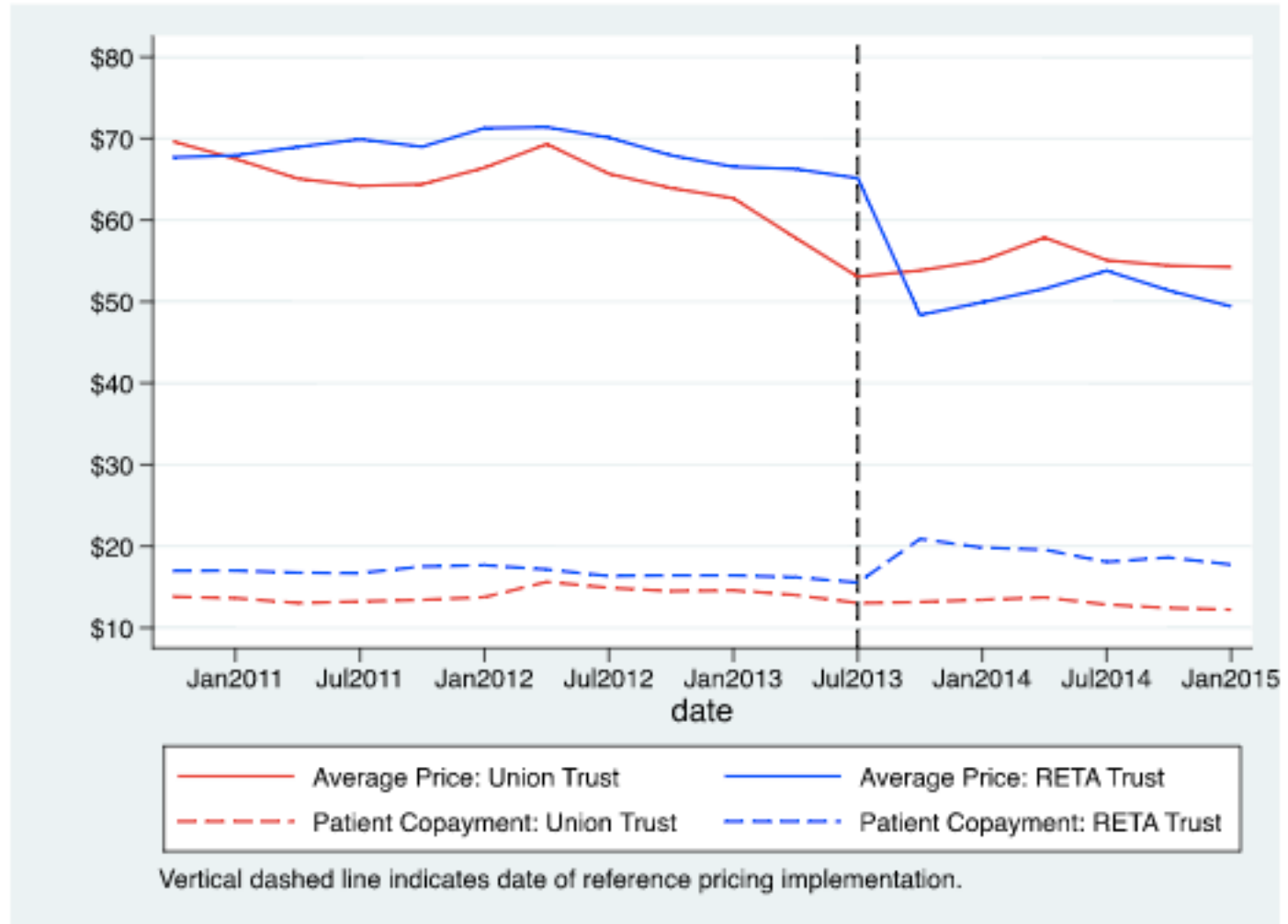


Impact of Reference Pricing: Increased Share for Low-Price Drug with Each Class



Vertical dashed line indicates date of reference pricing implementation.

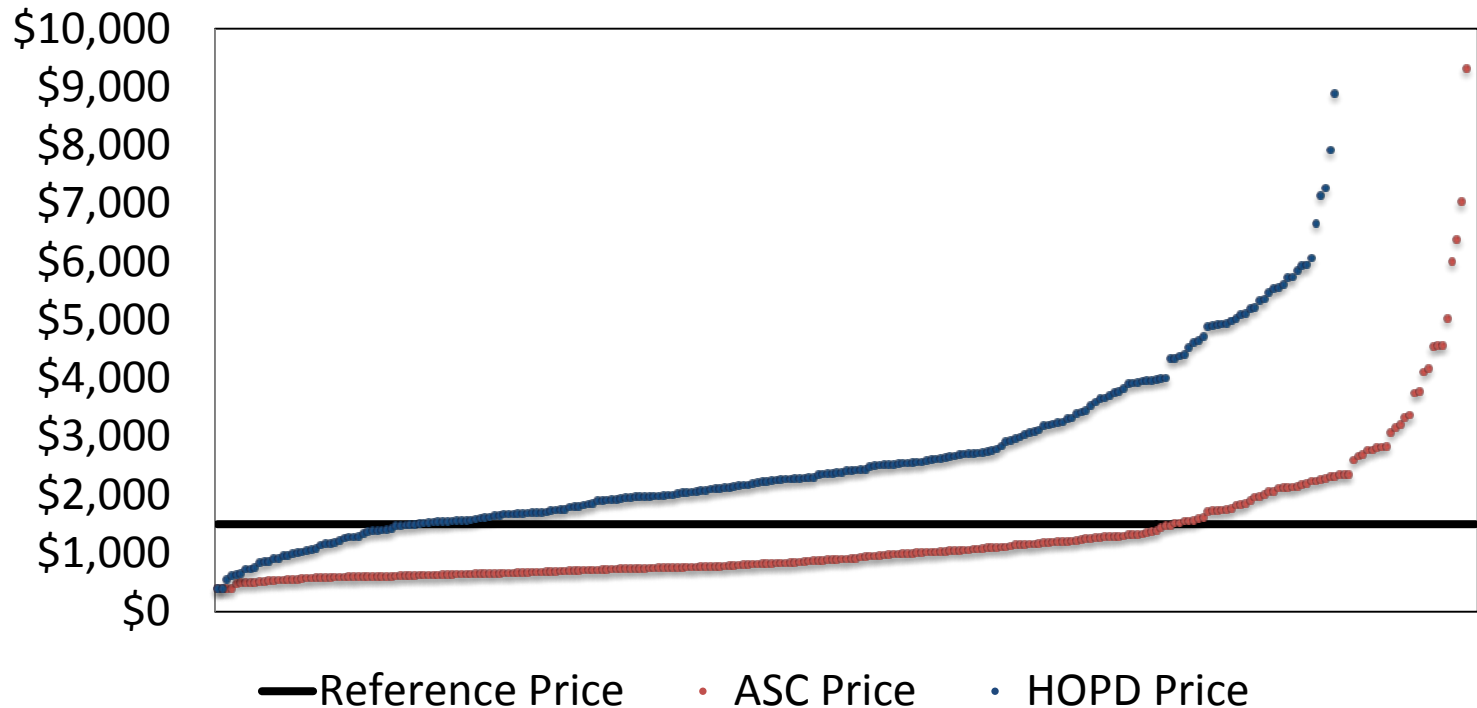
Impact of Reference Pricing: Reduced Prices Paid and Increased Consumer Cost Sharing



Reference Pricing for Surgical and Diagnostic Procedures



Variation in Colonoscopy Prices in 2011

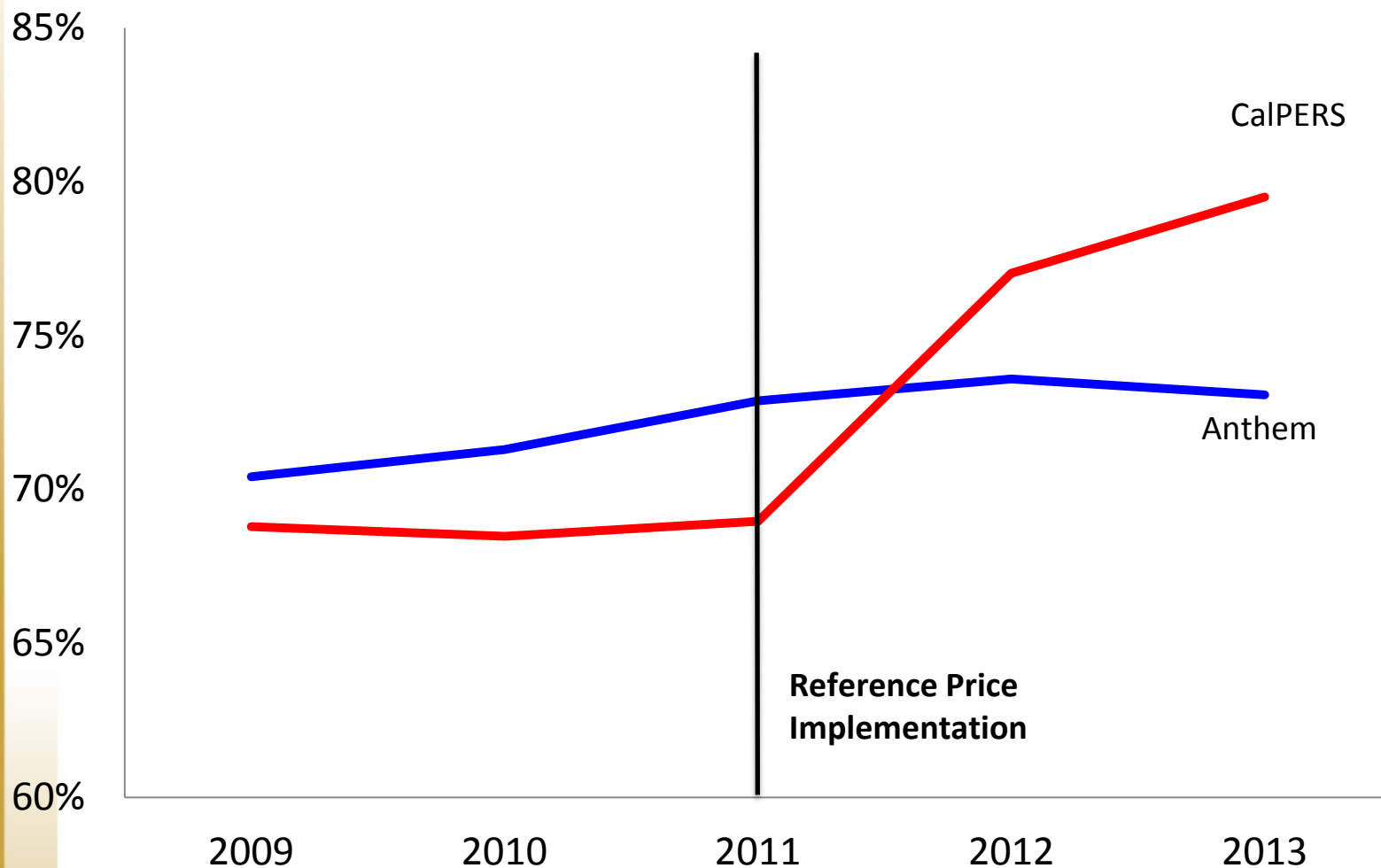


Multivariable Statistical Analysis of Reference Pricing for Colonoscopy

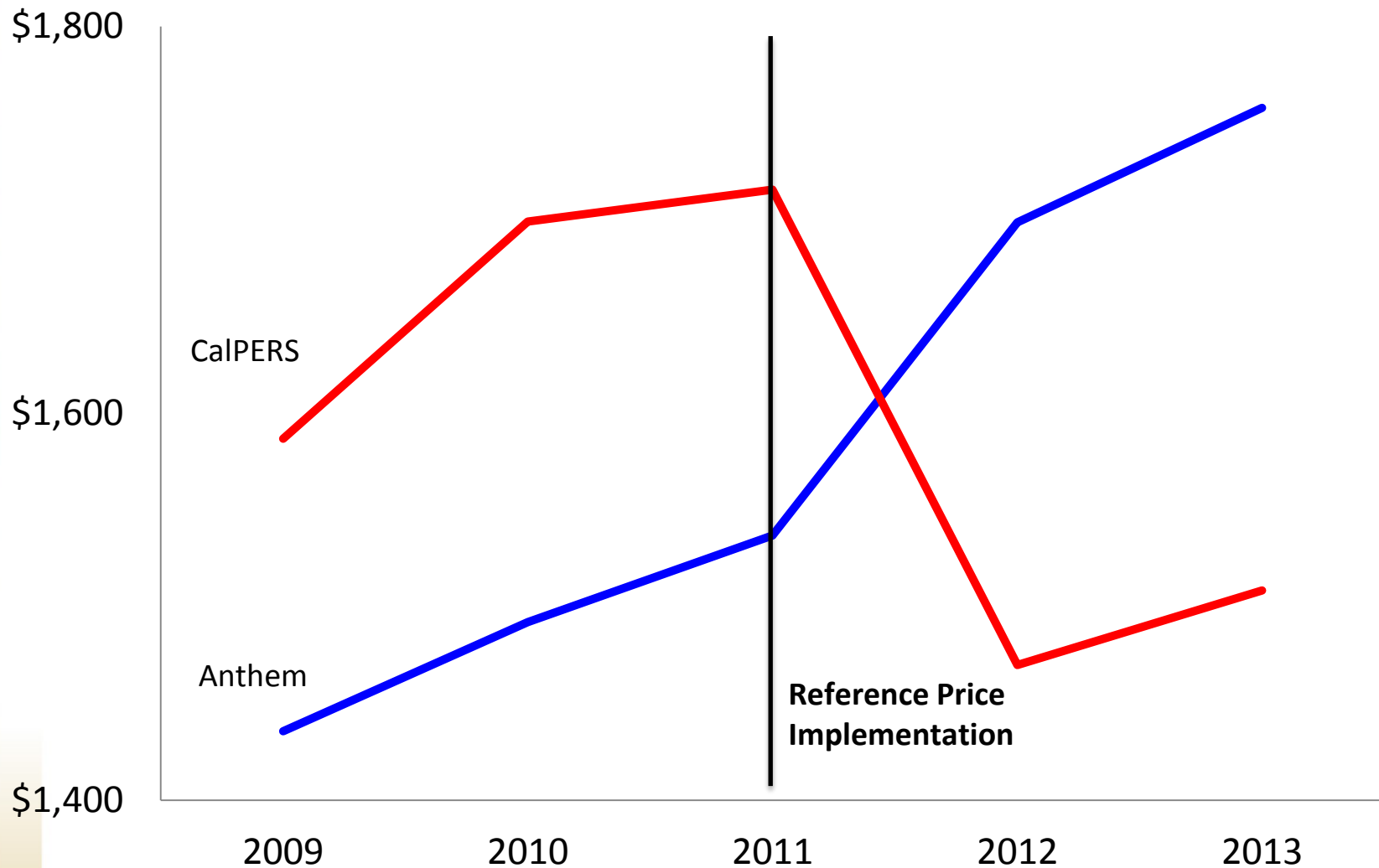
- Insurance claims for colonoscopy procedures from 2009 to 2014 were obtained from CalPERS (N=35,195) and comparison group Anthem Blue Cross (N=258,616)
- Multivariable (difference-in-difference) analyses:
 - 18 percentage point growth in probability that patient selects a (low-priced) non-hospital clinic
 - 21% reduction in average price paid
 - No change in surgical complications
- JC Robinson et al. Association of Reference Payment for Colonoscopy with Consumer Choices, Insurer Spending, and Procedural Complications. JAMA Internal Medicine 2015; 175(11):1783-91.



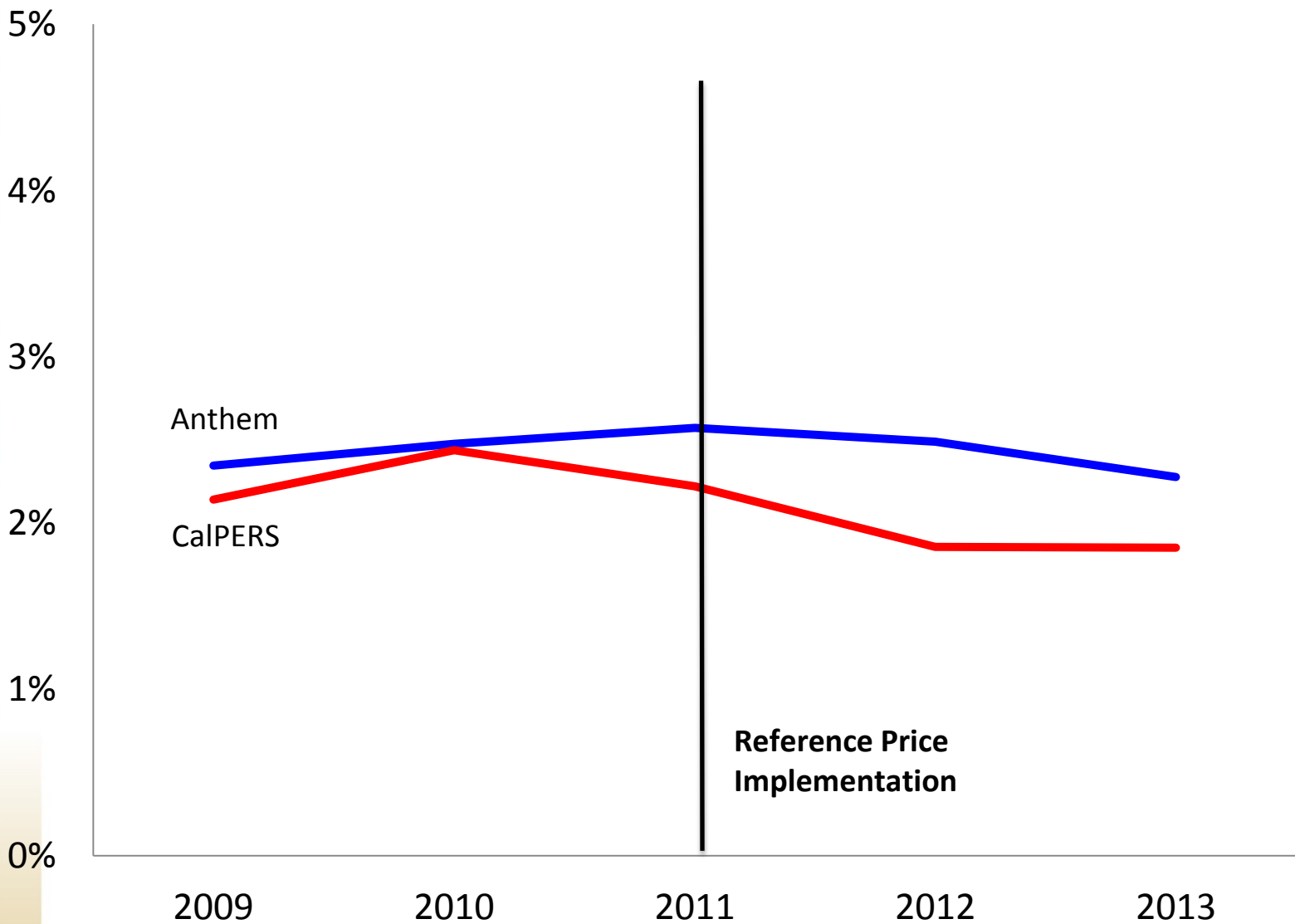
Percentage of Colonoscopy Patients Choosing ASC over HOPD before and after Implementation of Reference Pricing



Average Price (Allowed Charge) for Colonoscopy Before and After Implementation of Reference Pricing



Surgical Complications for Colonoscopy Before And After Implementation of Reference Pricing



Research on Alternative Pricing Models: Subscription Drug Pricing



- Under traditional (one-part) pricing, each dose sold must be priced to cover its marginal costs plus a share of fixed costs
 - The extent of the R&D load for each individual drug varies across nations and across payers within nations but must be covered across the firm's portfolio
- Under subscription (two part) pricing, unit prices are set equal to marginal costs, but payer also purchases a 'subscription' to grant it access to the brand (this rewards and finances R&D)
- Subscription varies by size of covered population, but not by number of doses prescribed

Traditional Pricing Models Generate Payer Resistance to R&D Funding

- Economic efficiency is achieved when price is set equal to marginal cost of production ($p=mc$)
- But this condition cannot be met in the presence of fixed costs ($F>0$), such as for R&D
- Exclusivity allows price to be set above costs, supporting R&D. But then consumers with under-utilize, unless demand is subsidized by insurance. But then insurers will resist utilization

Moderately Managed

- Specialist approval required
- Requires prior failure or contraindication with 1 DMARD (e.g., MTX)
- Initial authorization time limit ≥ 3 months but ≤ 6 months

Highly Managed

- Requires prior failure or contraindication with 1 DMARD AND 2 conventional therapies
- Severe RA only
- Initial authorization time limit < 3 months

Very Highly Managed

- Requires prior failure or contraindication with 1 or 2 biologic therapies, in addition to DMARD
- Severe RA only
- Initial authorization time limit

Degree of management is Increasing

Restrictions for Medicaid Reimbursement of Sofosbuvir for the Treatment of Hepatitis C Virus Infection in the United States

Soumitri Barua; Robert Greenwald, JD; Jason Grebely, PhD; Gregory J. Dore, MBBS, PhD; Tracy Swan; and Lynn E. Taylor, MD

The aim of this study was to systematically evaluate state Medicaid policies for the treatment of hepatitis C virus (HCV) infection with sofosbuvir in the United States. Medicaid reimbursement criteria for sofosbuvir were evaluated in all 50 states and the District of Columbia. The authors searched state Medicaid Web sites between 23 June and 7 December 2014 and extracted data in duplicate. Any differences were resolved by consensus. Data were extracted on whether sofosbuvir was covered and the criteria for coverage based on the following categories: liver disease stage, HIV co-infection, prescriber type, and drug or alcohol use. Of the 42 states with known Medicaid reimbursement criteria for sofosbuvir, 74% limit sofosbuvir access to persons with advanced fibrosis (Meta-Analysis of Histologic Data in Viral Hepatitis [METAVIR] fibrosis stage F3) or cirrhosis (F4). One quarter of states require persons co-infected with HCV and HIV to be receiving antiretroviral therapy or to have suppressed HIV RNA

levels. Two thirds of states have restrictions based on prescriber type, and 88% include drug or alcohol use in their sofosbuvir eligibility criteria, with 50% requiring a period of abstinence and 64% requiring urine drug screening. Heterogeneity is present in Medicaid reimbursement criteria for sofosbuvir with respect to liver disease staging, HIV co-infection, prescriber type, and drug or alcohol use across the United States. Restrictions do not seem to conform with recommendations from professional organizations, such as the Infectious Diseases Society of America and the American Association for the Study of Liver Diseases. Current restrictions seem to violate federal Medicaid law, which requires states to cover drugs consistent with their U.S. Food and Drug Administration labels.

Ann Intern Med. 2015;163:215-223. doi:10.7326/M15-0406 www.annals.org
For author affiliations, see end of text.

This article was published online first at www.annals.org on 30 June 2015.

INVESTIGATION

A pill too hard to swallow: how the NHS is limiting access to high priced drugs

A joint investigation by The BMJ and Cambridge and Bath universities uncovers how NHS England tried to limit access to expensive new drugs for hepatitis C. **Jonathan Gornall, Amanda Hoey, and Piotr Ozieranski** report

Jonathan Gornall *freelance journalist*¹, Amanda Hoey *consultant*, Piotr Ozieranski *lecturer*³

¹Suffolk, UK; ²Department of Sociology, University of Cambridge, Cambridge, UK; ³Department of Social and Policy Sciences, University of Bath, Bath, UK

Highly priced medicines are challenging health systems around the world in unprecedented ways. And none more so than the new sofosbuvir based antiviral drugs introduced by Gilead Sciences in 2014. Offering greatly reduced treatment durations and high cure rates, these medicines hold out the real prospect of eliminating hepatitis C in countries where they are widely administered, with all that implies for long term savings in healthcare costs.

But launch of these drugs has ignited a global debate about high priced medicines. With launch prices ranging from around \$90 000 (£69 000; €82 000) per patient in the US to almost £35 000

Our investigation finds that NHS England was unable to adopt innovative funding mechanisms to reduce the price because of NHS procurement law.

In interviews with clinicians, patient groups, and drug company representatives, a picture emerges of how NHS England failed to plan ahead for expensive drugs it knew were in the pipeline, exaggerated the numbers likely to come forward for treatment and the financial burden for them in its submissions to NICE, and, in a “shroud waving” exercise, claimed thousands of other NHS patients would die if NICE gave the go ahead to the hepatitis C drugs.



Case Study of Subscription Pricing: HCV Drugs

- The discounted (one part) price of HCV drugs is approximately \$40K per dose and the cost of manufacturing and distribution is \$2K per dose, hence each dose has \$38K in R&D loaded on
 - One part price: $\$40K = \$R/n + \$2K$
- National Academy of Medicine estimates subscription price (\$R) for the entire Medicaid population at \$2B, plus \$140K for manufacturing and distribution
 - Two part price: $(\$2B + \$140K)/n$

HealthAffairsBlog

A Good Deal For Eliminating Hepatitis C: Saving Money And Lives

Neeraj Sood, Gillian Buckley, and Brian Strom

April 24, 2017



Case Study of Subscription Pricing: Antibiotics

- Bacteria are developing resistance to existing (cheap, generic) antibiotics, due to overuse
- Low (generic) prices undermine incentives for pharma firms to invest in antibiotic R&D
- Two-part pricing; R&D prize combined with per-dose price set at generic levels

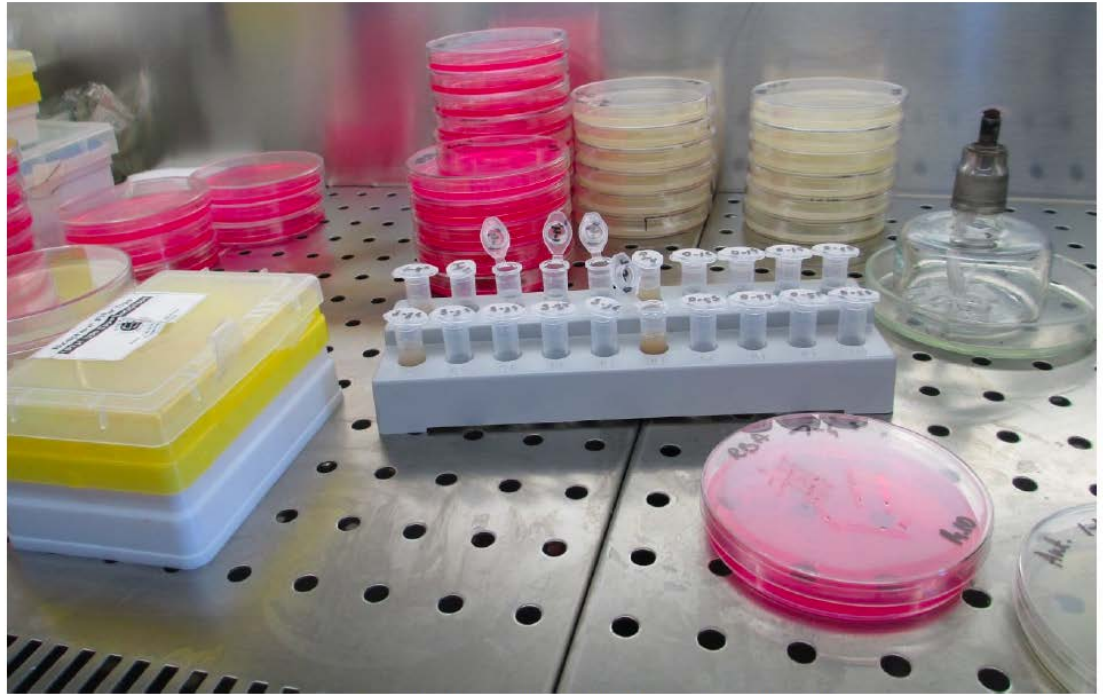


Lawmakers propose \$2B prize fund for new antibiotics—if developers waive exclusivity

by Phil Taylor | Apr 13, 2017 8:40am

US proposal:

\$2B prize for new antibiotics for drug-resistant infections, plus generic pricing for each dose



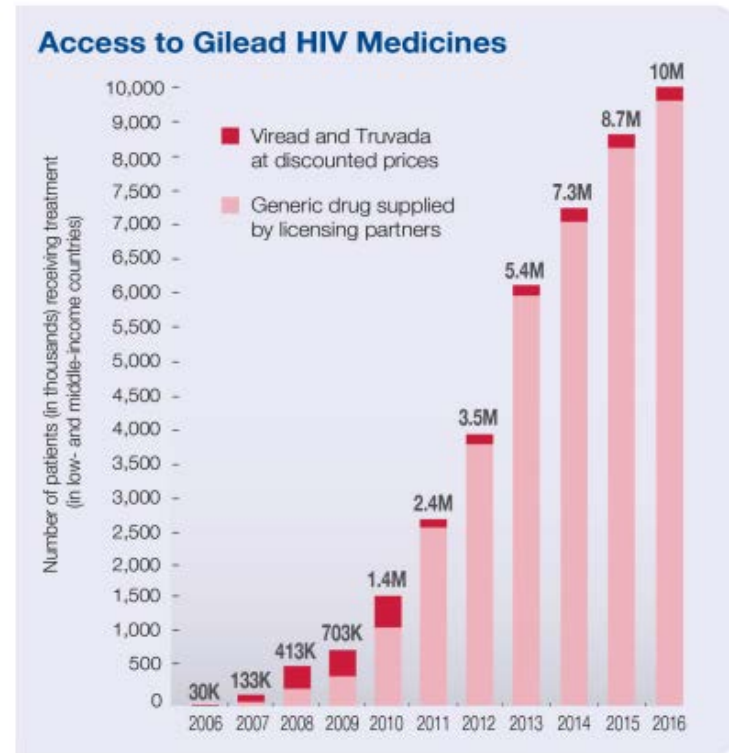
A new bill intends to stimulate R&D into drugs for serious and life-threatening bacterial infections.

A bill tabled by senior Democrats would set up a \$2 billion prize fund that will try to encourage the development of more effective antibiotics for serious infections.

Tucked away in the wide-ranging [Improving Access to Affordable Prescription Drugs Act](#), the antibiotic research clause calls for "up to three" prizes for products that "provide added benefit for patients over existing therapies in the treatment of serious and life-threatening bacterial infections demonstrating in superiority trials."

Case Study of Subscription Pricing: Low-Income Nations

- Low-income nations can only afford prices at generic levels (no payment for R&D)
- Selected firms are licensing their branded drugs at low or zero rates (for R&D), adding a price per dose at generic levels to cover marginal costs of distribution



Pfizer Announces Two-Part Pricing for Cancer Drugs in Africa

As Cancer Tears Through Africa, Drug Makers Draw Up a Battle Plan

In a deal similar to the one that turned the tide against AIDS, manufacturers and charities will make chemotherapy drugs available in six poor countries at steep discounts.

Global Health

By DONALD G. McNEIL Jr. OCT. 7, 2017

NAIROBI, Kenya — In a remarkable initiative modeled on the campaign against AIDS in Africa, two major pharmaceutical companies, working with the American Cancer Society, will steeply discount the prices of cancer medicines in Africa.

Under the new agreement, the companies — Pfizer, based in New York, and Cipla, based in Mumbai — have promised to charge rock-bottom prices for 16 common chemotherapy drugs. The deal, initially offered to a half-dozen countries, is expected to bring lifesaving treatment to tens of thousands who would otherwise die.

Pfizer said its prices would be just above its own manufacturing costs. Cipla said

Case Study of Subscription Pricing: Targeted and Combination Therapies

- Many difficult pricing (and hence access) problems for specialty drugs derive from the current need to combine payment for R&D (F/n) with payment for costs of manufacturing and distribution (mc)
- These could be alleviated by charging subscription price per patient or per covered population (rather than per dose)
- Some pharmaceutical firms are exploring these possibilities



Immune-Oncology

- Some cancer indications respond to multiple drugs (targeted, immune-oncology) better than to one
- But the composite price of 2 or more oncology drugs pushes the total price above \$300K/patient
 - The marginal costs for oncology drugs is only 15% of price
 - The current one-part prices contain a high R&D load
- Manufacturers and payers are constrained by rule that drug prices be uniform across indications
- Two part pricing could provide a solution:
 - Subscription price (per population) varies by indication
 - Unit price (per dose) is uniform across indications
- This also obviates a separate price for any companion diagnostic test, which is important since the clinical value to the patient depends on the test and drug jointly, not separately





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