

Pricing in the market for anticancer drugs

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Questions

- Have the benefit-adjusted launch prices of anticancer drugs increased over time?
- If so, why?

Outline

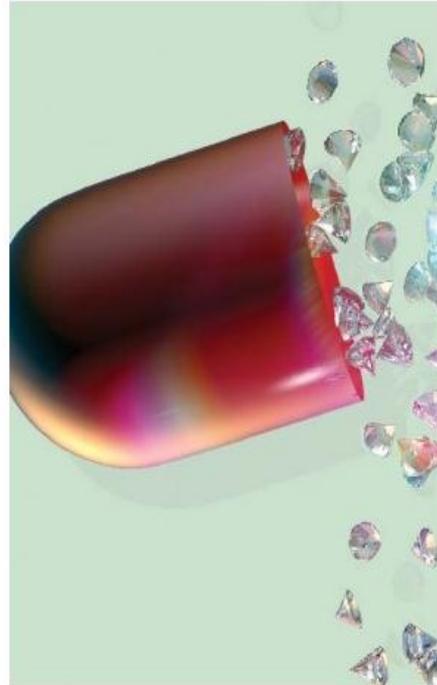
- The market for anticancer drugs: *not a competitive market*
- Data on pricing trends: *prices are going up, not related to benefits*
- Speculative theories on pricing behavior: *reference price models of demand and growth of discounts.*

The chemo market is interesting

- Financial significance:
 - Total spending was \$37 billion in 2013 (IMS 2014)
 - 37-41% average annual growth rate 2006-2013 (Conti et al 2014)
- Symbolic significance: “Today NICE routinely denies Britons life-prolonging drugs that are deemed not ‘cost effective’... The result, studies show, is that Great Britain’s cancer survival rates are among the worst in Europe and lag behind the United States.” Newt Gingrich (2009)
 - Anticancer drugs figure prominently in national discussions of health reform, alternately symbolizing wasteful spending and biomedical progress.

Big Pharma's Favorite Prescription: Higher Prices

By Robert Langreth | May 08, 2014

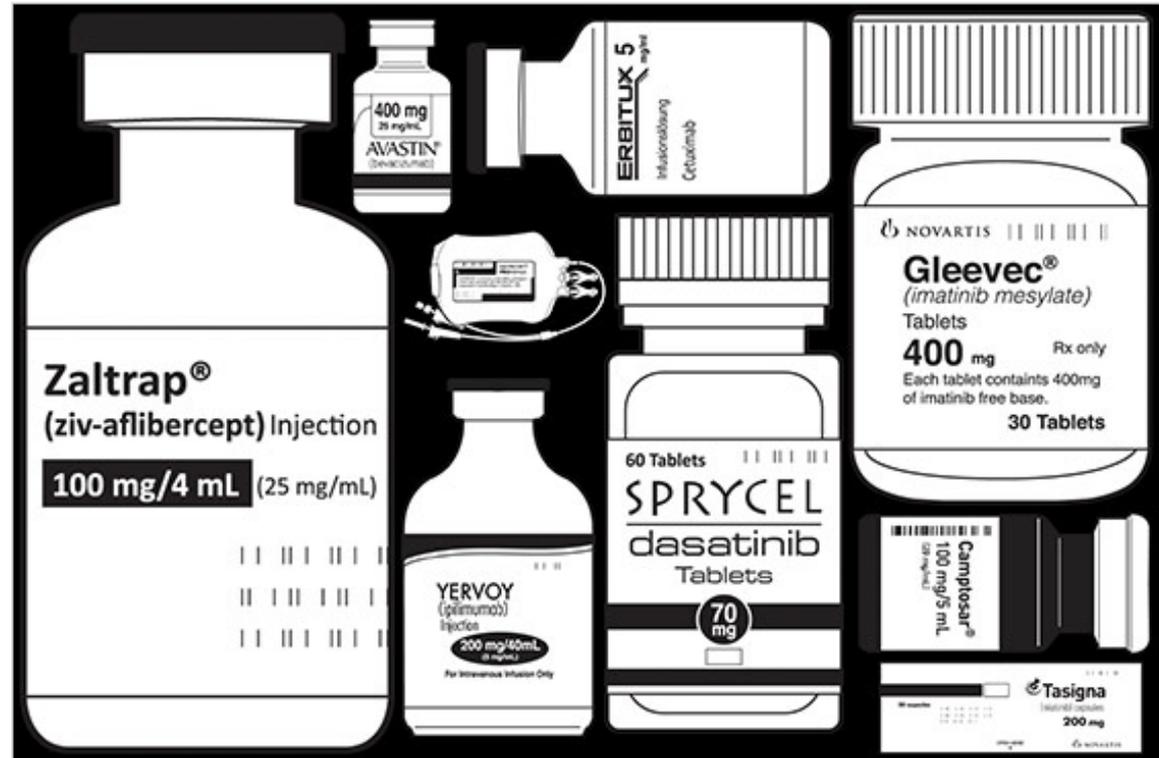


The Cost of Living

New drugs could extend cancer patients' lives—by days. At a cost of thousands and thousands of dollars. Prompting some doctors to refuse to use them.

By Stephen S. Hall | Published Oct 20, 2013 | Share

32 Comments



Avastin, \$5,000/month; Zaltrap, \$11,000/month; Yervoy, \$39,000/month; Provenge, \$93,000/course of treatment; Erbitux, \$8,400/month; Gleevec, \$92,000/year; Tasigna, \$115,000/year; Sprycel, \$123,000/year. (Photo: Illustrations by Remie Geoffroi)

Controversy over prices

“...the cost of the new generation of drugs is getting out of all proportion to the added benefit.” (Cavalli 2013).

Attention has focused on a handful of high-profile drugs like bevacizumab

In Newsweek Magazine

The Cancer “Breakthroughs” that Cost Too Much and Do Too Little

Aug 27, 2012 1:00 AM EDT

‘Death panels’ are a bad idea. But asking hard questions about health care is not.

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In his more than 35 years of practice, Dr. Lowell Schnipper has seen a lot of women die from breast cancer. A patient's options start to dwindle by the time tumor cells set up outposts in the bones, lungs, and other organs, defying all attempts to keep them under control. But in June, when the government approved Perjeta, Schnipper had something new to offer. The drug is one of an innovative class of drugs known as “targeted therapies.”



As the chief of oncology at Beth Israel Deaconess Medical Center in Boston, Schnipper knew Perjeta was

Some costly chemotherapeutics

- 2004: bevacizumab (Avastin), colorectal cancer, \$50,000, 5 months
- 2009: sipuleucel-T (Provenge), prostate cancer, \$93,000, 3 months
- 2011: ipilimumab (Yervoy), skin cancer, \$120,000, 3 months

Features of the market for new chemotherapeutics

- Producers are monopolists, few close substitutes
- Insurers cover drugs for FDA-approved uses regardless of price
- Patients face low cost sharing at the margin
- Physicians make money on office-administered drugs, neutral for oral drugs
- Value left to assess by MDs, Hospitals

Patient assistance programs

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Data

- Chemotherapy drugs approved between 1995-2013
- Price = amount paid by Medicare based on typical duration of use, stated in 2012 USD
- Survival benefit = increase in median survival time in months between treatment and control
- Other attributes: administration route, approval basis, side effects

Pricing formula

Approval year	Route	
	IV	Oral
pre-1997	100% of AWP	100% of AWP
1997-2003	95% of AWP	95% of AWP
2004	85% of AWP	85% of AWP
2005-2006	106% of ASP	106% of ASP
2006-2007	106% of ASP	Medicare price
2008-2012	100% of WAC	Medicare price

Monthly and Median Costs of Cancer Drugs at the Time of FDA Approval 1965 - 2013

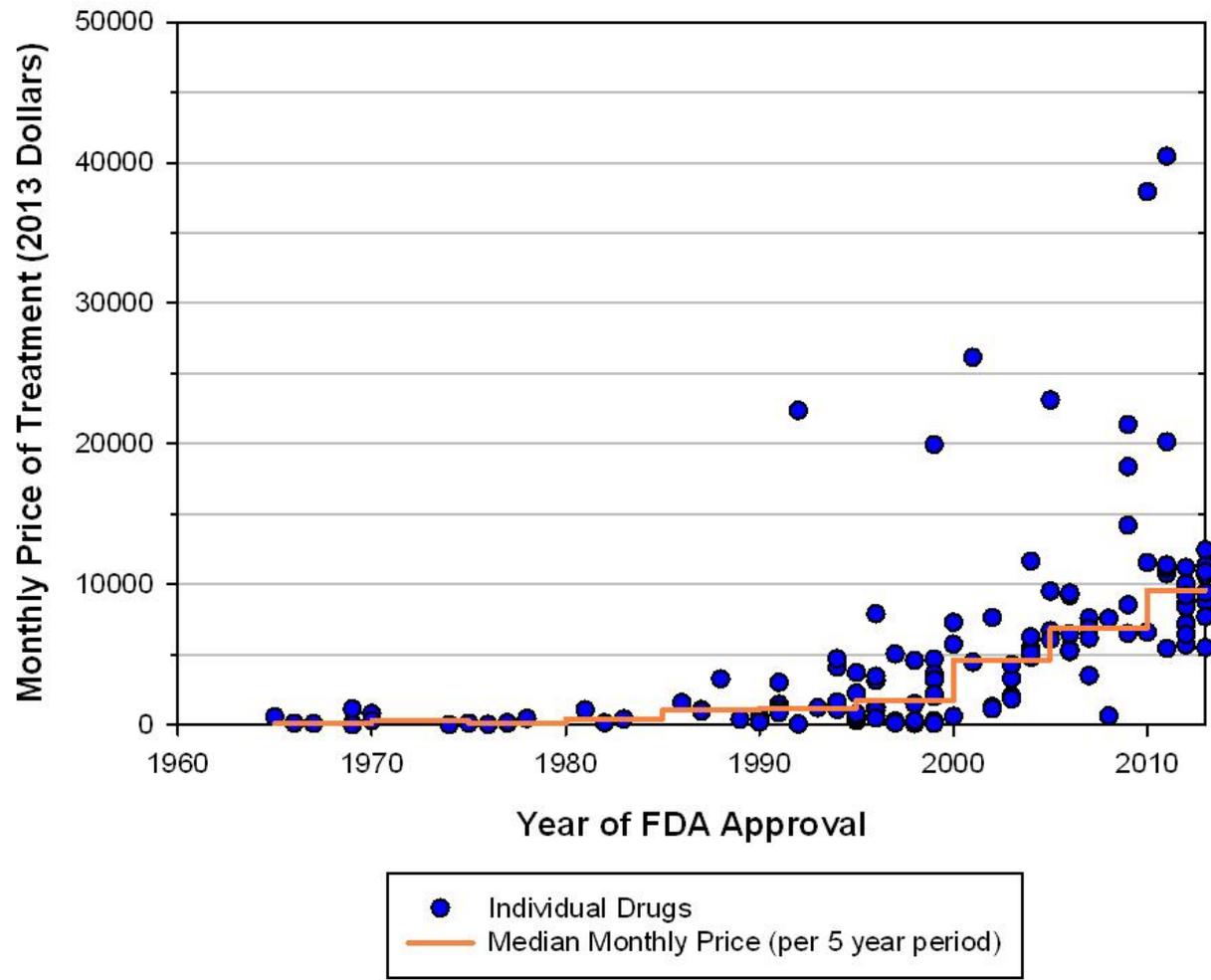
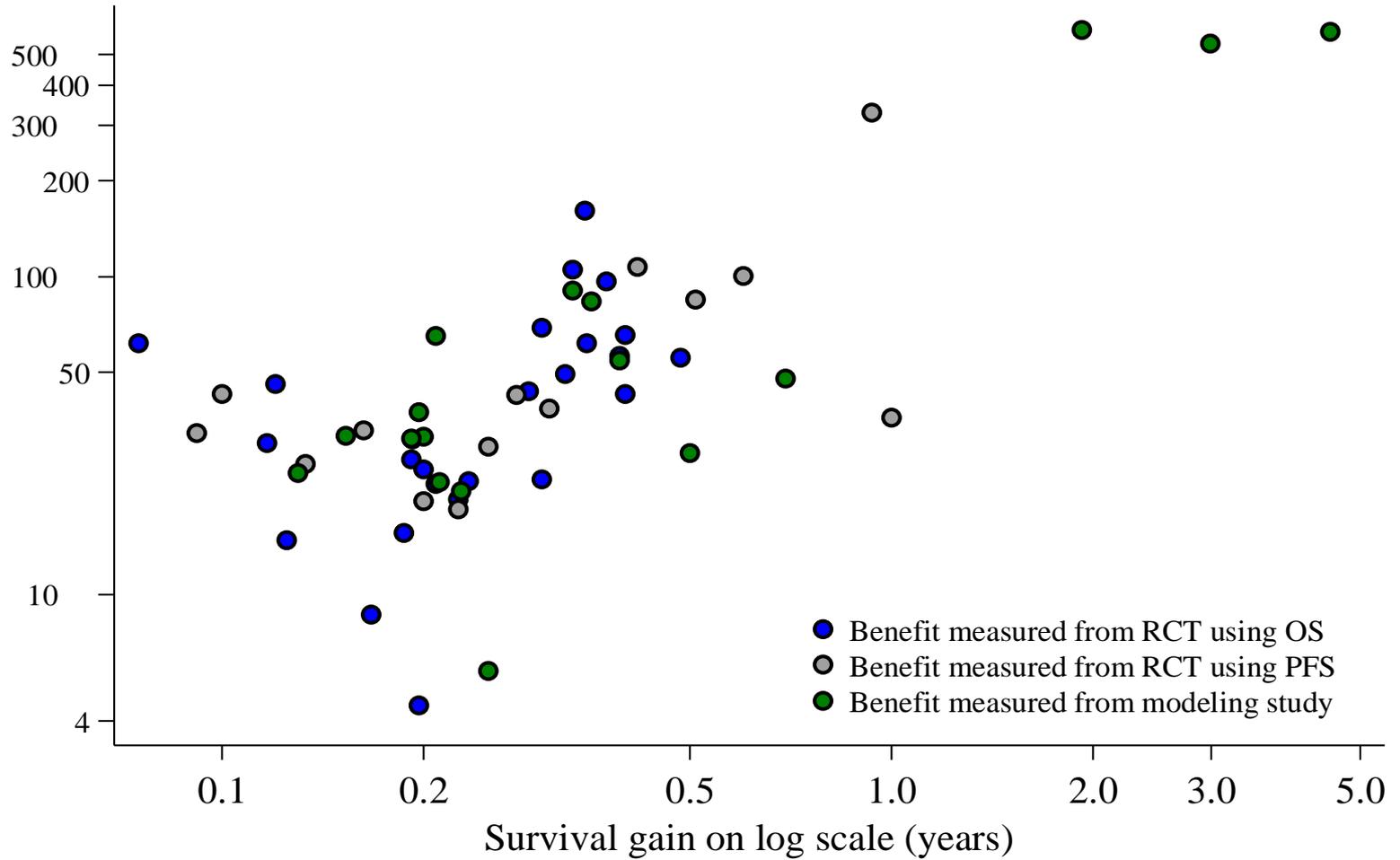
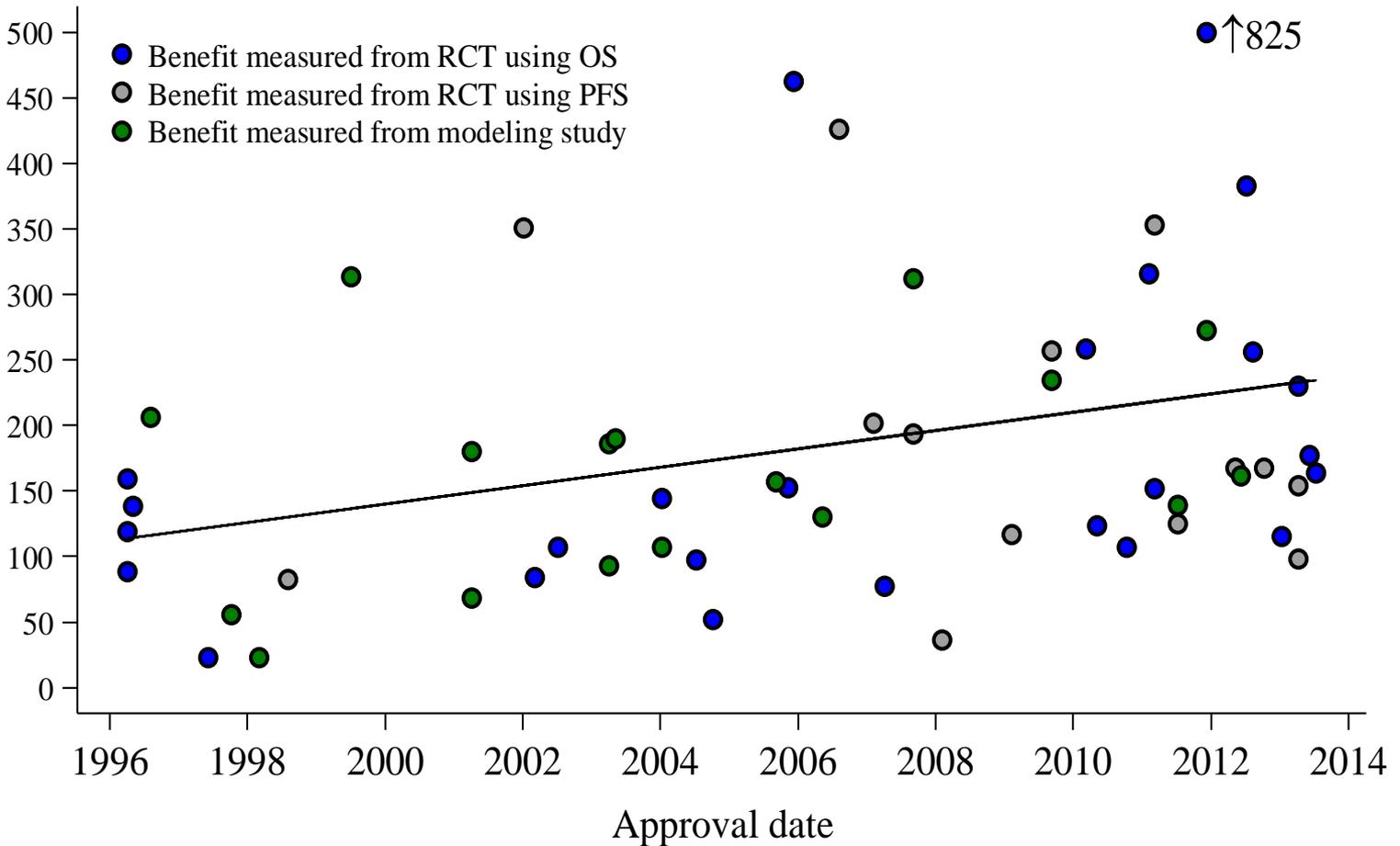


Figure 1: Price versus gain in survival time



RCT: randomized controlled trial. OS: Overall survival. PFS: Progression-free survival

Figure 2: Price per year of life gained versus approval date



The best fit line is: Price per year of life gained = \$101,077 + \$7,396 × Approval year.
For purposes of display, we re-coded one value from \$825,000 to \$500,000.
RCT: randomized controlled trial. OS: Overall survival. PFS: Progression-free survival

Table 2: Impact of approval year and other variables on the natural logarithm of the price per year of life gained in \$1,000s of 2013 USD

	A	B	C	D
Approval year	0.05 [0.02, 0.08]*	0.05 [0.02, 0.08]*	0.05 [0.02, 0.08]*	0.04 [0.01, 0.08]*
GI complication rate		0.01 [-1.11, 1.14]		
Neutropenia rate		0.17 [-0.61, 0.96]		
Biologic			0.07 [-0.30, 0.44]	
Multiproduct firm			0.06 [-0.32, 0.44]	
Active control				-0.18 [-0.59, 0.22]
Placebo control				0.13 [-0.32, 0.58]
Constant	4.50 [4.15, 4.86]*	4.48 [3.92, 5.04]*	0.06 [-0.3, 0.4]	4.57 [4.17, 4.97]*
N	56	52	56	56
R-squared	0.15	0.15	0.16	0.19
	E	F	G	H
Approval year	0.05 [0.02, 0.08]*	0.05 [0.02, 0.08]*	0.05 [0.02, 0.08]*	0.04 [0.01, 0.07]*
Ln(competitors)	-0.25 [-0.48, -0.02]*			
IV administration		-0.16 [-0.52, 0.19]		
Genetic test		-0.35 [-0.70, -0.01]*		
Second line		0.14 [-0.20, 0.48]		
Tumor deaths			-0.002 [-0.007, 0.002]	
Baseline survival				0.003 [-0.006, 0.013]
Constant	5.00 [4.43, 5.57]*	4.70 [4.15, 5.24]*	4.58 [4.20, 4.96]*	4.57 [4.19, 4.95]*
N	56	56	56	53
R-squared	0.22	0.22	0.17	0.12

*P < 0.05, +P < 0.10

95% Confidence intervals are in brackets.

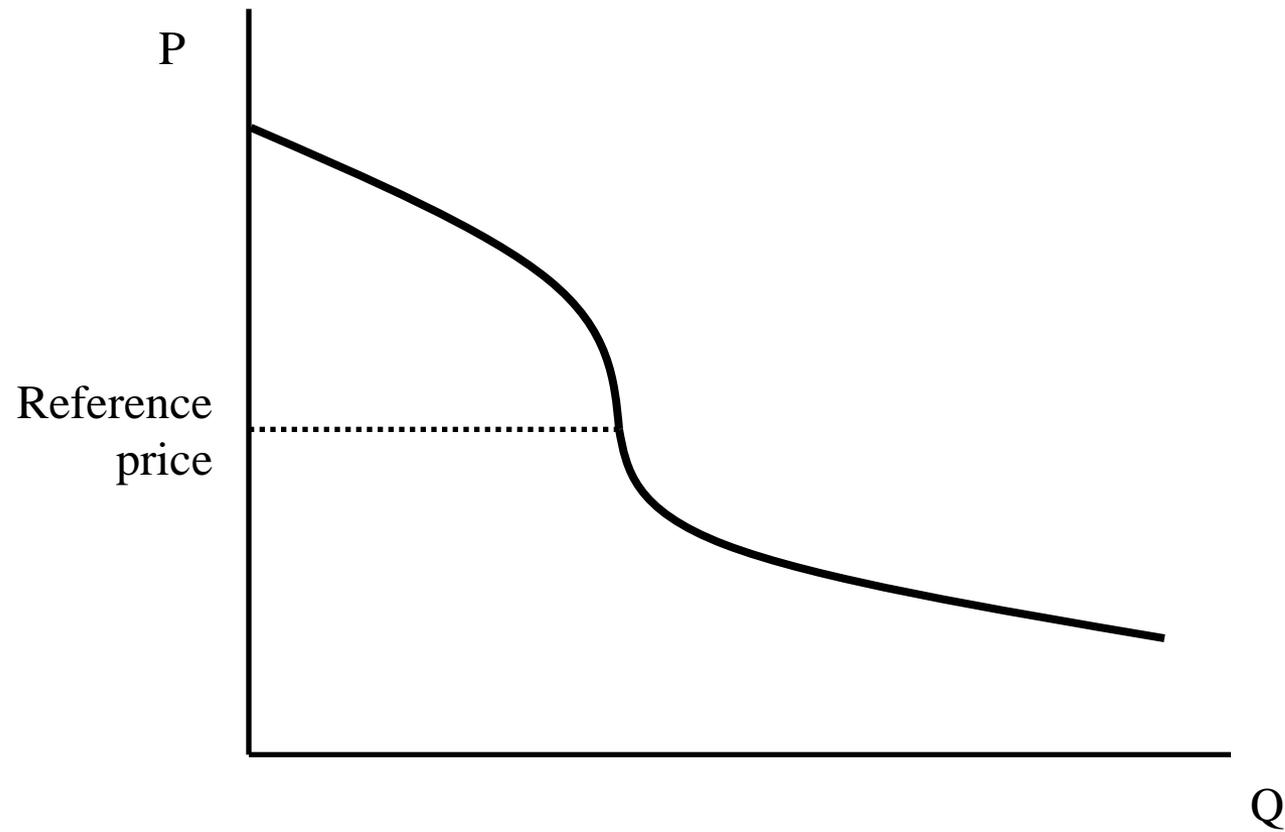
Why are benefit-adjusted prices increasing: some speculative theorizing

- Reference pricing
- Growth of discounts and rebates

Reference pricing in the chemo market

- Oncologists decide whether to use drugs
- They have no direct incentive to avoid costly drugs
- They may balk at prescribing drugs with prices they perceive as unreasonable
- Perceptions of unreasonableness are malleable and influenced by the prices of previously approved drugs – *a reference price!*
- If the reference price is $\$X$, manufacturers can set the price of a new drug at $\$X + \varepsilon$ without incurring a demand penalty

Demand curve w/ loss aversion



Least Convincing Argument of the Day

by [Alex Tabarrok](#) on December 6, 2009 at 8:29 am in [Medicine](#) | [Permalink](#)

Here is James Caruso, the chief commercial officer for drug maker Allos, defending the price of cancer drug Foltyn:

Mr. Caruso also said the price of Foltyn was not out of line with that of other drugs for rare cancers. Patients, moreover, are likely to use the drug for only a couple of months because the tumor worsens so quickly, he said.

In other words, our drug isn't so expensive given how poorly it works.



12 comments



Reference pricing in the chemo market

- A spokeswoman for AstraZeneca justified the price of Irressa as “*in line with other cancer treatments.*” (Marcus 2004).
- The retail price of the drug will be \$5,416 per month, an amount that Onyx said is in *the range of similarly specialized cancer drugs.* (Silber 2005)
- Gold [CEO of Dendreon] says that the cost of Provenge was based on the “*overall landscape*” of treatment prices for cancer. (Hutchison 2010)

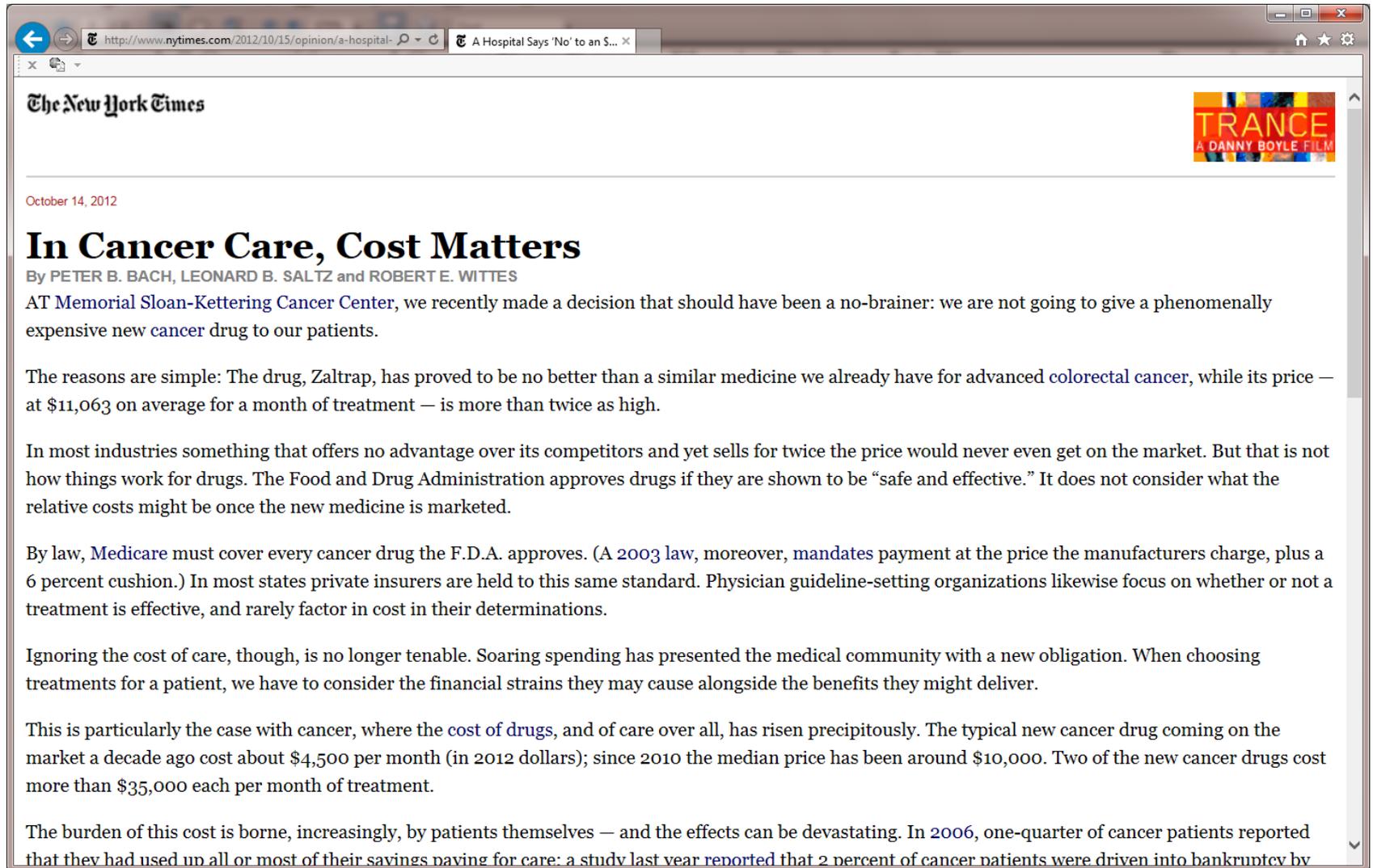
Reference pricing in the chemo market

- Companies will be looking at these products to help them determine the pricing of their own drugs...Tarceva and other drugs will likely take their cue from Erbitux and Avastin. --Wall St. Analyst
- ...the market structure effectively provides no mechanism for price control in oncology other than companies' goodwill and tolerance for adverse publicity --Wall St. Analyst

Reference pricing in the chemo market

- Right now...it is basically chutzpah...The most powerful predictor of the entry price is the entry price of the drug that came before it. There is nothing to do with innovation, accelerated approval, number of patients served. It is just a game of chicken. --
Oncologist

Reference pricing and Zaltrap



The screenshot shows a web browser window displaying a New York Times article. The browser's address bar shows the URL: <http://www.nytimes.com/2012/10/15/opinion/a-hospital->. The article is dated October 14, 2012, and is titled "In Cancer Care, Cost Matters" by Peter B. Bach, Leonard B. Saltz, and Robert E. Wittes. The article discusses the high cost of the cancer drug Zaltrap compared to similar medicines and the impact of Medicare and private insurers on drug pricing.

The New York Times

October 14, 2012

In Cancer Care, Cost Matters

By PETER B. BACH, LEONARD B. SALTZ and ROBERT E. WITTES

AT Memorial Sloan-Kettering Cancer Center, we recently made a decision that should have been a no-brainer: we are not going to give a phenomenally expensive new cancer drug to our patients.

The reasons are simple: The drug, Zaltrap, has proved to be no better than a similar medicine we already have for advanced colorectal cancer, while its price — at \$11,063 on average for a month of treatment — is more than twice as high.

In most industries something that offers no advantage over its competitors and yet sells for twice the price would never even get on the market. But that is not how things work for drugs. The Food and Drug Administration approves drugs if they are shown to be “safe and effective.” It does not consider what the relative costs might be once the new medicine is marketed.

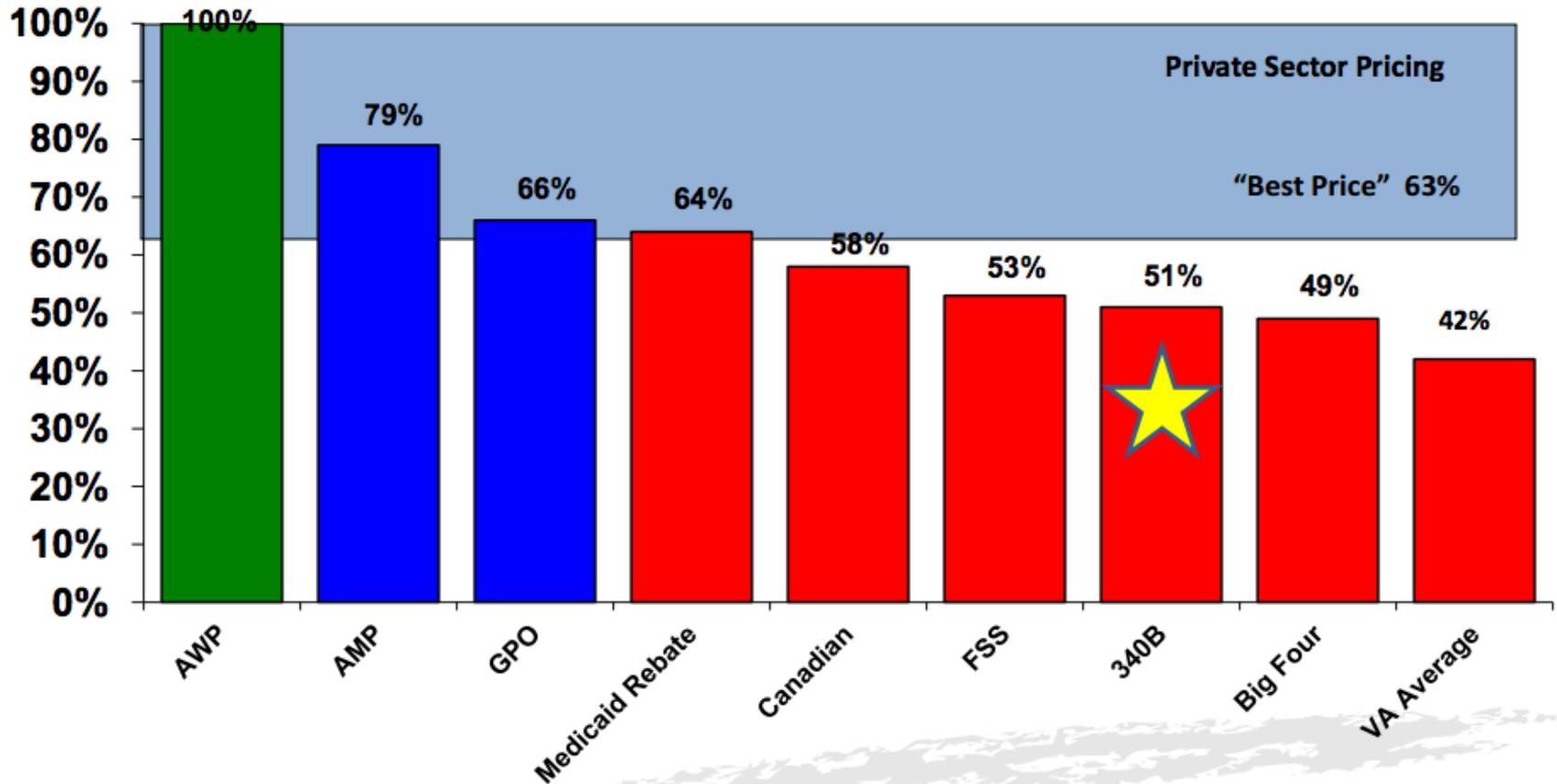
By law, Medicare must cover every cancer drug the F.D.A. approves. (A 2003 law, moreover, mandates payment at the price the manufacturers charge, plus a 6 percent cushion.) In most states private insurers are held to this same standard. Physician guideline-setting organizations likewise focus on whether or not a treatment is effective, and rarely factor in cost in their determinations.

Ignoring the cost of care, though, is no longer tenable. Soaring spending has presented the medical community with a new obligation. When choosing treatments for a patient, we have to consider the financial strains they may cause alongside the benefits they might deliver.

This is particularly the case with cancer, where the cost of drugs, and of care over all, has risen precipitously. The typical new cancer drug coming on the market a decade ago cost about \$4,500 per month (in 2012 dollars); since 2010 the median price has been around \$10,000. Two of the new cancer drugs cost more than \$35,000 each per month of treatment.

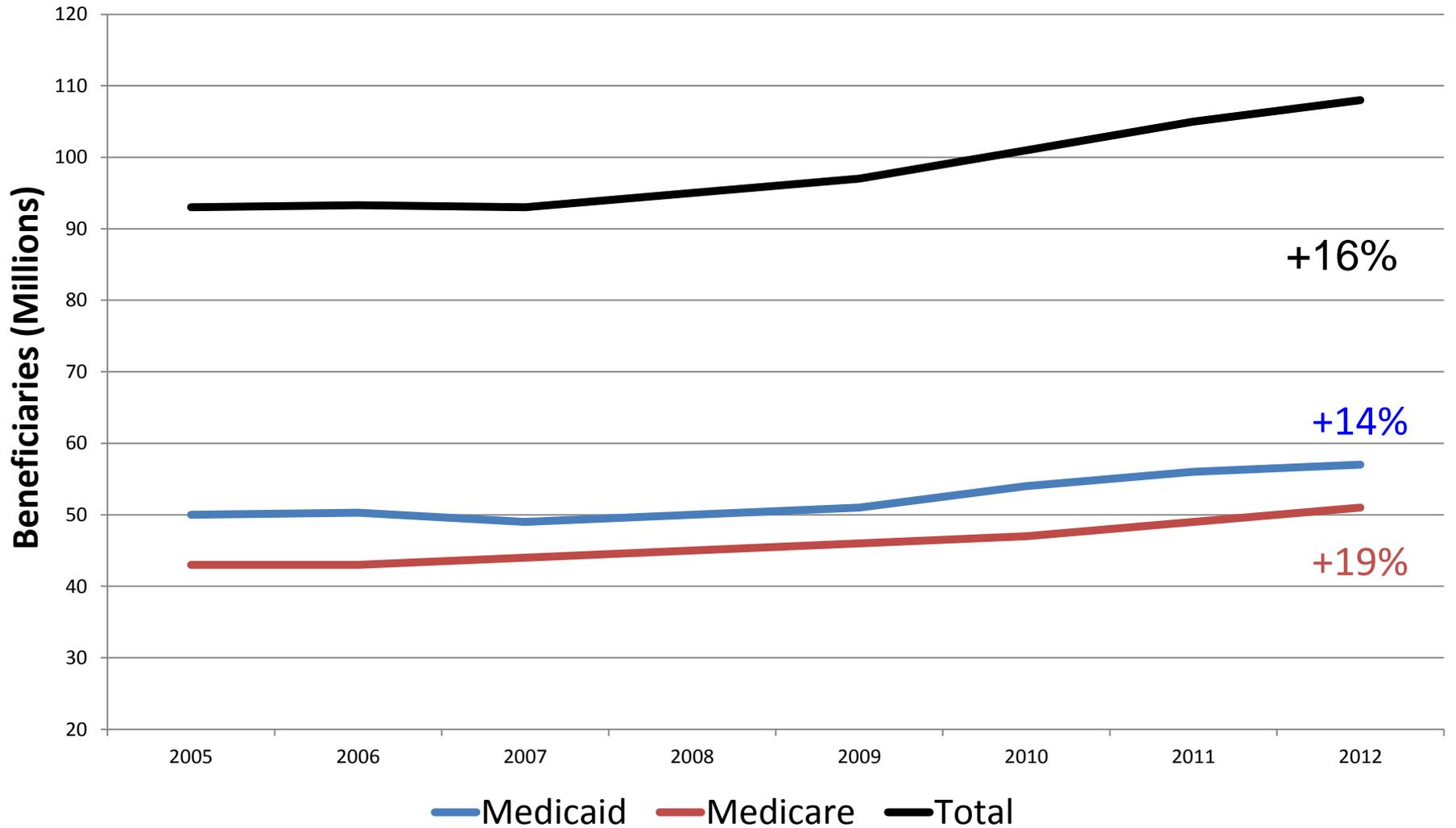
The burden of this cost is borne, increasingly, by patients themselves — and the effects can be devastating. In 2006, one-quarter of cancer patients reported that they had used up all or most of their savings paying for care: a study last year reported that 2 percent of cancer patients were driven into bankruptcy by

Discounts and rebates are significant



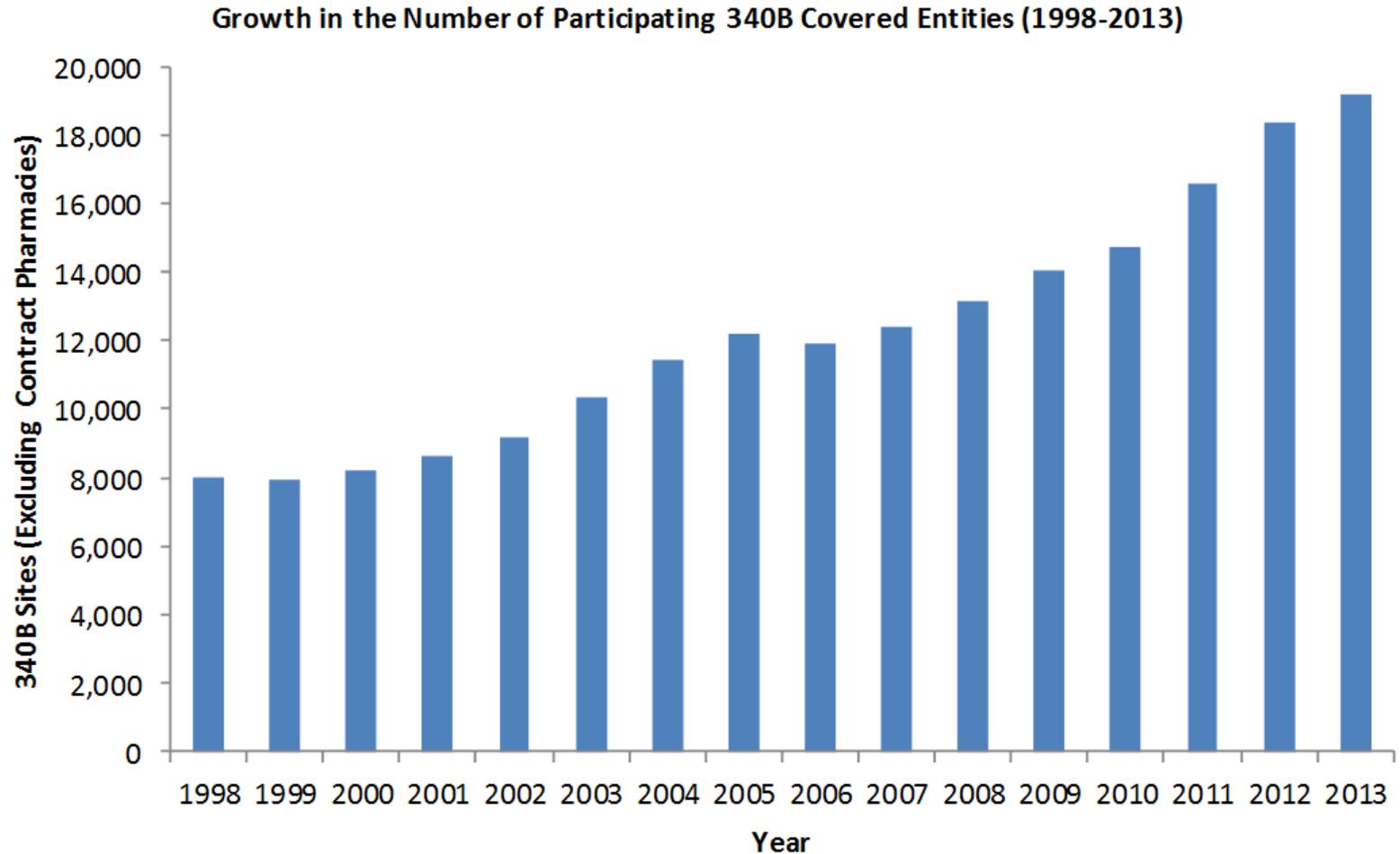
Adapted from a slide by Safety Net Hospitals for Pharmaceutical Access

Source: Data derived from [Prices for Brand-Name Drugs Under Selected Federal Programs](#), Congressional Budget Office (June 2005)



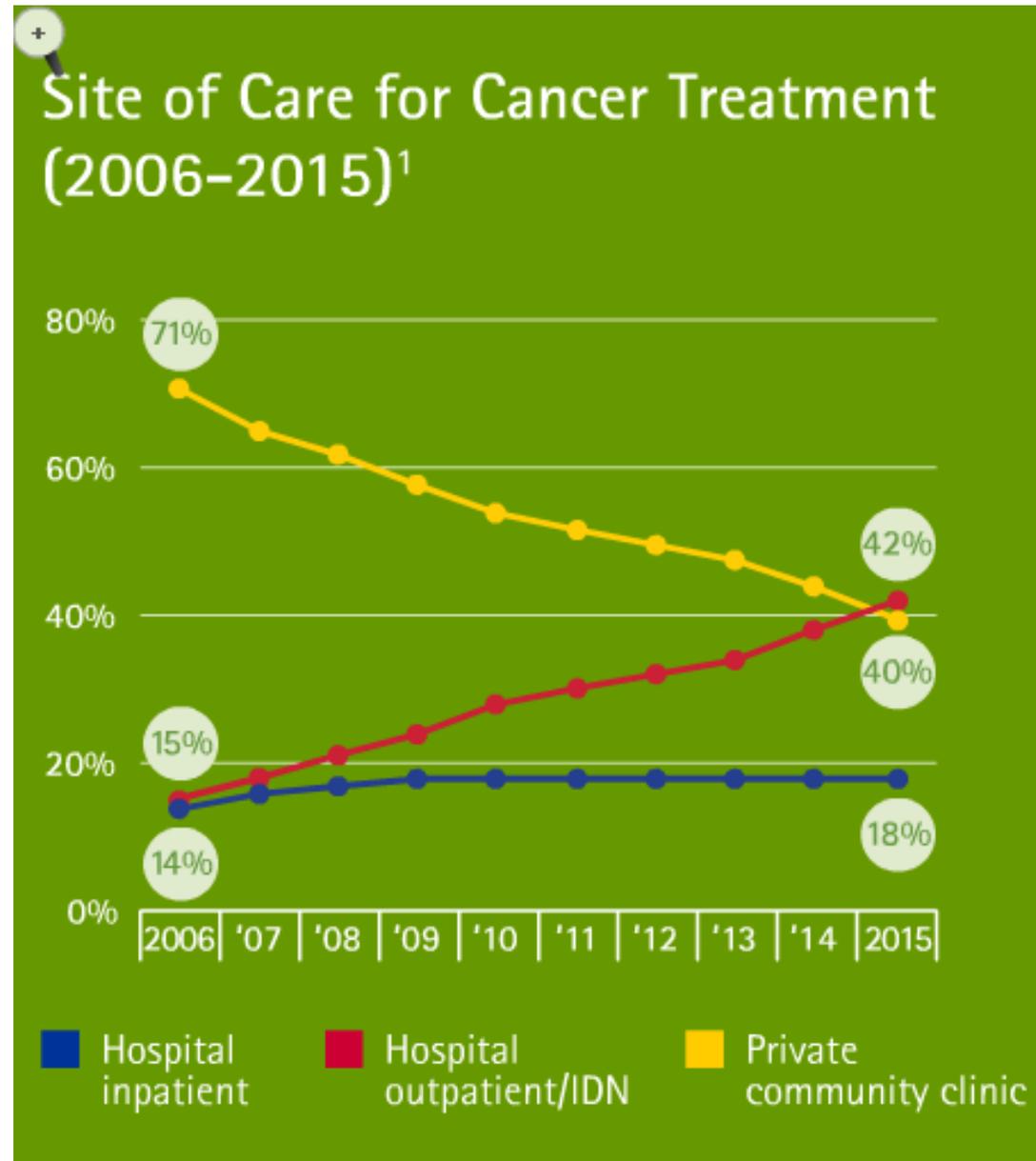
Source: CMS, Medicare and Medicaid statistical supplements

340B drug pricing program is growing



Source: Avalere Health analysis of Health Resources and Services Administration Office of Pharmacy Affairs files.

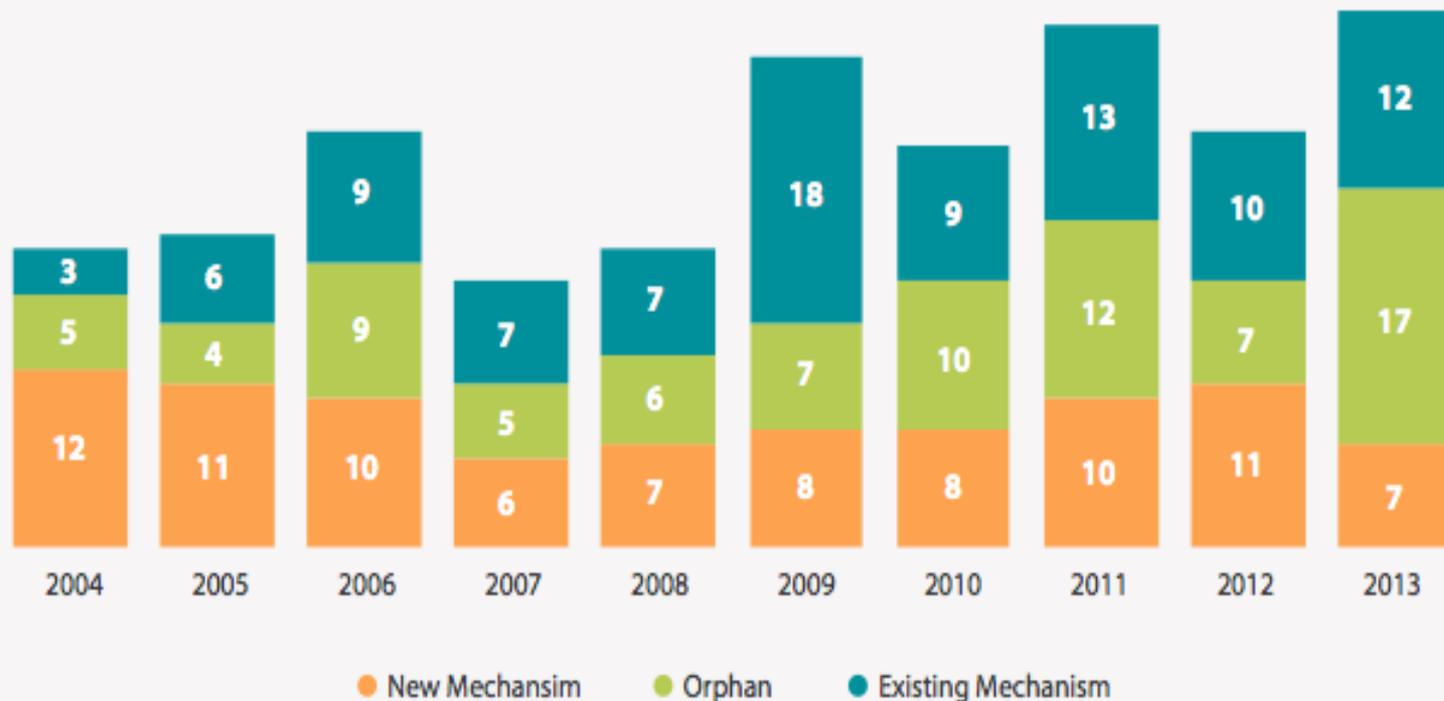
- Consolidation shifts bargaining
 - GPO power may increase



Source: EMD Serono Specialty Drug Report, 2013; Conti, Bach, 2013.

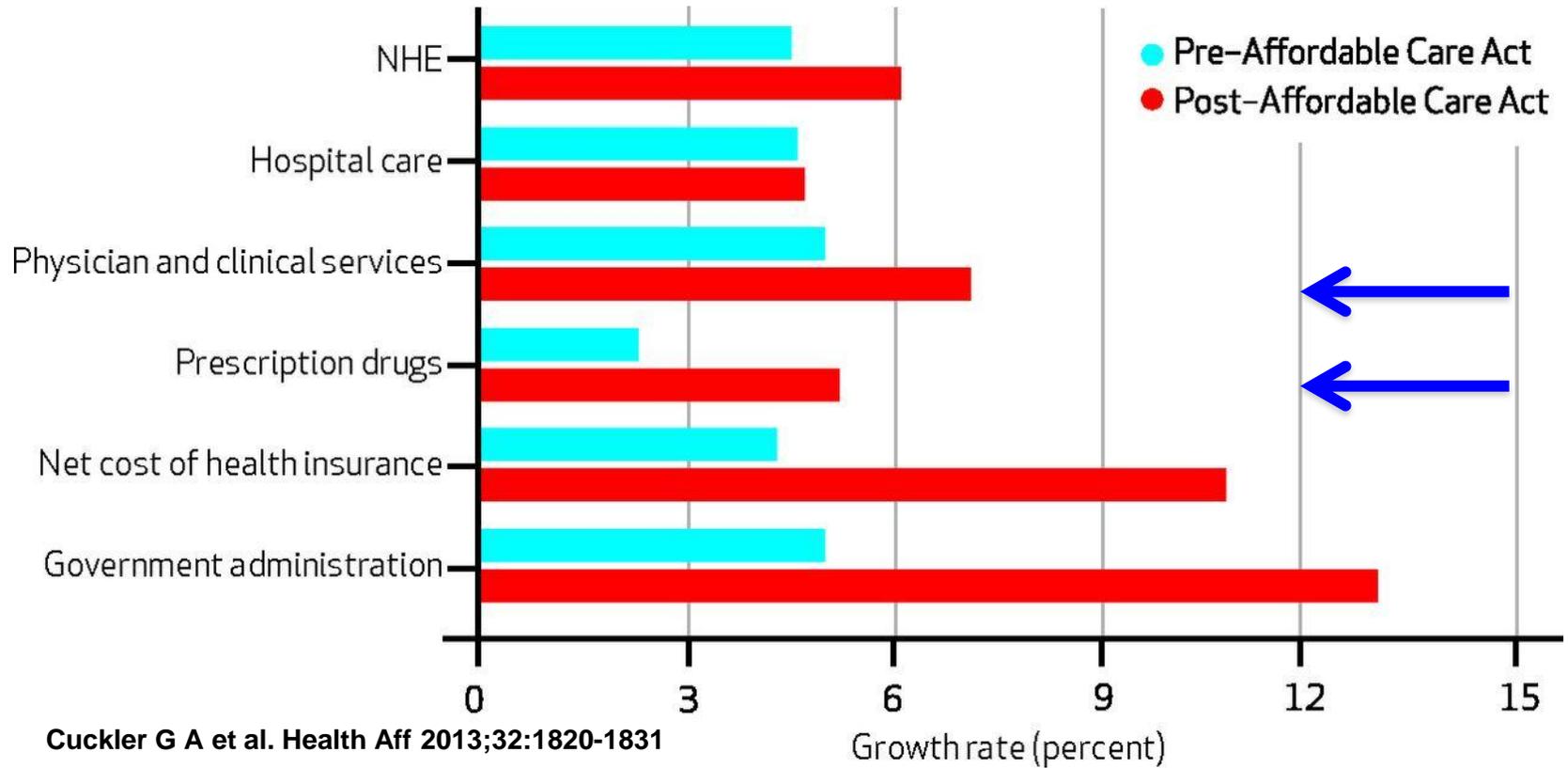
The number of new molecular entities launched in 2013 is the highest in the last 10 years

New molecular entities launched in the U.S. 2004-2013



Source: IMS Institute for Healthcare Informatics, Feb 2014

2014 Growth Rates By Selected Sector, Before And After The Impact Of The Affordable Care Act



Conclusions

- Benefit- and inflation-adjusted launch prices have increased
- Two plausible explanations
 - Demand is subject to reference-price effects
 - Growth of discounts and rebates
- These tradeoffs are not going to go away soon