The rate of growth of health spending remains moderate, but one area where prices appear to be increasing faster than in recent years is brand-name prescription drugs.\(^1\) Many blockbuster drugs lost their patents by 2012 and many people looked forward to a future when we could all get a month’s-long supply of generic drugs for $4. It did not quite work out that way.

**Specialty Drugs.** Over the past few years, specialized drugs for smaller patient populations have been introduced with high nominal prices. In September, EvaluatePharma confirmed the increasing cost of prescription drugs was concentrated in more specialized drugs.\(^2\) Of the top 100 selling drugs in the United States:

- The median revenue per patient of the Top 100 drugs increased from $1,260 in 2010 to $9,400 in 2014, representing a seven-fold increase;
- The median patient population size served by a Top 100 drug in 2014 was 146,000, down from 690,000 in 2010; and
- There were seven treatments priced in excess of $100,000 per patient per year in 2014, versus four in 2010.

Thus, understandably, the health insurance industry is campaigning against the high prices of specialty drugs.\(^3\) For its part, the brand-name pharmaceutical industry emphasizes that health insurers (especially in Obamacare exchanges) often put these specialty drugs on the most expensive tier of their formularies, requiring patients to pay high out-of-pocket costs.\(^4\) While this is an accurate description of the situation, a government policy simply forcing insurers to cover a higher share of the price of a specialty drug does not reduce the price. It just moves it from direct payment by patients to the premiums paid by all of the insured.

**Productivity of Drug Research.** Reducing the prices of specialty drugs requires improving the productivity of research and development (R&D). On that front, the news is sobering. Last December, Deloitte and Thomson Reuters examined newly introduced drugs from the 12 pharmaceutical companies with the largest R&D budgets.\(^5\) They found it cost $1.3 billion to bring one of these new compounds to market. However, the peak sales forecast for each of these drugs declined by 43 percent, dropping from an average of $816 million in 2010 to $466 million in 2013.

The high nominal prices of new drugs do not compensate for the smaller patient populations they target. Deloitte and Thompson Reuters estimate the internal rate of return (IRR) of R&D spending has dropped in half since 2010, from 10.5 percent to 4.8 percent. Sales of new drugs are not overcoming the loss of patents, weak pricing power for older drugs, or the reduced productivity of R&D.
The Crisis in Drug Research and Development

The R&D crisis is highlighted in a new report by the Tufts Center for the Study of Drug Development. ■

- In 2003, the Tufts team estimated the cost to research and develop a new drug was $802 million (in 2000 dollars), or $1.044 billion in 2013 dollars.
- An updated Tufts estimate, using drugs first tested on humans from 1995 through 2007, found it now costs $2.558 billion to develop a new medicine, almost two and a half times the (inflation-adjusted) 2003 estimate.

It appears the Tufts estimate is much larger than the one from Deloitte and Thomson Reuters because the Tufts group looks at costs from the first step of research, before discovery.

This means the cost of abandoned drugs is allocated to successful ones. And an astonishing 8 in 10 were investigatory drugs that were abandoned. Because some of the drugs in the Tufts study are still under development, even more will be abandoned. Writing in Forbes, venture capitalist Bruce Booth confirmed an 8 percent success rate is the consensus of other estimates.

Why such little success? The Tufts authors note, “Clinical approval success rates have declined significantly” since their earlier study.

For those who advocate subjecting the research-based pharmaceutical industry to government audit and regulation of its R&D budgets for each new compound, the Tufts report confirms this would be an impossible task. “The drug discovery and development process typically involves high fixed costs,” says the Tufts report, “meaning that substantial expenditures incurred prior to clinical testing cannot be directly linked to work on specific compounds.”

Cost of Capital. The Tufts report also estimates an average real cost of capital of 10.5 percent over the period. In 2010, it was 9.4 percent. Measured by the return on U.S. Treasury Inflation-Protected Securities, the real interest rate at that time was about 2.8 percent. This implies a real risk premium of about 6.6 percent. If the nominal IRR estimated by Deloitte and Thomson Reuters is only 4.8 percent, the pharmaceutical industry as a whole is clearly not achieving its hurdle rate.

With that said, the Tufts group’s estimates of $2.6 billion to research and develop a new medicine, 2.5 times more than its previous estimate published in 2003, are controversial.

The 2003 estimate also provoked criticism, against which the Tufts group defended itself without qualification. The Tufts group has not substantively changed its method. So, we can expect the same criticisms to be raised against the $2.6 billion figure.

Criticism of Drug Development Cost Estimates. There have been five criticisms of the Tufts group’s estimate:

- Lack of peer review, use

of proprietary data, excluding the value R&D tax benefits, including the cost of capital as a real cost, and the fact that the research-based pharmaceutical industry funds the Tufts group.

First, the new estimate has not yet been published in a peer-reviewed journal, although the 2003 estimate was published in the *Journal of Health Economics*.\(^1\) There is no reason to believe the Tufts group dropped its standards in 2014; and it can still use the new data for an academic article. However, peer-reviewed journals can take a long time to publish an article. The 2003 article was received by the *Journal of Health Economics* over a year before publication. Researchers often release working papers before publication by journals. For example, working papers released by the National Bureau of Economic Research (NBER) frequently have great impact in policy debates, while the associated journal articles are published years later with little impact (except for academic housekeeping).

Second, the Tufts group uses proprietary data provided by research-based drug companies. This would be a sound criticism except that it is also a feature of peer-reviewed articles. Most journal articles are published in Adobe Acrobat format, and contain data that is inaccessible to independent researchers. (It is a sign of the companies’ trust in the Tufts group that they are willing to hand over their data without fear that it will be leaked to their competitors.)

Researchers can use public data to estimate pharmaceutical R&D costs, but this leads to a wide range of estimates. In 2013, *Forbes* senior editor Matthew Herper counted the number of drugs launched by 98 firms over the last decade, and divided that number by each firm’s R&D spending over the same decade. That effort was straightforward and transparent, and resulted in an estimated R&D cost per new drug of $5 billion — twice as much as the Tufts group’s estimate.\(^\text{12}\)

Third, critics note, R&D costs are expensed immediately, not depreciated, and there is a tax credit for orphan drugs. In a 2011 article, critics insisted these tax breaks should whittle down the cost estimate by around 39 percent to 50 percent.\(^\text{13}\) This criticism distracts from the policy question, which concerns the actual dollars spent on R&D. If there were no corporate income tax, it would not really change what R&D contractors or drug company employees charge for their services. To improve R&D productivity, actual costs have to be addressed.

Fourth, some critics dismiss including the cost of capital as a true cost. However, the cost is very real, because investors demand a risk-adjusted return on capital. The Tufts group estimated a real cost of capital of 10.5 percent. Using more recent data, Wayne Winegarden of the Pacific Research Institute noted that the nominal weighted average cost of capital (WACC) for the research-based pharmaceutical industry is 8.33 percent, which is 1.39 percentage points higher than the WACC of 6.94 percent for companies in Standard & Poor’s index of 500 leading stocks.\(^\text{14}\)

This is a true economic cost. The Tufts group’s latest estimate of $2.6 billion includes $1.4 billion of negative cash flow (labeled “out-of-pocket” costs) and $1.2 billion of capital costs. Far from irrelevant, reporting the cost of capital distinct from the cash flow may be the Tufts group’s single most valuable contribution to our understanding of the total cost of R&D. This is because productivity improvements that shorten the R&D cycle can dramatically reduce the capital cost of R&D. This will increase the benefits of competition by reducing the prices of new drugs.

The final criticism, that the Tufts group is funded by the research-based pharmaceutical industry, barely merits response. It is an *ad hominem* argument, often resorted to by critics who cannot successfully defeat the conclusions of the research itself.

Nobody kicks a dead dog. The Tufts group’s research attracts such heightened criticism because it conclusively demonstrates that prescription drug prices and costs can only come down by dramatically increasing R&D productivity, not by railing against the pharmaceutical industry’s “greed.”

**Conclusion.** The body of evidence indicates a productivity crisis in R&D that demands attention. U.S. Representative Fred Upton, Chair of the House Energy & Commerce Committee, has launched a bipartisan initiative for “21st Century Cures” that is examining the entire regulatory process governing the research enterprise.\(^\text{15}\) It is a necessary and welcome step in the right direction.

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Notes


