

nature biotechnology

An unusual business

And the 2015 Nobel Prize for Pharmacoeconomics goes to.... Martin Shkreli

When Martin Shkreli, the CEO of Turing Pharmaceuticals, announced he was jacking up the price of a 62-year-old antiparasitic drug from \$13.50 to \$750 a pill, few were rushing to his side to congratulate him on his amazing business acumen. Instead, disdain heaped on him from all quarters: drug industry CEOs, US presidential wannabees, social media commentators, column writers and editorialists—all have painted Shkreli as the worst type of robber drug baron. According to one overzealous voice, he has ‘officially’ become the most hated person in America.

Back in February, Shkreli founded Turing around drug/delivery assets from his controversial former corporate alma mater, Retrophin. In August, he raised \$90 million in private funding and bought exclusive rights to market a drug called Daraprim from Impax Laboratories for \$55 million. That made Turing the sole supplier in the United States of the only US Food and Drug Administration (FDA)-approved (and, therefore, reimbursable) treatment for toxoplasmosis.

Impax itself acquired the US rights only in April when it paid \$700 million to buy the private-equity-backed company, Tower Holdings. Tower acquired those rights from GlaxoSmithKline in 2010 through a portfolio company Amedra Pharmaceuticals. GlaxoSmithKline was the drug’s original developer, back in the 1950s before either Glaxo or SmithKline had any connections with a company called Wellcome Laboratories. Three decades before Nobel-prize winning artemisinin came along to combat malaria, pyrimethamine was a key drug in fighting the disease.

What kicked off the social media storm was not only Shkreli’s decision to increase the price 55-fold, but also his deliberately brash defense that invoked “normal industry practices” and the R&D imperative. Certainly, Shkreli’s bratish persona and history as a hedge fund manager helped fuel the criticism. He was labeled as a pharma outsider, bringing the industry into disrepute.

What then transpired was the unusual sight of industry lobby organizations Biotechnology Industry Organization and Pharmaceutical Research and Manufacturers of America both distancing themselves from Turing and Shkreli. Biogen CEO George Scangos chimed in saying that Shkreli had “dropped down a storm” on an undeserving industry. Novartis’s Joe Jimenez noted that companies like Turing were “taking advantage of inflated biotech valuations.” The real muck hit the media fan, however, on September 21 when US presidential hopefuls Hillary Clinton, Donald Trump and Bernie Sanders weighed in, contributions that somehow made the prospect of reform to pharmaceutical pricing more real.

A week later, many more people had reason to dislike Martin Shkreli. The NASDAQ Biotech Index dropped over 18% between September 18 and September 28 as the Sunday papers translated Turing’s move into the need for wholesale ‘drug pricing’ reform. The share values of many individual companies fared much worse: 30–40% falls were not uncommon, especially for firms with no marketed products.

So much for facts; now for the conjecture.

Turing has a US market monopoly on Daraprim because in the 2000s Hoffman-La Roche discontinued production of the only competing drug,

Fansidar. Outside of the United States, there is no ‘shortage’ of pyrimethamine (generic Daraprim); the drug is produced for pennies by companies like Ipca laboratories in Mumbai and Guilin Pharmaceutical in Shanghai, and it is widely used in global antimalaria and antitoxoplasmosis programs. These generic companies do not serve the US market simply because the cost of entering it is prohibitive; the requirements of the Generic Drug User Fee Act of 2012 mean that any company entering the market must pay \$400,000 just for the FDA to look at their filing. They would also need to stump up the additional cost of generating data for the submission.

Second, Turing will not make a sackful of money from Daraprim. Even if Daraprim could obtain its sticker price of \$750, Turing’s new 2015 price would raise ~\$800 million in annual sales. In reality, though, Turing would be lucky to sell any drug at that price point. Negotiations with payers on drug prices always take place behind closed doors, and any reimbursement on Daraprim would be heavily discounted compared with the advertised price. Shkreli himself claims that half of the US patients get the drug for a dollar.

Third, and perhaps most importantly, what has not been said is that Daraprim will still be available at \$7 a pill from the above non-US manufacturers through online pharmacies. Health insurance restrictions might make reimbursement difficult: but only in a truly mad world would health insurers sign off \$100,000 per patient for Turing’s version of a 60-year-old drug rather than \$700–1,300 for the same formulation made in Europe, China or India.

So if the drug is available cheaper from online pharmacies, what is all the fuss about?

One theory is that this had less to do with drug pricing than with stocks. As a former hedge fund manager, Shkreli had much to gain from shorting inflated biotech stocks before contriving a mechanism to not only increase the moral indignation around drug pricing but also give him some element of control over the timing of events. But that is just conjecture.

The larger picture is that as the US election progresses, we will likely continue to see more spats about drug pricing. Organizations like the American Society for Clinical Oncology and the Institute for Clinical and Economic Review will continue to push for changes in drug pricing practices. And those in industry will continue to stress the need to maintain the status quo.

This journal recognizes the right of brand manufacturers to obtain a high price/return on the investment they make in bringing innovative drugs to market. But premium prices are justifiable only for R&D-intensive, first-in-class experimental therapies. And many of the same companies that are discovering and developing innovative drugs also are gouging the market, hiking up prices 400% to 500%, year after year, on old drugs, particularly off-patent biologics (*Nat. Biotechnol.* **31**, 467, 2013). This is the drug industry’s dirty little secret. Shkreli’s crime was attracting the spotlight to the shadows.