

# Despite steep costs, payments for new cancer drugs make economic sense

Frank R Lichtenberg

**Cancer drugs have become more expensive over the past few years, leading many people to question whether the treatments are really worth their high costs. But despite the sticker shock, cancer medicines have provided good value for money.**



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Avastin. Rituxan. Gleevec. Herceptin. All of these now-familiar drug names are expensive cancer therapies that cost as much as \$100,000 for a course of treatment that often lasts only a few months. The most recent cancer medicine to join the premium club was Dendreon's Provenge, a therapeutic prostate cancer vaccine approved last year that costs \$93,000 per patient. The price tags on such drugs are steep, it's true. And these new cancer treatments can pose a substantial financial burden on healthcare systems if not targeted to the correct patient groups. But, contrary to accounts in the popular press—where individual medicines are often lambasted for not providing suitable bang for their large buck—today's cancer treatments are indeed a cost-effective way of extending life when one looks at the big picture.

Although such a statement may seem counterintuitive at first glance, it's worth moving beyond the headlines and considering quantitative measures of the cost-effectiveness of pharmaceutical innovation. In the past, many researchers have directly compared newer and older cancer drugs in head-to-head clinical trials in an attempt to determine the newer medicines' worth. No definitive answer has been reached with this approach. Most studies have shown that newer cancer drugs increase people's survival rates more than established treatments to some extent<sup>1,2</sup>, but others have found no such added benefit of the newer (and typically more expensive) options<sup>3</sup>.

Yet simply surveying previous clinical studies—which often vary extensively in their methodologies and metrics of trial success—does not provide a reliable estimate of the overall impact of medical innovation. For one thing, these studies might use clinical endpoints that do not reflect the survival impact of some treatments. This can be seen in a survey of the data used by the US Food and Drug Administration to approve oncology drugs between 1990 and 2002, where only around a quarter of the pivotal clinical trials were based on survival benefits rather than surrogate endpoints such as tumor size<sup>4</sup>.

In addition, evidence from clinical trials cannot necessarily be extrapolated to real-world experience. In many cases, for instance, there is a gap between efficacy—that is, statistical significance in a carefully controlled trial—and effectiveness, defined as success in the circumstances of everyday life, because study subjects do not necessarily reflect patient populations at large.

Two years ago, I published a study that attempted to overcome these limitations. Instead of simply surveying previous clinical studies of specific drugs, I looked at nearly three decades' worth of data considering chemotherapy treatments for a number of cancer types, including breast, prostate and lung. I then measured the relationship between the number of new drug approvals and any improvements in the survival rate of people previously diagnosed with cancer. After controlling for variables likely to reflect changes in diagnostic techniques during the time period considered—1978 to 2004—I found that cancers with more approved drugs had larger

improvements in survival rate<sup>5</sup>. In December, I was honored—and humbled—to receive Research!America's 2010 Garfield Economic Impact Award for this work.

I have since expanded on this research and considered the impacts of new diagnostic imaging tools, such as magnetic resonance imaging and computed tomography scans. I surveyed a decade's worth of data from 1996 to 2006 covering some 60 different types of cancer and found that new diagnostic technologies were associated with above-average declines in cancer mortality<sup>6</sup>.

Taken together, my research shows that, on average, new cancer drugs introduced over the past 30 years have increased the life expectancy of patients with cancer by almost one year. What's more, when one considers that many of these new medicines probably have fewer side effects than older drugs, the quality-adjusted benefit—the idea that time spent in perfect health is worth more to patients and society than time spent in pain—could be even greater. Unfortunately, however, comprehensive data on the quality of life of patients with cancer aren't available.

On the basis of the average cancer drug expenditure per patient from diagnosis until death over the past decade, my analysis shows that the cost of that added year of life—plus any further benefits to people's quality of living—was about \$6,500. Given that surveys have estimated that most Americans would be willing to pay between \$100,000 and \$300,000 to extend their lives by one year<sup>7</sup>—\$6,500 represents a true bargain.

So, even though the Provenches and Avastins of the cancer pharmacy shelf might seem like raw deals, it's worth remembering that these expensive drugs remain outliers in the grand scheme of cancer therapies. What's more, drug prices usually decline steeply after patents expire and the drugs become available as generics, yet the ability of companies to charge high prices for a brief window provides incentive for the pharmaceutical industry to keep the wheels of innovation turning. This system may do a pretty good job of balancing society's need for innovation as well as for access.

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