

PRESCRIPTION DRUG MARKETS

S. Vincent Rajkumar, M.D.

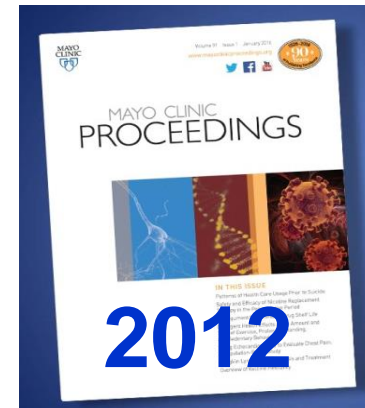
Professor of Medicine

Mayo Clinic

The High Cost of Cancer Drugs and What We Can Do About It

Mustaqeem Siddiqui, MD

S. Vincent Rajkumar, MD



-
- 20 trials (8 RCTs)
 - Regulatory trials
 - Celgene (Thalidomide)
 - Takeda (Ixazomib)
 - Amgen (Carfilzomib)
 - Janssen (Daratumumab)

Number of new myeloma patients in the US in 2017: 30,000

Total lifetime costs to treat all patients diagnosed in 2017: \$22.4 billion

Excludes spending on hospital, infusion, laboratory, imaging, physician, nursing and ancillary costs

Drug Costs

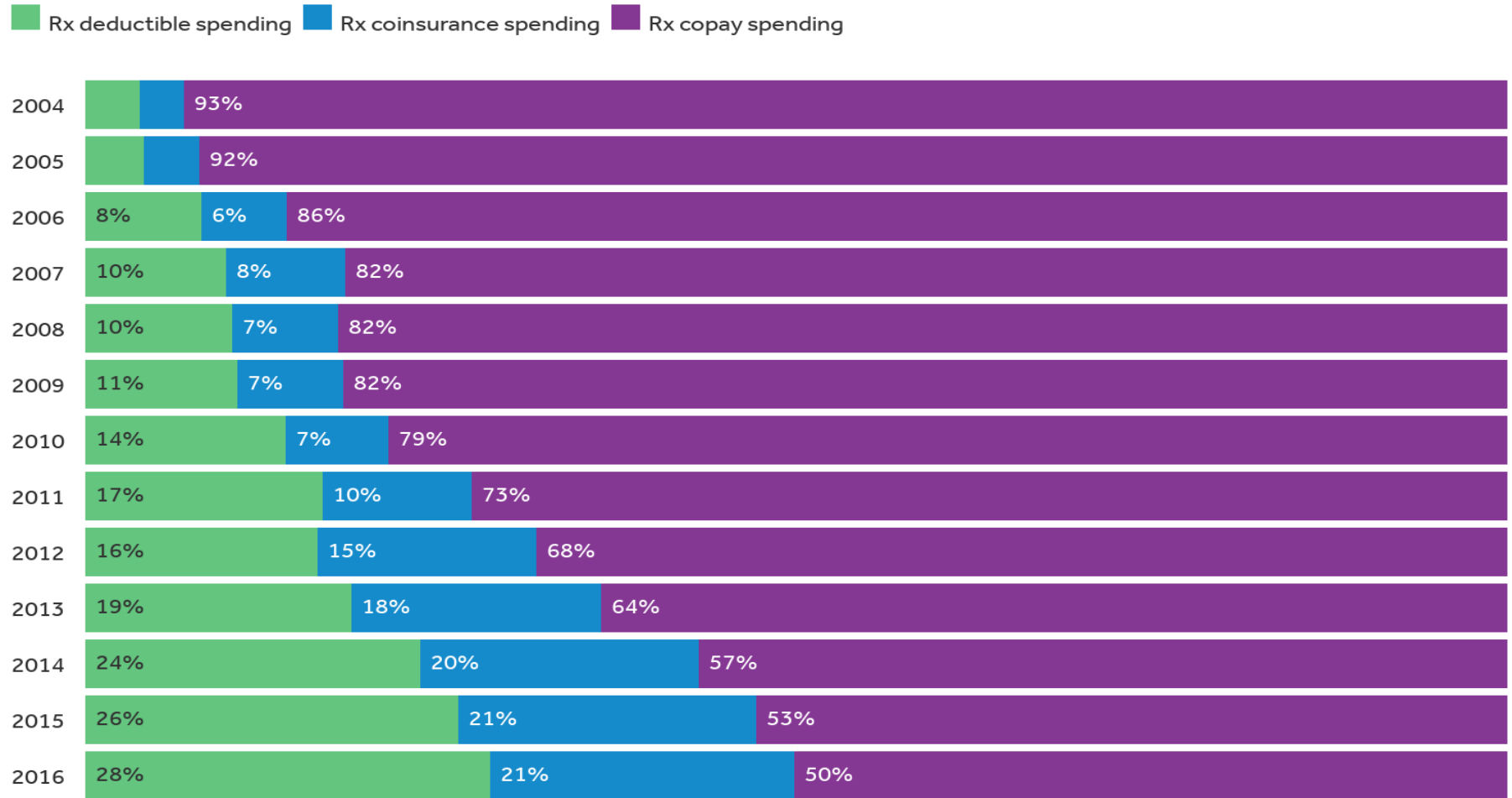
Drugs	Approximate Drug Cost per Year* (in U.S. Dollars)	Comment
Thalidomide	60,000	
Lenalidomide	168,000	
Pomalidomide	192,000	
Bortezomib	50,000	
Ixazomib	111,000	
Carfilzomib	130,000	260,000 (at 56 mg/m ²)
Daratumumab	120,000	
Elotuzumab	120,000	
Panobinostat	96,000	
Cyclophosphamide	5800	
Melphalan IV	10,000	Per transplant

Drug Costs

Regimens	Appx. Drug Cost Per Year* (U.S. Dollars)
VRd	220,000
KRd	300,000
VCd	60,000
DRd	290,000
D-VRd	340,000
D-KRd	590,000

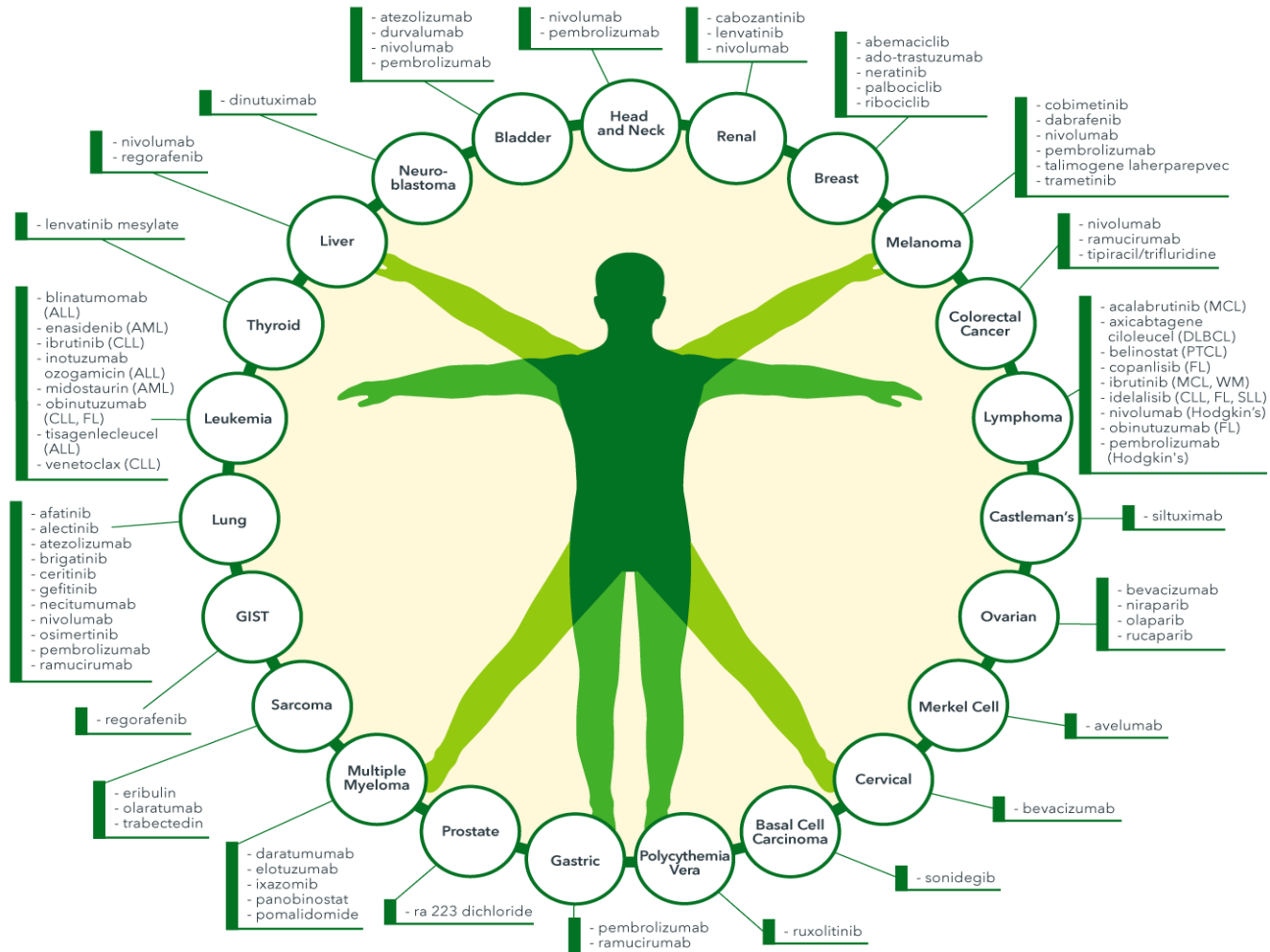
*Source for calculating costs: parenteral drug prices: <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Part-B-Drugs/McrPartBDrugAvgSalesPrice/2017ASPFiles.html> (accessed Feb 12, 2018); oral drug prices: GoodRx.com (accessed February 12, 2018).

Distribution of cost-sharing payments for retail prescription drugs in large employer plans, by type of payment, 2004-2016



Source: Kaiser Family Foundation analysis of Truven Health Analytics MarketScan Commercial Claims and Encounters Database, 2004-2016 • [Get the data](#) • [PNG](#)

New Active Substance Approvals in Oncology by Indication, 2013–2017



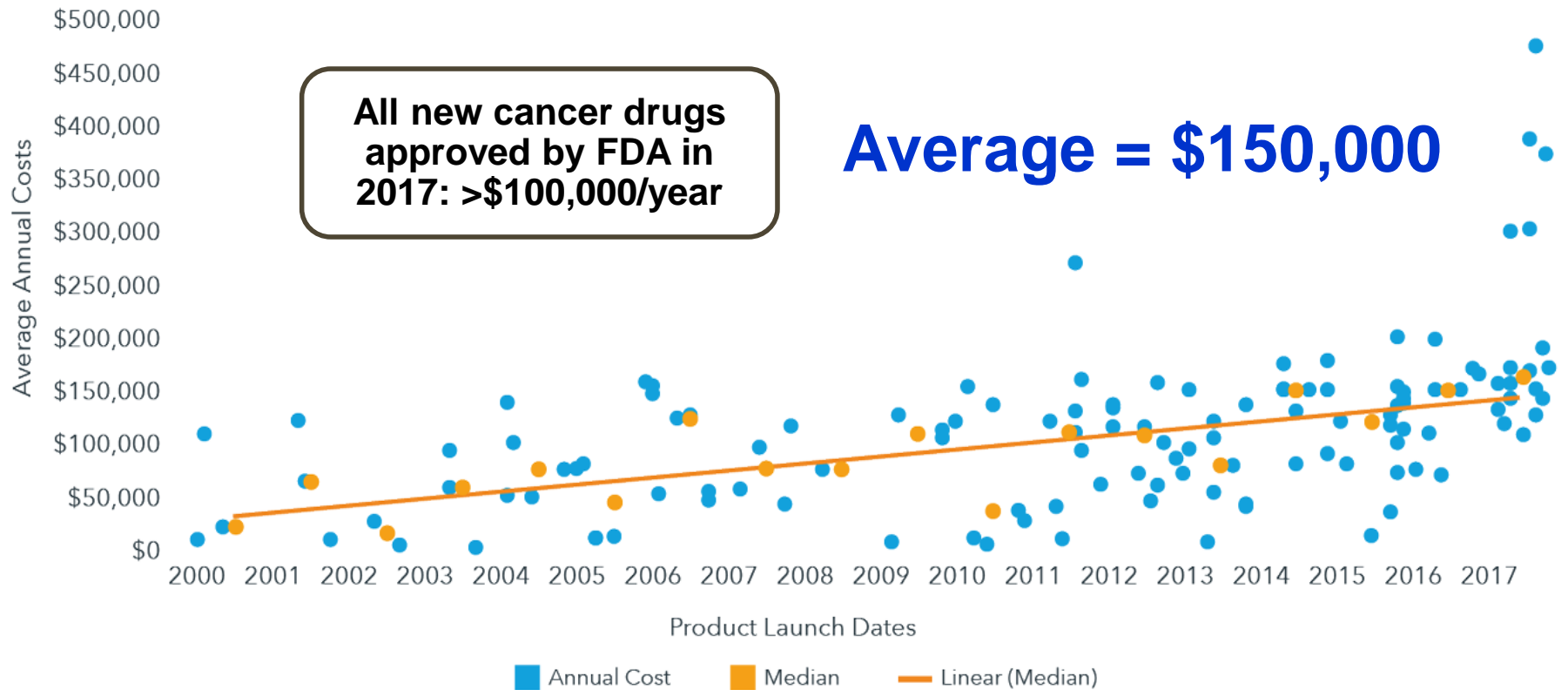
Source: IQVIA, ARK R&D Intelligence, Apr 2018; IQVIA Institute, Apr 2018

Chart notes: Includes initial and subsequent indications. Excludes supportive care. GIST = gastrointestinal stromal tumor. ALL = acute myeloid leukemia; AML = acute myeloid leukemia; CLL = chronic lymphocytic leukemia; FL = follicular lymphoma; MCL = mantle cell lymphoma; DLBCL = Diffuse large B-cell lymphoma; PTCL = peripheral T-cell lymphoma; WM = Waldenstrom macroglobulinemia; SLL = small lymphocytic lymphoma.

*Irinotecan liposome (pancreatic cancer) and daunorubicin + cytarabine (AML), approved during this period, have not been included as these do not fulfil the criteria to be considered as New Active Substance..

Report: Global Oncology Trends 2018: Innovation, Expansion and Disruption. IQVIA Institute for Human Data Science, May 2018

Average Annual Costs For Oncology Products by Launch Year in the United States

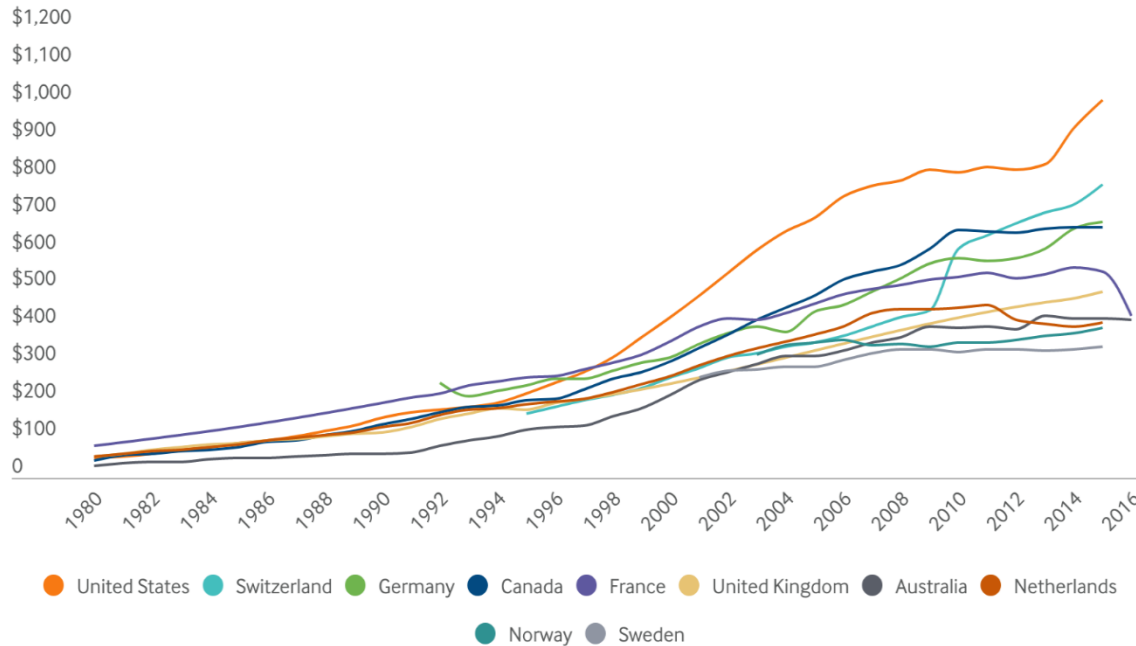


Source: IQVIA Institute, Apr 2018

Notes: If published annual costs are available they have been included, and if not, annual costs were estimated based on IQVIA Institute interpretation of the most-common dosing in the approved label and available product unit pricing information.

Report: Global Oncology Trends 2018: Innovation, Expansion and Disruption. IQVIA Institute for Human Data Science, May 2018

National Trends in Per Capita Pharmaceutical Spending, 1980–2015



\$ 360 billion (USA)
(~10% healthcare spend)

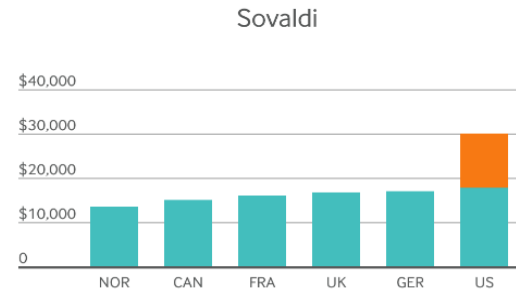
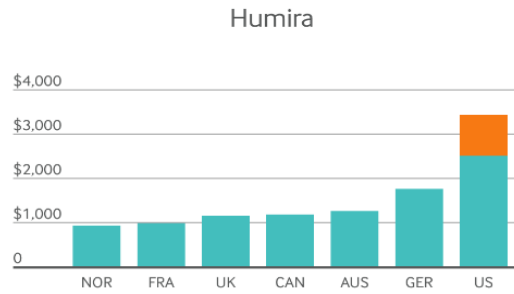
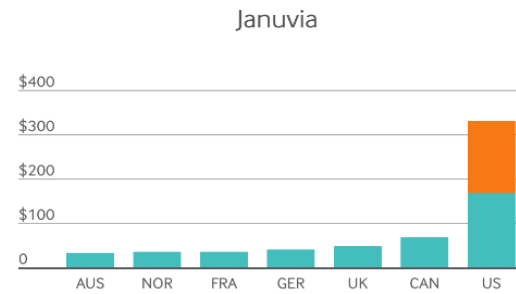
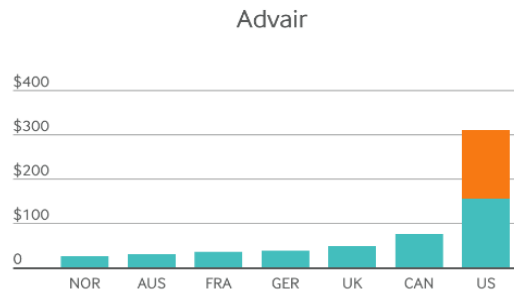
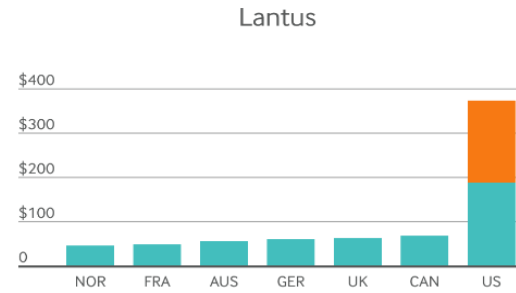
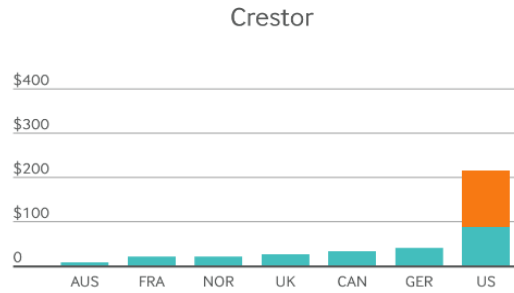
Cancer Drugs
\$50 billion (USA)
\$60 billion (Rest of the world)

Notes: Final expenditure on pharmaceuticals includes wholesale and retail margins and value-added tax. Total pharmaceutical spending refers in most countries to "net" spending, i.e., adjusted for possible rebates payable by manufacturers, wholesalers, or pharmacies. Data from all countries include only the portion spent on retail prescription medications, except for the Netherlands and the United Kingdom, where spending on pharmaceuticals includes prescribed medicines, over-the-counter medications, and other medical nondurable goods. Pharmaceuticals consumed in hospitals and other health care settings are excluded.

Data: Organisation for Economic Co-operation and Development, 2017. Data for Australia and Canada from 2014.

Source: D. O. Sarnak, D. Squires, G. Kuzmak, and S. Bishop, [Paying for Prescription Drugs Around the World: Why Is the U.S. an Outlier?](#) The Commonwealth Fund, October 2017.

Monthly Price of Six Top-Selling Prescription Drugs



Note: Data not available for the Netherlands, Norway, or Sweden, nor for Australia in the case of Sovaldi.

Data: R. Langreth, B. Migliozi, and K. Gokhale, "The U.S. Pays a Lot More for Top Drugs Than Other Countries," *Bloomberg*, Dec. 18, 2015.

Source: D. O. Sarnak, D. Squires, G. Kuzmak, and S. Bishop, *Paying for Prescription Drugs Around the World: Why Is the U.S. an Outlier?* The Commonwealth Fund, October 2017.

Asserted Reasons for High Costs

High Cost of
Development

Cost-Benefit
of New Drugs

Market Forces
will Decide

Stifle
Innovation

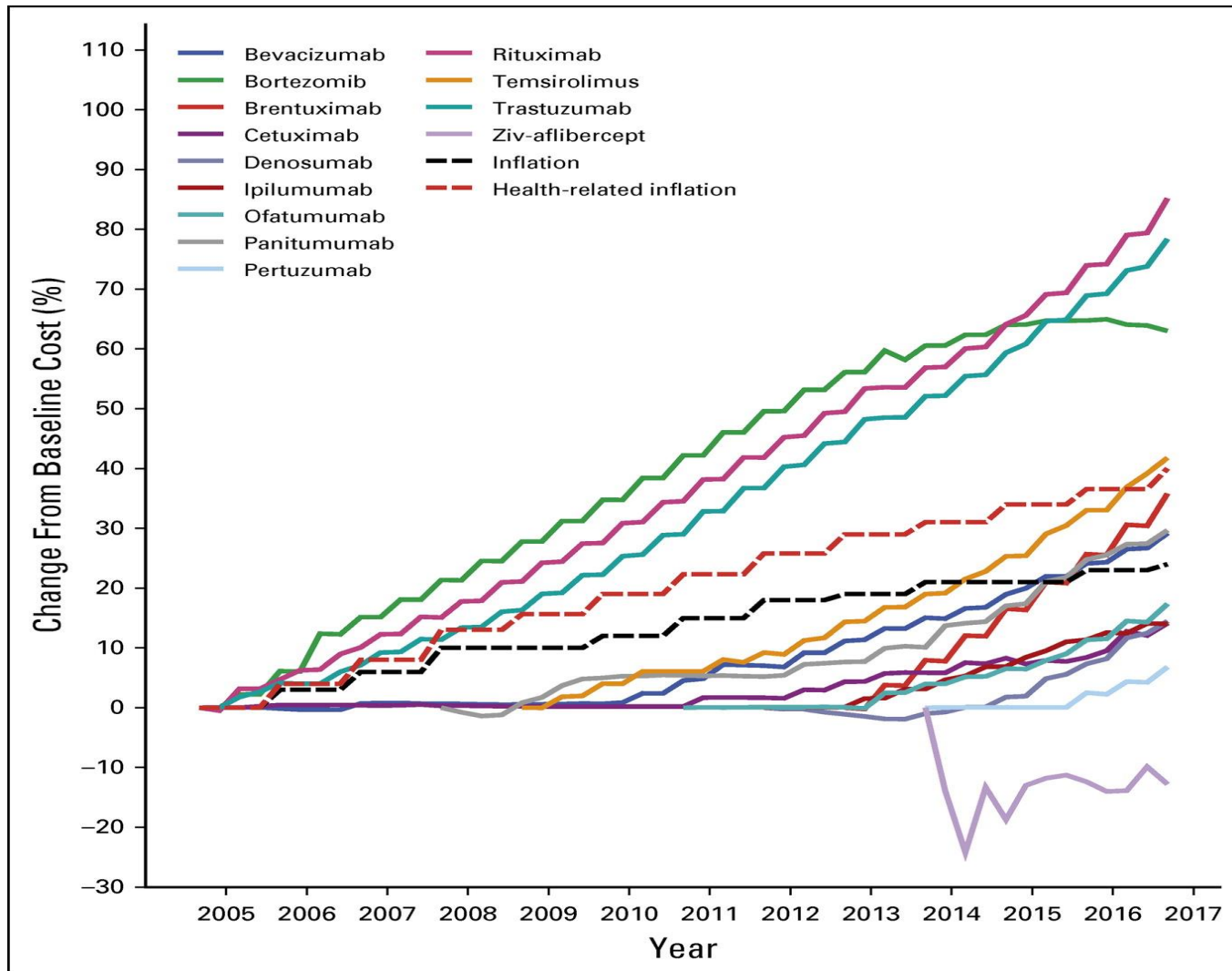


Fig 1. Cost trajectories of targeted therapies. Cumulative change (%) from baseline mean monthly cost by year. General inflation rates are plotted as black dotted line; health-related inflation is plotted as red dotted line.

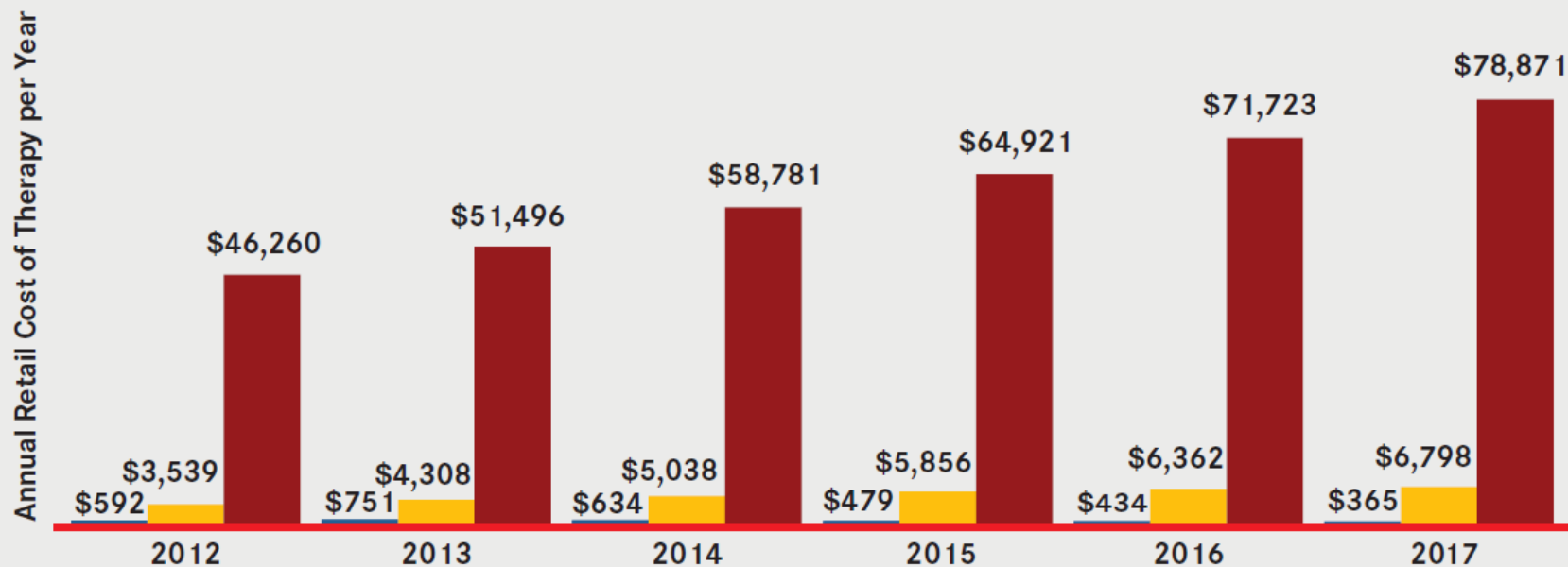
TRENDS IN DRUG COSTS AND REIMBURSEMENT

TABLE 1
Price trend of generic drugs, December 2012–July 2015

Drug name	Price per unit (\$)				Percentage (%) price increase 2012–2015
	2012	2013	2014	2015	
Tetracycline 500 mg capsule	0.04	0.05	8.50	8.40	18,808
Niacin ER 1,000 mg tablet	0.10	4.80	4.80	4.20	7,673
Captopril 50 mg tablet	0.00	0.80	1.80	1.60	6,863
Clomipramine 25 mg capsule	0.20	8.30	8.30	8.30	3,600
Albuterol sulfate 2 mg tablet	0.10	3.80	3.80	4.00	3,516
Doxycycline hyclate 100 mg tablet	0.10	3.50	2.30	1.90	3,139
Hydroxychloroquine 200 mg tablet	0.10	0.10	0.50	2.60	2,476
Amitriptyline HCl 100 mg tablet	0.00	0.00	1.10	1.10	2,442
Methylegonovine maleate 0.2 mg tablet	1.10	12.70	20.50	21.60	1,887
Enalapril maleate 20 mg tablet	0.00	0.20	0.40	0.50	1,649
Carbamazepine 200 mg tablet	0.00	0.00	0.80	0.70	1,459
Ursodiol 300 mg capsule	0.30	0.30	4.50	4.20	1,318
Fluoxetine HCl 10 mg tablet	0.10	0.10	0.60	1.00	1,309
Captopril/hydrochlorothiazide 50/15 mg tablet	0.10	0.40	1.50	1.50	1,145
Phenazopyridine 200 mg tablet	0.10	0.10	0.80	1.80	1,138
Butalbital/acetaminophen/caffeine 50/325/40 tablet	0.10	0.10	0.60	0.60	1,060
Fluconazole 100 mg tablet	0.10	1.50	1.40	1.40	1,044
Clobetasol 0.05% ointment	0.30	0.20	5.00	3.90	1,026
Econazole nitrate 1% cream	0.30	0.10	2.10	3.60	976
Nadolol 80 mg tablet	0.30	3.90	3.60	3.60	967
Propranolol 40 mg tablet	0.00	0.00	0.00	0.30	888
Sodium bicarbonate 8.4% vial	0.00	0.00	0.20	0.20	857
Hydroquinone 4% cream	0.30	2.70	3.00	2.60	817
Duexis 800/26.6 mg tablet	1.70	7.30	11.00	15.00	765
Mirtazapine 7.5 mg tablet	0.10	0.10	1.10	1.20	765
Indapamide 1.25 mg tablet	0.00	0.10	0.30	0.30	749
Promethazine 25 mg suppository	1.00	8.30	8.30	8.80	743
Methylphenidate ER 20 mg tablet	0.60	1.60	1.60	5.00	727
Digoxin 250 mcg tablet	0.10	0.10	1.00	1.00	712
Fentanyl 0.05 mg/ml ampule	0.10	0.50	0.40	0.50	696
Doxazosin mesylate 2 mg tablet	0.10	0.60	0.50	0.50	695
Triazolam 0.25 mg tablet	0.10	0.60	0.80	1.00	654
Prednisone 5 mg tablet	0.00	0.10	0.10	0.10	643
Ketoconazole 200 mg tablet	0.20	0.20	1.40	1.60	631
Fluocinonide-e 0.05% cream	0.20	0.40	1.80	1.60	627
Fluorometholone 0.1% drops	1.70	1.10	8.70	12.40	622
Sulfamethoxazole/trimethoprim suspension	0.00	0.10	0.30	0.30	619
Bumetanide 2 mg tablet	0.10	0.10	1.10	1.00	605

table continues

- Generic Price
- Brand Name Price
- Specialty Price



Note: Calculations of average annual drug price of therapy included the drug products most widely used by older Americans for chronic conditions: generic drugs products (260), brand name drug products (214), and specialty drug products (61).

Source: Prepared by the AARP Public Policy Institute and the PRIME Institute, University of Minnesota, based on data from Truven Health MarketScan® Research Databases.

LEARN MORE

Opinion

The Insulin Wars

How insurance companies farm out their dirty work to doctors and patients.

By Danielle Ofri

Dr. Ofri practices at Bellevue Hospital in New York.

Jan. 18, 2019



Illustration by Joan Wong; Photographs by Westend61/Getty Images and malerapaso/Getty Images

30 million diabetics in the United States

1.3 million Type I ~30% of diabetics take insulin

Source: CDC

Why are drug prices so high?



#1: Circumstances

Vulnerable populations willing to pay anything for access to life-saving drugs

#2



#3: Patent Evergreening

- Discovered 1921
- 1923 First Insulin patented (Patent sold for \$3)
- 1946 Improved NPH patented
- 1950s Improved Lente versions patented
- 1970s Improved pure insulins patented
- 1980s Recombinant human insulin patented
- 1990s Analog insulin patented
- 2000s Long acting analog insulin patented

#4: Planned Obsolescence

The NEW ENGLAND JOURNAL of MEDICINE

MEDICINE AND SOCIETY

Debra Malina, Ph.D., Editor

Why Is There No Generic Insulin? Historical Origins of a Modern Problem

Jeremy A. Greene, M.D., Ph.D., and Kevin R. Riggs, M.D., M.P.H.



Imatinib



Nilotinib

#5: Barriers to Generic and Biosimilar Entry

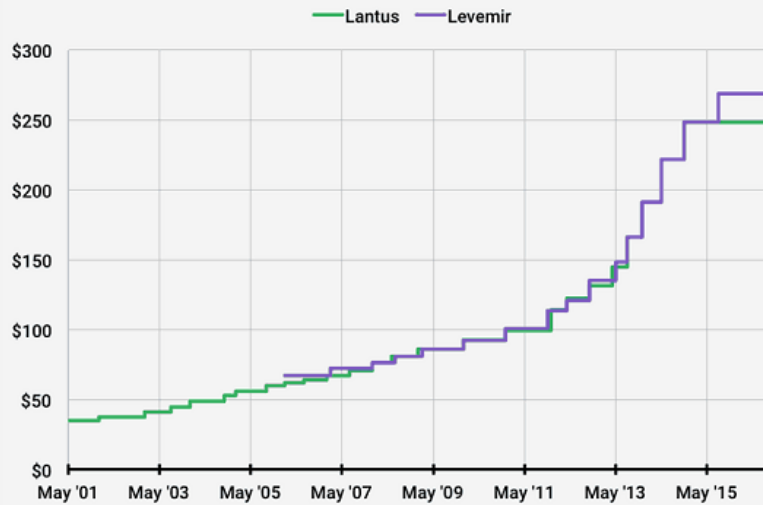
FDA obstacles

Lawsuits

Pay for delay

#6: Lock-step Pricing

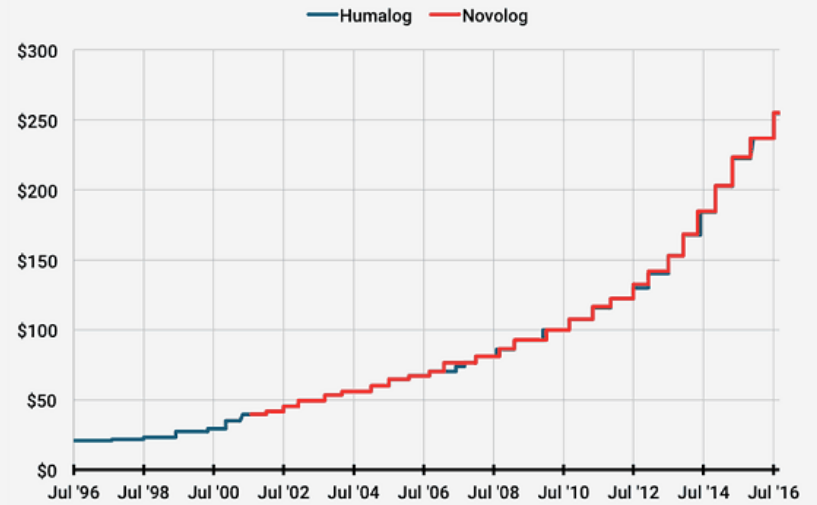
RISING INSULIN PRICES



SOURCE: Truven Health Analytics

BUSINESS INSIDER

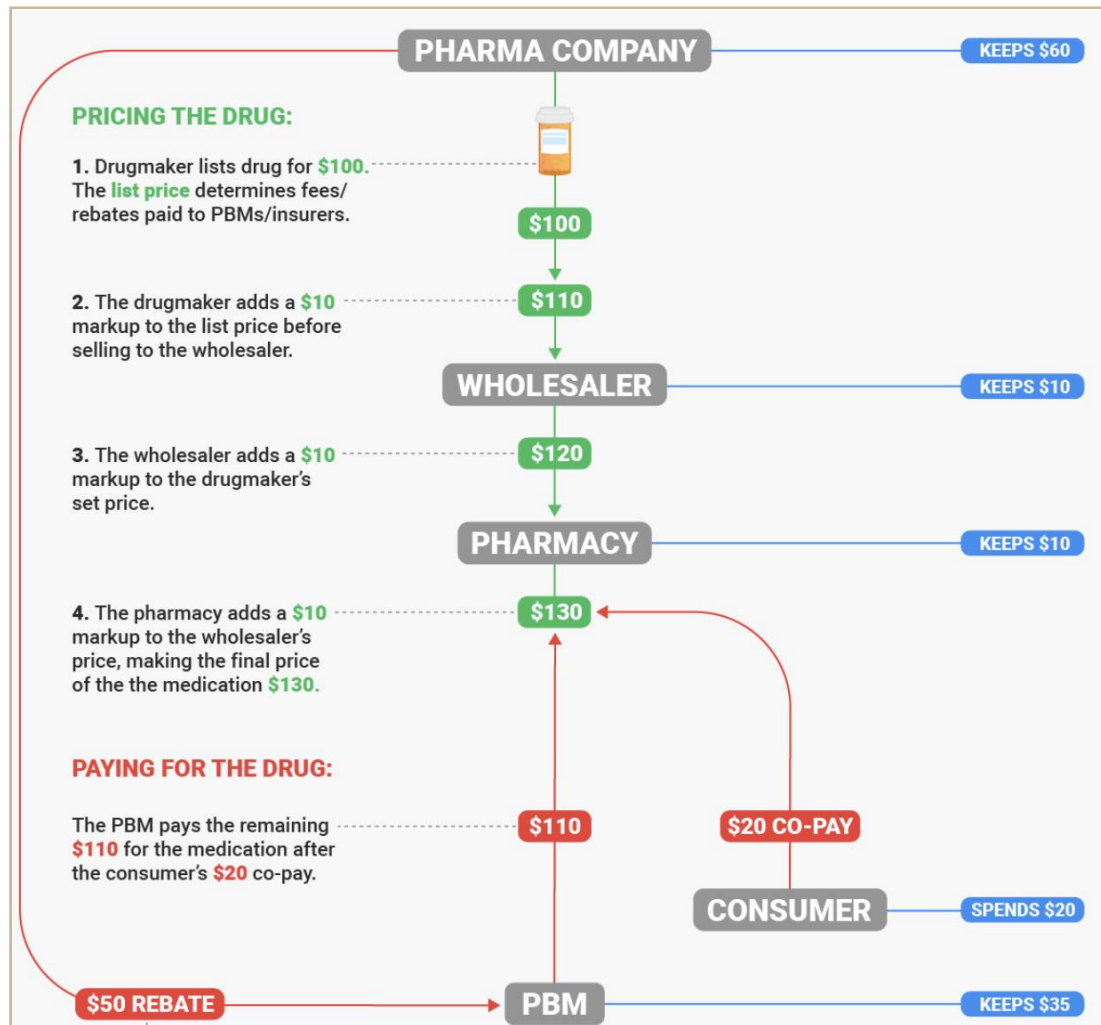
RISING INSULIN PRICES



SOURCE: Truven Health Analytics

BUSINESS INSIDER

#7: Middlemen



Why are drug prices so high?

3 reasons unique to the United States

- 1) Medicare cannot negotiate
- 2) Ban on personal importation
- 3) Reimbursement system encourages more expensive options

Amgen



Sanofi/Regeneron



Patients

REVLIMID CAPS 10MG

NINLARO CAPS 1'S 4MG

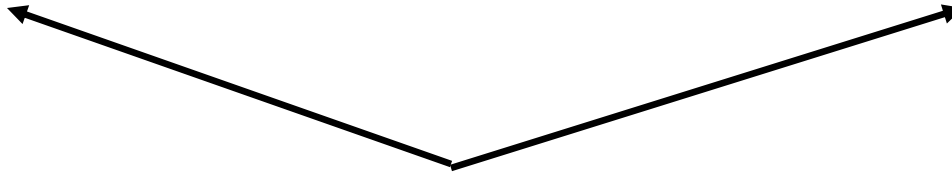
Plan paid: \$12044.59
You paid: ~~\$2000.15~~

Plan paid: \$8112.67
You paid: ~~\$2000.17~~

Co-pay assistance

\$

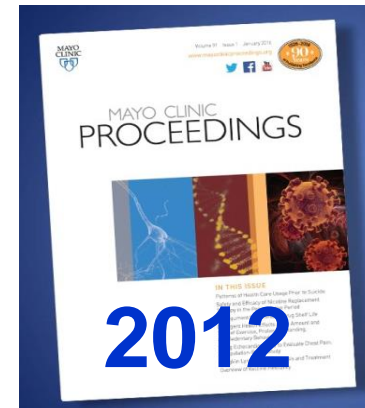
Pharma



The High Cost of Cancer Drugs and What We Can Do About It

Mustaqeem Siddiqui, MD

S. Vincent Rajkumar, MD



-
- Nonprofit Generic and biosimilar manufacturers

CIVICA

Questions?