Statement before the Judiciary Committee

Subcommittee on Courts and Competition

On Biologics and Biosimilars: Balancing Incentives for Innovation

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The views expressed in this testimony are those of the author alone and do not necessarily represent those of the American Enterprise Institute.

Chairman Johnson, Ranking Member Coble and other Members of the Committee:

Thank you for the opportunity to appear before the Committee today to testify on an important matter currently before Congress, creating a pathway to allow for more competition within the biologic drug sector. My name is Alex Brill and I am a research fellow at the American Enterprise Institute (AEI).[1] My testimony will address 4 topics:

1. The size, scope and importance of the biologic drug industry;
2. A framework for understanding the likely market dynamics for biogeneric competition;
3. An economic model for understanding the appropriate amount of exclusivity to provide innovator biologic drugs;
4. Views on proper data exclusivity, tiered exclusivity schemes and the negative consequences from granting "too much" exclusivity

To avoid the building of any undue suspense, I will begin with my conclusion. Biologic drugs offer great promise for improving outcomes in healthcare. While they are costly, time consuming and risky products to develop, they offer some of the best hopes for treating some of the nation's most deadly and debilitating diseases.

A properly designed pathway for biogeneric entry will, over time, lead to additional market entrants, lower prices, increased access to drugs and a few billion dollars a year in reduced spending. The largest single purchaser of biologic drugs is the federal government and a large share of total savings will be taxpayer dollars.

It is important to ensure adequate incentives for innovative drug companies to undertake the risk and expense of developing new drugs and a market exclusivity period can be a well

[1] The opinions expressed in this testimony are solely mine and do not necessarily represent AEI, or any other individuals or organizations.

designed tool for that purpose. Excessive exclusivity that needlessly blocks competition is a government built monopoly that unduly interferes in the marketplace.

The Market for Biologic Drugs

Biologic drugs are large, complex molecules derived from living organisms.[2] Recently, U.S. sales of biologic drugs exceed $40 billion annually[3] and global sales were over $112 billion[4]. Sales are concentrated among a few blockbuster products as just 27 biologic products represent approximately 87 percent of total biologic drug sales.[5] While a biologic drug may compete with other brand biologic products, there is currently no expedited process by which a biogeneric product could enter the U.S. market.[6]

Biologic drugs contains the promise to fight some of our most dangerous diseases, including anemia, hemophilia, cancer, diabetes, HIV, rheumatoid arthritis and thrombosis. Top selling biologics include Avastin and Herceptin (cancer); Enbrel, Remicade, and Humira (arthritis); and Epogen and Procit (anemia). However, biologic drug development is a costly process, with an expected development expense of about $1.2 billion for an approved product[7]. Similarly, the cost of purchasing a biologic drug is also often very expensive and annual treatment costs frequently are tens of thousands of dollars.

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[2] According to Department of Health and Human Services, a biologic drug is defined as follows: "A biological product subject to licensure under the Public Health Service Act is any virus, therapeutic serum, toxin, antitoxin, vaccine, blood, blood component or derivative, allergenic product, or analogous product, applicable to the prevention, treatment or cure of diseases or injuries to humans. Biological products include, but are not limited to, bacterial and viral vaccines, human blood and plasma and their derivatives, and certain products produced by biotechnology, such as interferons and erythropoietins." See: "What is a Biologic?" at http://www.hhs.gov/faq/drug/drugs/414.html (accessed July 12, 2009).

[3] Federal Trade Commission, "Emerging Health Care Issues: follow-on biologic drug competition," FTC Report, June 2009, p. 3.

[4] FTC 2009, p. 4.

[5] Ibid.

[6] A pathway for biosimilars does exist in other markets including the EU.

[7] "Average Cost to Develop a New Biotechnology Product is $1.2 billion." Tufts Center for the Study of Drug Development, Recent News, November 9, 2006. [http://csdd.tufts.edu/NewsEvents/NewsArticle.asp?newsid=69]

The Market Dynamic for Competition in Biologics

As noted above, an approved biologic drug in the U.S. market currently faces no direct competition. But, brand biologic drugs may compete with other brand drug products or other treatment modalities. In general, however, brand biologic drugs enjoy strong monopoly pricing power.

While many experts who have discussed the expected market dynamic for biogeneric competition make reference to the market development in small-molecule drugs that emerged after enactment of Hatch-Waxman legislation, it is important to understand critical differences between traditional pharmaceutical and biologic drug markets. Because of the cost, uncertainty and complexity in biologic drugs (both for discovery and manufacturing), a competitive biologic drug market will be very different than a competitive small-molecule market.

While competition results in price declines of up to 80 percent[8] and over 10 new entrants[9] for a popular small molecule drug, biologic drug competition can be expected to be quite different.

As described in the recently released FTC report, *Emerging Health Issues: Follow-on Biologic Drug Competition*, "Competition from FOB drug entry is likely to resemble brand-to-brand competition rather than generic drug competition…Branded manufacturers are likely to continue to reap profits after FOB entry."[10]

As the FTC reports, high barriers to entry, will limit the number of generic competitors to only a few and only among relatively large markets. The result, FTC estimates, will be price

[8] Federal Trade Commission, "Prepared Statement," United States Senate, Committee on the Judiciary, Hearing on: Anticompetitive Patent Settlements in the Pharmaceutical Industry: the benefits of a legislative solution, January 17, 2007, p. 8. [http://www.ftc.gov/speeches/leibowitz/070117anticompetitivepatentsettlements_senate.pdf]

[9] David Reiffen and Michael R. Ward, "Generic Drug Industry Dynamics," Review of Economics and Statistics 87 (1), 37-49.

[10] FTC 2009, pp. 13-14.

declines of 10 to 30 percent. The Congressional Budget Office estimates that follow-on prices will decline as much as 40 percent compared with branded prices.[11] These more modest price effects (on a percent basis) relative to small molecule drugs means that the need for additional market protection for biologic drugs facing competition is weaker, as innovator drug companies will continue to be able to profit from their innovations after a follow-on competitor has entered the market.

Protecting Innovators from Competition

Determining the optimal length of market protection is a crucially important regulatory problem. Too little market protection has the potential to make drug companies unwilling to take costly risks to develop life-saving drugs, while too much allows branded drugs the opportunity to obtain excessive monopoly rents, driving up prices for patients in need and healthcare costs to the U.S. government.

As University of California, Berkeley economist, Professor Richard Gilbert, and his co-author Alan Weinschel note, "[I]nnovators need to be compensated for their innovative efforts, and this sometimes requires practices that may exclude potential competitors. At the same time, one must be careful not to lean too heavily on practices that focus on rewards to innovation, because these practices incur costs in the short run by limiting the use of innovations and possibly in the long run by raising the costs for future innovators who use protected innovations as inputs into their own innovative efforts."[12]

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[11] Congressional Budget Office. S. 1695: Biologics Price Competition and Innovation Act of 2007. Congressional Budget Office Cost Estimate. June 25, 2008. [http://www.cbo.gov/ftpdocs/94xx/doc9496/s1695.pdf]

[12] Richard J. Gilbert and Alan J. Weinschel, "Competition Policy for Intellectual Property: balancing competition and reward," University of California at Berkeley Working Paper, September 2007. [http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1078&context=iber/cpc]

Before entering into a specific discussion on the balance of promoting innovation and promoting competition in the biologic drug market, I would like to describe the right way to think about the problem of market protection, more generally. A common refrain in the debate over an exclusivity period is the concern over being able to "free ride" on the innovator's data.

However, I want to stress that free-ridership is certainly not always a problem. A follow-on product -- in any industry -- takes advantage of the research and development of their predecessors, and we don't always identify this "free-riding" as problematic. It is through this process that products are improved upon and refined, in the end making everyone better off. A 2003 report by the Federal Trade Commission notes, titled *To Promote Innovation: The Proper Balance of Competition and Patent Law Policy* notes, "[I]n the real world, innovation is an ongoing process, with one invention frequently providing a building block for the next."[13]

When a person shares a ride home with a neighbor, they are (literally) free riding. The alternative would be that each person drive themselves separately, thereby consuming twice as much gasoline. Free riding is only a problem when, due to the potential lessened profits of the originator product caused by expected competition from a follow-on product, the originator product itself is expected to be unprofitable. We typically combat this problem through the patent system, which is intended itself to create the incentives to innovate by granting exclusive rights for a limited time.

Pharmaceutical R&D and Market Dynamics

The Hatch-Waxman legislation grants innovator, small molecule drugs an exclusivity period beyond the protection granted by the patent system to give innovators greater confidence

[13] Federal Trade Commission, "To Promote Innovation: the proper balance of competition and patent law and policy," FTC Report, October 2003, p. 32. [http://www.ftc.gov/os/2003/10/innovationrpt.pdf]

that they would have sufficient time to generate the necessary rents to recoup the cost of R&D. This additional protection was deemed necessary due to the particular dynamics of the small molecule drug industry. First, once generic competitors enter the market, the price of the originator drops so much that profit, measured as the price of the drug less the combined costs of all inputs, including the opportunity cost of money, drops to near zero. Second, the strength of the patent protection may be insufficient. Therefore, without adequate market protection allowing originator drugs to recoup their R&D costs before competition enters the market, drug companies would refuse to undertake the costly R&D required to develop these innovative drugs.

The FTC argues that biologic drug patents are, collectively, stronger than small molecule drug patents, making the need for additional protection unnecessary. Therefore, in the eyes of the FTC report, neither of the problems inherent to small molecule drug patents apply to biologic drugs, and they advocate no additional protection beyond that given by the patent system, i.e., no data exclusivity.

Furthermore, Georgetown Law professor John Thomas' research supports the FTC's conclusions on the strength of biologic drug patents. Based both on historical experience and legal theory, Thomas notes that "marketing exclusivities should be granted only in circumstances where the patent system, under its own terms, cannot protect activities that promote public health," and concludes: "The proposition that patent protection is inferior with respect to biologics has not been demonstrated."[14]

Economic model for estimating exclusivity

I do not take as strong a stand against an exclusivity period as the FTC. There is an immense importance to sufficiently encouraging healthcare innovation and the costs of

[14] John R. Thomas, "Toward a Theory of Marketing Exclusivities," mimeo, pp. 31-33.

providing modest additional intellectual property rights to drug originators will likely outweigh the potential costs (i.e. patents that otherwise would have been successfully challenged remaining valid because of the additional protection provided by data exclusivity). However, the consequence of a long period of exclusivity, one in excess of the time necessary to ensure the innovator undertakes the investment, will be costly to the consumer both in terms of higher costs and limited access.

The empirical modeling framework for determining proper duration of exclusivity was first established by Professor Henry Grabowski at Duke University (the "Nature model")[15]. The principle for the model is rather straight forward. A "break-even analysis" is conducted that subtracts the cumulative value of the expected cost of developing an approved biologic drug from the expected sales net of cost of production. The point in time at which this calculation becomes positive is the "break-even point." (Note however, that among the costs accounted for in this analysis is the expected debt and equity costs of obtaining funds from investors.)

Research I conducted last year extended this break-even analysis by introducing an exclusivity period and assuming a profit function for the innovator product post-biogeneric entry that is consistent with the CBO assumptions in their cost estimate of S. 1695. That research demonstrated that an exclusivity period of seven years is sufficient to ensure that innovator drug companies continue to earn economic rents. Modeling included in the recent FTC Report further extends the model to incorporate a total market share dynamic, namely an estimate of how much

[15] Henry G. Grabowski, Follow-on biologics: data exclusivity and the balance between innovation and competition. *Nature Reviews Drug Discovery*. Advance Online Publication, May 12, 2008. [http://fds.duke.edu/db?attachment-25--1301-view-503]

the total market will increase as prices decline.[16] As a result, the FTC model finds further support for the view that seven years of market exclusivity will be sufficient.[17] Furthermore, the Administration's FY 2010 Budget advocates a seven year exclusivity period as well. [18]

I believe that proposals that establish a long period of market protection lead to unreasonably large rents for originator drug companies and provide no additional benefit to consumers. Ultimately, it is a balancing act, promoting innovation by shielding a company from market competitors and promoting innovation and price competition by allowing market entrants.

Tiered Exclusivity and Drug Improvements

Yet, as these proposals have become more complex, another important issue has come to the fore, that of tiered exclusivity. Frequently, drug developers make innovations to their drugs after the drug has entered the market. This post-launch R&D involves cost (albeit far less than the original cost of approval) and should be encouraged, since it only stands to reason that a drug's original developer has the best knowledge of their own invention.

However, when thinking about the optimal amount of protection to give to an "improvement" to an existing drugs, we once again return to the basic question of the particular market dynamics among biologic drugs. Because it is reasonable to expect that biogeneric competition will be limited in scope (i.e. more similar to brand-to-brand competition) one would

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[16] Brill 2008 conservatively assumes the market size is held constant; Alex M. Brill, Proper Duration of Data Exclusivity for Generic Biologics: A Critique, Matrix Global Advisors, LLC, White Paper, 2008.

[17] Specifically, the FTC notes, "[Our] results are much different than in previous versions of the Nature model. For example, Grabowski concludes that 'notably, with an exclusivity period of 7 years, the *only* combination of assumptions that yields a breakeven point of less than 50 years is the one used by Brill.' On the contrary, with an exclusivity period of seven years, there is only one set of assumptions... that does not result in the branded manufacturer breaking-even" (A-14).

[18] Nancy-Ann DeParle and Peter Orzsag, "Response to Chairman Waxman's Letter Regarding Biologics," June 24, 2009. [http://energycommerce.house.gov/Press_111/20090625/biologicsresponse.pdf]

expect that the innovator biologic drug would be earning an economic profit. An "improvement" that enlarges market share (e.g. a new indication) would increase profits further and an improvement such as a new dose or delivery mechanism would similarly attract new customers.

If the additional profits earned by an improvement are not sufficient to induce additional research, one way to correct for this would be to provide additional market protection. However, there are important principles that must be followed in order to provide the correct incentives: (1) The additional exclusivity period should be very limited in duration, perhaps 180 days to a year, as the R&D costs of a new indication are substantially less and the improvement will likely be at least partially protected by the existing exclusivity; (2) it should be granted for the entire product in order to avoid "gaming opportunities" such as off-label use; (3) it should be added to the end of the existing data exclusivity period; (4) the number of times it can be awarded should not be limited; and (5) it must only be granted for truly novel and substantial improvements; a high bar should be set.

However, that I advocate for additional exclusivity for novel and substantial improvements does not mean that I am arguing that the optimal period of exclusivity is seven years for a new approval and then an additional protection period for each improvement. If it is the case that a biologic drug can be expected make at least one new improvement, then the proper amount of exclusivity for the original novel drug would be less than seven years. The greater the period of exclusivity that is expected to be attached to drug improvements, the shorter the period that needs to be given to newly approved drugs.[19]

Conclusion

[19] To the extent that the likelihood of a substantial improvement is uncertain or that the number of improvements is uncertain, it would be better to be cautious in reducing the duration of the initial exclusivity period for the first approval of a new biologic.

Policymakers constantly face challenges in seeking the balance between innovation and competition. As former Federal Reserve Board Vice Chairman Roger W. Ferguson noted, "Throughout history, economic growth and an increasing standard of living have been driven by an economy's capacity for invention and innovation...The task for public policy...is to strike the right balance--to encourage innovation and rapid adoption of new products and processes while limiting the damage from granting monopoly power."[20]

Establishing a pathway for biogeneric competition is an important but challenging task facing lawmakers today. A number of elements of this legislation will affect the balance between innovation and competition. Market exclusivity, while critical, is only one among them. Ultimately, it is the set of policy decisions that will determine the degree to which competition is promoted, innovation protected and savings accrued. A short exclusivity period, robust patent protection and an efficient approval pathway are all necessary components.

[20] Roger W. Ferguson, Jr., "Remarks," Financial Market Conference of the Federal Reserve Bank of Atlanta, Sea Island, Georgia, April 5, 2003. [http://www.federalreserve.gov/boarddocs/speeches/2003/20030407/default.htm]