

2015

# In Support of a Patient-Driven Initiative and Petition to Lower the High Price of Cancer Drugs

A. Tefferi

K. Rai

*Zucker School of Medicine at Hofstra/Northwell*

A. I. Schafer

C. Schiffer

M. A. Sekeres

*See next page for additional authors*

Follow this and additional works at: <https://academicworks.medicine.hofstra.edu/articles>



Part of the [Hematology Commons](#), and the [Oncology Commons](#)

---

## Recommended Citation

Tefferi A, Rai K, Schafer A, Schiffer C, Sekeres M, Siu L, Stewart F, Thompson M, Vose J, Wiernik P, . In Support of a Patient-Driven Initiative and Petition to Lower the High Price of Cancer Drugs. . 2015 Jan 01; 90(8):Article 2163 [ p.]. Available from: <https://academicworks.medicine.hofstra.edu/articles/2163>. Free full text article.

This Article is brought to you for free and open access by Donald and Barbara Zucker School of Medicine Academic Works. It has been accepted for inclusion in Journal Articles by an authorized administrator of Donald and Barbara Zucker School of Medicine Academic Works. For more information, please contact [academicworks@hofstra.edu](mailto:academicworks@hofstra.edu).

---

**Authors**

A. Tefferi, K. Rai, A. I. Schafer, C. Schiffer, M. A. Sekeres, L. L. Siu, F. M. Stewart, M. Thompson, J. M. Vose, P. H. Wiernik, and +109 additional authors



# HHS Public Access

Author manuscript

Mayo Clin Proc. Author manuscript; available in PMC 2017 March 24.

Published in final edited form as:

Mayo Clin Proc. 2015 August ; 90(8): 996–1000. doi:10.1016/j.mayocp.2015.06.001.

## In Support of a Patient-Driven Initiative and Petition to Lower the High Price of Cancer Drugs

*A full list of authors and affiliations appears at the end of the article.*

The high prices of cancer drugs are affecting the care of patients with cancer and our health care system.<sup>1</sup> In the United States, the average price of new cancer drugs increased 5- to 10-fold over 15 years, to more than \$100,000 per year in 2012. A study by Howard et al<sup>2</sup> documented the escalation in cancer drug prices by an average of \$8500 a year over the past

**Correspondence:** Address to Hagop Kantarjian, MD, MD Anderson Cancer Center, 1400 Holcombe Blvd, Houston, TX 77030 (hkantarjian@mdanderson.org).

**Potential Competing Interests:** Dr Antman reports he is a member of the Data Monitoring Committee, and has received grants, personal fees, nonfinancial support, and other as Dean of Boston University School of Medicine, outside the submitted work; he also serves as a trustee of the Faculty Practice Plan and of the principal teaching hospital. Dr Baker reports personal fees from Morphotek, Immune Design, Marathon Pharmaceutical, INC Research, and Cyt Rx, outside the submitted work. Dr Bennett reports personal fees from Celgene Corp, Amgen, Novartis, and Glaxo, outside the submitted work. Dr Bhojwani reports participation on the Advisory Board at Amgen and Incyte Pharmaceuticals. Dr Broxmeyer reports receiving an honorarium from Corduse, a Cord Blood Banking Company, outside the submitted work. Dr Chabner reports personal fees from Epizyme, Merrimack, PharmaMar, Sanofi Aventis, Eli Lilly, Celgene, Biomarin, Clovis, Gilead, Seattle Genetics, and Biogen, outside the submitted work. Dr Chesson worked as consultant for Astellas, AstraZeneca, Celgene, Genentech, Gilead, Pfizer, Pharmacyclics, Amgen, Spectrum, Seattle Genetics; his institution received research support from AbbVie, Acerta, Celgene, Genentech, Gilead, Medimmune, Pharmacyclics, Teva, and Seattle Genetics. Dr Colon-Otero reports grants from Novartis, during the conduct of the study. Dr Daley reports a consulting or scientific advisory relationship and holder of equity or options with the following entities: MPM Capital, Epizyme, Verastem, Solasia, KK, True North, Ocata, Raze; in addition, Dr. Daley holds patents broadly related to cancer biology (See <http://www.faqs.org/patents/inventor/george-q-daley-weston-US-1/>). Dr DeAngelo reports personal fees from Novartis, Ariad, BMS, Pfizer, Astra-Zeneca, Boehringer Ingelheim, Amgen, and Incyte, outside the submitted work. Dr Einhorn served on the scientific advisory board for Celgene and Ziopharm and owns stock at Amgen and Biogenetics. Dr Erba reports personal fees from Novartis, Incyte, Celgene, Sunesis, Pfizer, and Ariad; grants from Celator, grants and personal fees from Seattle Genetics, grants and personal fees from Amgen, and grants from Millennium/Takeda and Astellas, outside the submitted work. Dr Hortobagyi reports personal fees from Bayer HealthCare Pharmaceuticals, Metastat, Peregrine Pharmaceuticals, Inc, Celgene Corp, Pfizer Inc, Society for Translational Oncology, Antigen Express, Galena Biopharma, Genentech, Inc, Amgen Inc, Rockpointe, AstraZeneca Pharmaceuticals, and grants and personal fees from Novartis Pharmaceuticals Corp, outside the submitted work. Dr Issa reports grants from Astex and AACR/Stand Up To Cancer, during the conduct of the study; grants and personal fees from Astex, and personal fees from Janssen Teva, and Boehringer, outside the submitted work. Dr Johnson reports personal fees from Novartis, Merck, AstraZeneca, Clovis Oncology, Chugai Pharmaceuticals, Transgene, Genentech, Otsuka, and Eli Lilly, outside the submitted work; in addition, Dr Johnson has a patent on EGFR Mutation Testing with royalties paid and is a stockholder of KEW Group. Dr Lonial reports personal fees from Millennium, Celgene, Novartis, BMS, Onyx, and Janssen, outside the submitted work. Dr Mendelsohn reports personal fees and other from Merrimack Pharmaceuticals, outside the submitted work; in addition, Dr. Mendelsohn has a UCSD patent on Erbitux with royalties paid. Dr Meropol reports personal fees from biomotiv, outside the submitted work; in addition, Dr. Meropol has a US Patent Office 20020031515 “Methods of therapy for cancers characterized by over expression of the HER2 receptor protein” (expires May 14, 2021) issued and is an elected board member of the American Society of Clinical Oncology and Eastern Cooperative Oncology Group Research and Education Foundation. Dr Messenger reports personal fees from Jazz Pharmaceuticals and Sigma Tau, outside the submitted work, in both cases honorarium for one-time advisory board participation. Dr Press reports personal fees from Algeta and Roche/Genentech, and other from Emergent Biosolutions, PhaseRx, and Roche/Genentech, outside the submitted work. Dr Rugo reports other from Novartis, outside the submitted work. Dr Sekeres reports personal fees from Celgene, Boehringer-Ingelheim, Amgen, MEI, and Seattle Genetics, outside the submitted work. Dr Steensma reports personal fees from Celgene, Novartis, Genoptix, Amgen, Onconova, and from MEI Pharma, outside the submitted work. Dr Stewart received compensation from NGCN and George Washington University for speaking. Dr Stock reports personal fees from Amgen, Gilead, ADC Pharmaceutical, Sigma Tau, Up to Date, and American Society of Hematology, outside the submitted work. Dr Stone reports personal fees from Agios, Amgen, Abbvie, Arog, BMS, Celator, Celgene, Pfizer, Roche/Genentech, Karyopharm, and Merck, outside the submitted work. Dr Van Etten reports personal fees and other from Deciphera Pharmaceuticals, Sunesis Pharmaceuticals, Karyopharm Pharmaceuticals, and grants from Verastem, outside the submitted work. Dr Zelenet reports fees from Adaptive Biotechnologies Corp, Alissa Pharma, Amgen, Boehringer Ingelheim, Celgene, Clinical Care Options, Dr. Reddy’s Laboratories, Genentech/Roche, Gilead, Hospira, Novartis, Onyx Pharmaceuticals, Pfizer, Sandoz, and Sanofi Aventis, outside the submitted work. The remaining authors report no competing interests.

15 years. The cost of drugs for each additional year lived (after adjusting for inflation) has increased from \$54,000 in 1995 to \$207,000 in 2013.<sup>2</sup> This increase is causing harm to patients with cancer and their families. Here are the facts:

- Cancer will affect 1 in 3 individuals over their lifetime
- Recent trends in insurance coverage put a heavy financial burden on patients, with their out-of-pocket share increasing to 20% to 30% of the total cost<sup>3</sup>
- In 2014, all new US Food and Drug Administration (FDA)–approved cancer drugs were priced above \$120,000 per year of use<sup>4</sup>
- The average annual household gross income in the United States is about \$52,000<sup>5</sup>
- For a patient with cancer who needs one cancer drug that costs \$120,000 per year, the out-of-pocket expenses could be as high as \$25,000 to \$30,000—more than half the average household income and possibly more than the median take-home pay for a year. Patients with cancer then have to make difficult choices between spending their incomes (and liquidating assets) on potentially lifesaving therapies or foregoing treatment to provide for family necessities (food, housing, education). This decision is even more critical for senior citizens who are more frequently affected by cancers and have lower incomes and limited assets.<sup>6</sup> Because of costs, about 10% to 20% of patients with cancer do not take the prescribed treatment or compromise it.<sup>7</sup> It is documented that the greater the out-of-pocket cost for oral cancer therapies, the lower the compliance.<sup>8</sup> This is a structural disincentive for compliance with some of the most effective and transformative drugs in the history of cancer treatment<sup>8</sup>
- Given the rising incidence of cancer in our aging population, high cancer drug prices will affect millions of Americans and their immediate families, often repeatedly

In 2006, the US government made a great effort to improve access to approved cancer drugs by requiring Medicare Part D to cover such drugs. Conversely, the 2003 Medicare Prescription Drug, Improvement, and Modernization Act contains legislation that forbids Medicare from negotiating drug prices.<sup>9</sup> These policies have created an opportunity for drug companies, rendering them the sole decision makers on the price of cancer drugs.<sup>10,11</sup> There is no relief in sight because drug companies keep challenging the market with even higher prices. This raises the question of whether current pricing of cancer drugs is based on reasonable expectation of return on investment or whether it is based on what prices the market can bear.<sup>12</sup>

The good news is that effective new cancer therapies are being developed by pharmaceutical and biotechnology companies at a faster rate than ever before. More than 900 new drugs are under development, many for rare cancers. Drug companies should be rewarded with reasonable profits for these efforts. The unfortunate news, also acknowledged by some of the pharmaceutical leadership, is that the current pricing system is unsustainable and not affordable for many patients.

Patients and cancer specialists are voicing their concerns about this trend of increasing cancer drug prices, which ultimately harms patients with cancer and our health care system. Although some economic experts lament the difficulty of finding solutions, simple and measured incremental actions can improve the situation and allow market forces to work better. These actions include:

1. Creating a post-FDA drug approval review mechanism to propose a fair price for new treatments, based on the value to patients and health care
2. Allowing Medicare to negotiate drug prices
3. Allowing the Patient-Centered Outcomes Research Institute, created through the Affordable Care Act initiatives to evaluate the benefits of new treatments, and similar organizations to include drug prices in their assessments of the treatment value
4. Allowing importation of cancer drugs across borders for personal use (eg, prices in Canada are about half of prices in the United States)
5. Passing legislation to prevent drug companies from delaying access to generic drugs (pay-for-delay)<sup>13</sup>
6. Reforming the patent system to make it more difficult to prolong product exclusivity unnecessarily (patent “evergreening”)
7. Encouraging organizations that represent cancer specialists and patients (eg, American Society of Clinical Oncology, American Society of Hematology, American Association for Cancer Research, American Cancer Society, National Comprehensive Cancer Network) to consider the overall value of drugs and treatments in formulating treatment guidelines

Health care in most economically advanced nations is provided to all citizens with minimal personal economic burdens. In the United States, health care is delivered in a profit-driven marketplace that commands 18% of our gross domestic product, compared with 4% to 9% in other industrialized nations. Despite the 2- to 3-fold higher spending per capita, the United States is not “number 1” in health care parameters compared with other industrialized nations that spend far less per capita. Rather, the United States often ranks well below average in several comparative studies that assess a number of measures of health care quality.<sup>14</sup> Money diverted as profit does not necessarily contribute to better health outcomes, or even to innovation and development of novel therapies.

Drug companies, insurance companies, pharmaceutical distributors, many hospitals and physicians, and perhaps some patient advocacy groups can be financially conflicted when it comes to discussing rational drug prices. The individuals most harmed and least engaged in these discussions are cancer patients because they are exhausting their energy, resources, and time fighting for their lives. Patients should voice their concerns and take a page from the history of AIDS advocacy strategies that resulted, within 2 decades of the start of the AIDS epidemic, in the FDA approval of more than 35 AIDS drugs<sup>15</sup> that now prevent most AIDS deaths and allow patients to live normal lives, with affordable AIDS drugs available to all.

A cancer patient–based grassroots movement that advocates against the high price of cancer drugs can accomplish a great deal. One such movement, a petition, is already available and is actively collecting signees. It has been designed to be signed online on [Change.org](https://chn.ge/1DCWT1M) (short link URL: [http://chn.ge/1DCWT1M](https://chn.ge/1DCWT1M)) and is publicized on e-mail ([stophighdrugcosts@gmail.com](mailto:stophighdrugcosts@gmail.com)), on Facebook (<https://www.facebook.com/stophighdrugcosts>), and on Twitter (@StopHighRxCosts), thus using contemporary methods to address a contemporary crisis. Those encouraged to sign the petition include patients, relatives, friends, supporters, health care professionals, and others. Should this petition or any other similar grassroots efforts generate in aggregate an immense number of unique supporters (eg, >1 million petition signees or a comparable mass action quantified in other terms), this quantified support can then be used by advocates, lobbyists, and others to advocate against the aforementioned harms generated by the high price of cancer drugs. With proper support of these grassroots efforts, and proper use of that support downstream, it should be possible to focus the attention of pharmaceutical companies on this problem and to encourage our elected representatives to more effectively advocate for the interests of their most important constituents among the stakeholders in cancer—American cancer patients.

## Authors

Ayalew Tefferi, MD, Hagop Kantarjian, MD, S. Vincent Rajkumar, MD, Lawrence H. Baker, DO, Jan L. Abkowitz, MD, John W. Adamson, MD, Ranjana Hira Advani, MD, James Allison, MD, Karen H. Antman, MD, Robert C. Bast Jr, MD, John M. Bennett, MD, Edward J. Benz Jr, MD, Nancy Berliner, MD, Joseph Bertino, MD, Ravi Bhatia, MD, Smita Bhatia, MD, Deepa Bhojwani, MD, Charles D. Blanke, MD, Clara D. Bloomfield, MD, Linda Bosserman, MD, Hal E. Broxmeyer, PhD, John C. Byrd, MD, Fernando Cabanillas, MD, George Peter Canellos, MD, Bruce A. Chabner, MD, Asher Chanan-Khan, MD, Bruce Cheson, MD, Bayard Clarkson, MD, Susan L. Cohn, MD, Gerardo Colon-Otero, MD, Jorge Cortes, MD, Steven Coutre, MD, Massimo Cristofanilli, MD, Walter J. Curran Jr, MD, George Q. Daley, MD, PhD, Daniel J. DeAngelo, MD, PhD, H. Joachim Deeg, MD, Lawrence H. Einhorn, MD, Harry P. Erba, MD, PhD, Francisco J. Esteva, MD, PhD, Elihu Estey, MD, Isaiah J. Fidler, DVM, PhD, James Foran, MD, Stephen Forman, MD, Emil Freireich, MD, Charles Fuchs, MD, MPH, James N. George, MD, Morie A. Gertz, MD, Sergio Giralt, MD, Harvey Golomb, MD, Peter Greenberg, MD, Jordan Gutterman, MD, Robert I. Handin, MD, Samuel Hellman, MD, Paulo Marcelo Hoff, MD, Ronald Hoffman, MD, Waun Ki Hong, MD, Mary Horowitz, MD, MS, Gabriel N. Hortobagyi, MD, Clifford Hudis, MD, Jean Pierre Issa, MD, Bruce Evan Johnson, MD, Philip W. Kantoff, MD, Kenneth Kaushansky, MD, David Khayat, MD, PhD, Fadlo R. Khuri, MD, Thomas J. Kipps, MD, PhD, Margaret Kripke, PhD, Robert A. Kyle, MD, Richard A. Larson, MD, Theodore S. Lawrence, MD, PhD, Ross Levine, MD, Michael P. Link, MD, Scott M. Lippman, MD, Sagar Lonial, MD, Gary H. Lyman, MD, MPH, Maurie Markman, MD, John Mendelsohn, MD, Neal J. Meropol, MD, Yoav Messinger, MD, Therese M. Mulvey, MD, Susan O'Brien, MD, Roman Perez-Soler, MD, Raphael Pollock, MD, PhD, Josef Prchal, MD, Oliver Press, MD, PhD, Jerald

Radich, MD, Kanti Rai, MD, Saul A. Rosenberg, MD, Jacob M. Rowe, MD, Hope Rugo, MD, Carolyn D. Runowicz, MD, Brenda M. Sandmaier, MD, Alan Saven, MD, Andrew I. Schafer, MD, Charles Schiffer, MD, Mikkael A. Sekeres, MD, MS, Richard T. Silver, MD, Lillian L. Siu, MD, David P. Steensma, MD, F. Marc Stewart, MD, Wendy Stock, MD, MA, Richard Stone, MD, Rainer Storb, MD, Louise C. Strong, MD, Martin S. Tallman, MD, Michael Thompson, MD, PhD, Naoto T. Ueno, MD, PhD, Richard A. Van Etten, MD, PhD, Julie M. Vose, MD, MBA, Peter H. Wiernik, MD, Eric P. Winer, MD, Anas Younes, MD, Andrew D. Zelenetz, MD, PhD, and Charles A. LeMaistre, MD

## Affiliations

Ayalew Tefferi, MD, S. Vincent Rajkumar, MD, Morie A. Gertz, MD, Robert A. Kyle, MD, Mayo Clinic, Rochester, MN; Hagop Kantarjian, MD, James Allison, Robert C. Bast, Jr, Jorge Cortes, MD, Isaiah J. Fidler, DVM, PhD, Emil Freireich, MD, Jordan Gutterman, Waun Ki Hong, Gabriel N. Hortobagyi, MD, John Mendelsohn, MD, Louise C. Strong, MD, Naoto T. Ueno, MD, PhD, Charles A. LeMaistre, MD, University of Texas MD Anderson Cancer Center, Houston; Lawrence H. Baker, DO, Theodore S. Lawrence, MD, PhD, University of Michigan, Ann Arbor; Jan L. Abkowitz, MD, H. Joachim Deeg, MD, Elihu Estey, MD, Gary H. Lyman, MD, MPH, University of Washington Medical School, Seattle; John W. Adamson, MD, University of California, San Diego School of Medicine, La Jolla; Ranjana Hira Advani, MD, Steven Coutre, Peter Greenberg, MD, Michael P. Link, MD, Saul A. Rosenberg, Stanford University School of Medicine, Stanford, CA; Karen H. Antman, MD, Boston University School of Medicine, Boston, MA; John M. Bennett, MD, University of Rochester Medical Center, Rochester, NY; Edward J. Benz, Jr, MD, George Peter Canellos, MD, George Q. Daley, MD, PhD, Daniel J. DeAngelo, Charles Fuchs, MD, MPH, Robert I. Handin, MD, Philip W. Kantoff, MD, David P. Steensma, MD, Richard Stone, Eric P. Winer, MD, Dana-Farber Cancer Institute and Harvard Medical School, Boston, MA; Nancy Berliner, MD, Robert I. Handin, MD, Brigham and Women's Hospital, Boston, MA; Joseph Bertino, Rutgers Cancer Institute of New Jersey, New Brunswick; Ravi Bhatia, MD, Smita Bhatia, MD, Harry P. Erba, MD, PhD, University of Alabama at Birmingham; Deepa Bhojwani, MD, Children's Hospital Los Angeles, Los Angeles, CA; Charles D. Blanke, MD, Oregon Health & Science University, Portland; Clara D. Bloomfield, MD, John C. Byrd, MD, Raphael Pollock, MD, PhD, Ohio State University Comprehensive Cancer Center, Columbus; Linda Bosserman, MD, Stephen Forman, MD, City of Hope Medical Foundation, Duarte, CA; Hal E. Broxmeyer, PhD, Lawrence H. Einhorn, MD, Indiana University School of Medicine, Indianapolis; Fernando Cabanillas, MD, Auxilio Cancer Center, Hato Rey, Puerto Rico; Bruce A. Chabner, MD, Gerardo Colon-Otero, MD, Massachusetts General Hospital, Boston; Asher Chanan-Khan, MD, James Foran, Mayo Clinic Cancer Center, Jacksonville, FL; Bruce Cheson, MD, Georgetown Lombardi Comprehensive Cancer Center, Washington, DC; Bayard Clarkson, MD, Sergio Giral, Clifford Hudis, MD, Ross Levine, MD, Martin S. Tallman, Anas Younes, MD, Andrew D. Zelenetz, Memorial Sloan Kettering Cancer Center, New York, NY; Susan L. Cohn, MD, Harvey Golomb, MD, Samuel Hellman,

MD, Richard A. Larson, MD, Wendy Stock, MD, MA, University of Chicago, Chicago, IL; Massimo Cristofanilli, MD, Sidney Kimmel Cancer Center at Thomas Jefferson University, Philadelphia, PA; Walter J. Curran, Jr, MD, Fadlo R. Khuri, MD, Sagar Lonial, MD, Winship Cancer Institute of Emory University, Atlanta, GA; George Q. Daley, MD, PhD, Boston Children's Hospital, Boston, MA; H. Joachim Deeg, MD, Gary H. Lyman, MD, MPH, Oliver Press, MD, PhD, Jerald Radich, MD, Brenda M. Sandmaier, Rainer Stone, Fred Hutchinson Cancer Research Center, Seattle, WA; Francisco J. Esteva, MD, PhD, New York University Langone Medical Center, New York City; James N. George, MD, University of Oklahoma Health Sciences Center, Oklahoma City; Paulo Marcelo Hoff, MD, Universidade de São Paulo, São Paulo, Brazil; Ronald Hoffman, Icahn School of Medicine at Mount Sinai, New York, NY; Mary Horowitz, MD, MS, Medical College of Wisconsin, Milwaukee; Jean Pierre Issa, MD, Temple University, Philadelphia, PA; Bruce Evan Johnson, MD, Lowe Center for Thoracic Oncology, Boston, MA; Kenneth Kaushansky, MD, Stony Brook University, Stony Brook, NY; David Khayat, MD, PhD, Pitié-Salpêtrière Hospital, Paris, France; Thomas J. Kipps, MD, PhD, Scott M. Lippman, MD, University of California, San Diego Moores Cancer Center, La Jolla; Margaret Kripke, Cancer Prevention and Research Institute of Texas, Austin; Maurie Markman, MD, Cancer Treatment Centers of America, Eastern Regional Medical Center, Philadelphia, PA; Neal J. Neropol, MD, University Hospitals Case Medical Center and Case Western Reserve University, Cleveland, OH; Yoav Messinger, MD, Children's Hospitals and Clinics of Minnesota, Minneapolis-St Paul, MN; Therese M. Mulvey, MD, Southcoast Centers for Cancer Care, Fairhaven, MA; Susan O'Brien, MD, Richard A. Van Etten, MD, PhD, University of California, Irvine; Roman Perez-Soler, Albert Einstein College of Medicine, Bronx, NY; Josef Prchal, MD, University of Utah, Salt Lake City; Kanti Rai, North Shore-LIJ Cancer Institute, New Hyde Park, NY; Jacob M. Rowe, Northwestern University Feinberg School of Medicine, Chicago, IL; Hope Rugo, University of California, San Francisco Helen Diller Family Comprehensive Cancer Center; Carolyn D. Runowicz, MD, Florida International University Herbert Wertheim College of Medicine, Miami; Alan Saven, MD, Richard T. Silver, MD, Scripps Clinic Medical Group, La Jolla, CA; Andrew I. Schafer, MD, Weill Cornell Medical College, New York, NY; Charles Schiffer, Barbara Ann Karmanos Cancer Institute, Detroit, MI; Mikkael A. Sekeres, MD, MS, Cleveland Clinic, Cleveland OH; Lillian L. Siu, MD, Princess Margaret Cancer Centre, University Health Network, Toronto, Ontario, Canada; F. Marc Stewart, MD, Seattle Cancer Care Alliance, Seattle, WA; Michael Thompson, MD, PhD, Aurora Research Institute, Aurora Health Care, Milwaukee, WI; Julie M. Vose, MD, MBA, University of Nebraska Medical Center, Omaha; Peter H. Wiernik, MD, Dhc, Cancer Research Foundation, Bronx, NY

## Acknowledgments

The opinions expressed in this commentary are those of the authors and do not necessarily reflect the opinions of their institutions or other affiliations.



## Abbreviations and Acronyms

**FDA** US Food and Drug Administration

## References

1. Kantarjian H, Rajkumar SV. Why are cancer drugs so expensive in the United States, and what are the solutions? *Mayo Clin Proc.* 2015; 90(4):500–504. [PubMed: 25792242]
2. Howard DH, Bach PB, Berndt ER, Conti RM. Pricing in the market for anticancer drugs. *J Economic Perspect.* 2015; 29(1):139–162. <https://www.aeaweb.org/articles.php?doi=10.1257/jep.29.1.139>. Accessed June 4, 2015.
3. Neuman, T., Cubanski, J., Huang, J., Damico, A. How much “skin in the game” is enough? the financial burden of health spending for people on Medicare; an updated analysis of out-of-pocket spending as a share of income. Henry J Kaiser Family Foundation website. <https://kaiserfamilyfoundation.files.wordpress.com/2013/01/8170.pdf>. Published June 2011. Accessed April 1, 2015
4. Ackerman, T. MD Anderson doctor planning online petition against cancer drug costs. Houston Chronicle website. <http://www.houstonchronicle.com/news/houston-texas/houston/article/MD-Anderson-doctor-planning-online-petition-6083743.php>. Published February 16, 2015. Updated February 17, 2015. Accessed May 8, 2015
5. Household income in the United States. Wikipedia website. [http://en.wikipedia.org/wiki/Household\\_income\\_in\\_the\\_United\\_States](http://en.wikipedia.org/wiki/Household_income_in_the_United_States). Updated June 5, 2015. Accessed April 1, 2015
6. Medicare at a glance. Henry J Kaiser Family Foundation website. <http://kff.org/medicare/fact-sheet/medicare-at-a-glance-fact-sheet/>. Published September 2, 2014. Accessed April 1, 2015
7. Zafar SY, Peppercorn JM, Schrag D, et al. The financial toxicity of cancer treatment: a pilot study assessing out-of-pocket expenses and the insured cancer patient’s experience. *Oncologist.* 2013; 18(4):381–390. [PubMed: 23442307]
8. Dusetzina SB, Winn AN, Abel GA, Huskamp HA, Keating NL. Cost sharing and adherence to tyrosine kinase inhibitors for patients with chronic myeloid leukemia. *J Clin Oncol.* 2014; 32(4): 306–311. [PubMed: 24366936]
9. Das, K., Petigara, T., Anderson, G. Price negotiations for drugs in the US. Health Policy Monitor website. [http://hpm.org/en/Surveys/Johns\\_Hopkins\\_Bloomberg\\_School\\_of\\_Publ\\_H\\_-\\_USA/09/Price\\_Negotiations\\_for\\_Drugs\\_in\\_the\\_U.S..html](http://hpm.org/en/Surveys/Johns_Hopkins_Bloomberg_School_of_Publ_H_-_USA/09/Price_Negotiations_for_Drugs_in_the_U.S..html). Published April 2007. Accessed April 1, 2015
10. Big pharma pockets \$711 billion in profits by price-gouging taxpayers and seniors. Health Care for America Now website. <http://healthcareforamericanow.org/2013/04/08/pharma-711-billion-profits-price-gouging-seniors/>. Published April 8, 2013. Accessed May 27, 2015
11. Big pharma CEOs pocket \$1.57 billion in total pay as they preside over sharp rise in marketing violations, Medicare price-gouging. Health Care for America Now website. <http://healthcareforamericanow.org/2013/04/08/pharma-711-billion-profits-price-gouging-seniors/>. Published May 8, 2013. Accessed May 27, 2015
12. Mailankody, S., Prasad, V. Five years of cancer drug approvals: innovation, efficacy, and costs [published online ahead of print April 2, 2015]. *JAMA Oncol.* <http://dx.doi.org/10.1001/jamaoncol>. Accessed June 25, 2015
13. Klobuchar, Grassley reintroduce legislation to crack down on anti-competitive pay-for-delay deals [news release]. Chuck Grassley website. <http://www.grassley.senate.gov/news/news-releases/klobuchar-grassley-reintroduce-legislation-crack-down-anti-competitive-pay-delay>. Published February 5, 2013. Accessed April 1, 2015
14. Kantarjian, H. Does the United States have the best health-care system in the world?. ASCO Post website. <http://www.ascopost.com/issues/august-15,-2014/does-the-united-states-have-the-best-health-care-system-in-the-world.aspx>. Published August 15, 2014. Accessed April 1, 2015
15. Treatments for HIV & AIDS. AIDSMEDES website. <http://aidsmeds.com/list.shtml>. Updated March 13, 2015. Accessed April 1, 2015